60459300

CONTROL DATA CORPORATION

NOS VERSION 2 SYSTEM MAINTENANCE REFERENCE MANUAL

CDC® COMPUTER SYSTEMS:
CYBER 170
CYBER 70
MODELS 71, 72, 73, 74
6000

COMMANDS

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REVISION RECORD

REVISION	DESCRIPTION
A	Manual released at NOS 2.0, PSR level 562. NOS Version 2 is the successor product to NOS Version
(04-26-82)	1. The file name table reorganization and support of models 825, 835, and 855 is documented. In
	addition, parameter changes and enhancements are included for the permanent file utilities, queue
	file utilities, mass storage subsystem utilities, data gathering utilities, memory dump directives,
	and system accounting information. The ASTIM, NSTIM, and VALNET commands have been deleted and a
	glossary has been added.
B	Manual released at NOS 2.1, PSR level 580. New features include support of the Remote Host
(01-27-83)	Facility, Remote Diagnostic Facility, Multi Host, and models 815, 865, and 875. Section 4 has been
	revised to include the NAMI and COLLECT utilities. Also the LFG and NDA utility descriptions have
	been revised and the Network Products Stimulator and NETUVSN utility have been deleted. New CMR
	dump directives have been added to section 10. The Controlware Loading Utility described in section
	14 has been expanded and rewritten. Section 16 has been added to describe the new RHF utilities.
	New diagnostic messages and glossary terms have also been added. Due to extensive changes, change
	bars and dots are not used, and all pages reflect the latest revision level. This edition obsoletes
	all previous editions.
C	Manual released at NOS 2.2, PSR level 596. New features include support of project prologues and
(10-11-83)	epilogues, enhanced system security, service class assignment by users, expanded equipment status
	table, reformatted TRACER output, network enhancements, and support of model 845. Also the K
	displays have been revised for permanent file utilities, queue file utilities, MODVAL, and PROFILE.
	Due to extensive changes, change bars and dots are not used, and all pages reflect the latest
	revision level. This edition obsoletes all previous editions.
Publication No. 60459300	

REVISION LETTERS I, O, Q, S, X AND Z ARE NOT USED.

Address comments concerning this manual to:
Control Data Corporation
Publications and Graphics Division
4201 North Lexington Avenue
St. Paul, Minnesota 55112

or use Comment Sheet in the back of this manual.

LIST OF EFFECTIVE PAGES

New features, as well as changes, deletions, and additions to information in this manual, are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

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PREFACE

PURPOSE

This manual describes the Network Operating System (NOS) Version 2. NOS controls the operation of CONTROL DATA® CYBER 170 Computer Systems; CDC® CYBER 70 Computer Systems, Models 71, 72, 73, and 74; and CDC 6000 Computer Systems.

AUDIENCE

This manual contains information required by the site analyst or administrator to perform the day-to-day maintenance activities required in a normal production environment of NOS.

CONVENTIONS

The term CYBER 70 Computer Systems is used to refer to models 71, 72, 73, and 74 only.

Extended memory for model 176 is large central memory extended (LCME). Extended memory for models 815, 825, 835, 845, 855, 865, and 875 is unified extended memory (UEM). Extended memory for models 865 and 875 may also include either extended core storage (ECS) or extended semiconductor memory (ESM). Extended memory for all other NOS computer systems is either ECS or ESM. ECS and ESM are the only forms of extended memory that can be shared in an ECS multimainframe complex and can be accessed by a distributive data path (DDP).

In this manual, ECS refers to both ECS and ESM, and extended memory refers to all forms of extended memory unless otherwise noted. However, when referencing extended memory in the context of an ECS multimainframe complex or DDP access, UEM and LCME are excluded.

Programming information for the various forms of extended memory can be found in the COMPASS Reference Manual and in the appropriate computer system hardware reference manual. Hardware descriptions of the various forms of extended memory can be found in the following manuals.

Control Data Publication	Publication Number
Extended Semiconductor Memory Hardware Reference Manual	60455990
Extended Core Storage Reference Manual	60347100
Extended Core Storage II and Distributive Data Path Reference Manual	60430000

All batch jobs in this manual have the following form:

```
ujn.
USER,username,password,familyname.
CHARGE,*.
    .
    .
    .
```

At all sites, a user job name (UJN) must be specified on a Job command and a user name, password, and family must be specified on a USER command. The CHARGE command is not required at all sites. However, the execution of the system and user prologues depends on the presence of a CHARGE command in batch jobs. Although each site may not use the CHARGE command for accounting purposes, each batch job example contains a CHARGE command to promote including it in each batch job.

RELATED PUBLICATIONS

The following is a list of NOS operating system manuals and NOS product set reference manuals.

The NOS Manual Abstracts is a pocket-sized manual containing brief descriptions of the contents and intended audience of all NOS and NOS product manuals. The abstracts can be useful in determining which manuals are of greatest interest to a particular user.

Control Data also publishes a Software Publications Release History of all software manuals and revision packets it has issued. This history report lists the revision level of a particular manual that corresponds to the level of software installed at the site. These manuals are available through Control Data sales offices or Control Data Literature Distribution Services (308 North Dale, St. Paul, Minnesota 55103).

The reader should be thoroughly familiar with the material in the following publications.

Control Data Publication	Publication Number
NOS Version 2 Operator/Analyst Handbook	60459310
NOS Version 2 Reference Set, Volume 2 Guide to System Usage	60459670
NOS Version 2 Reference Set, Volume 3 System Commands	60459680

The following publications provide additional information about NOS and its product set that may be useful to the reader.

Control Data Publication	Publication Number
COMPASS Version 3 Reference Manual	60492600
CYBER Cross System Version 1 Build Utilities Reference Manual	60471200
CYBER Loader Version 1 Reference Manual	60429800
CYBER Record Manager Advanced Access Methods Version 2 Reference Manual	60499300
CYBER Record Manager Basic Access Methods Version 1.5 Reference Manual	60495700
CYBER 70 Model 71 Computer System Hardware Reference Manual	60453300
CYBER 70 Model 72 Computer System Hardware Reference Manual	60347000

Control Data Publication	Publication Number
CYBER 70 Model 73 Computer System Hardware Reference Manual	60347200
CYBER 70 Model 74 Computer System Hardware Reference Manual	60347400
CYBER 170 Computer Systems Models 171 through 175 and 176 (Level A) Hardware Reference Manual	60420000
CYBER 170 Computer Systems Models 720, 730, 750, 760, and 176 (Level B) Hardware Reference Manual	60456100
CYBER 170 Computer Systems Model 825 Hardware Reference Manual	60469350
CYBER 170 Computer Systems Models 835, 845, and 855 Hardware Reference Manual	60469290
CYBER 170 Computer Systems Models 865 and 875 Hardware Reference Manual	60458920
FORTRAN Extended Version 4 Reference Manual	60497800
FORTRAN Version 5 Reference Manual	60481300
Message Control System Version 1 Reference Manual	60480300
Modify Version 1 Instant	60450200
Modify Version 1 Reference Manual	60450100
Network Products Network Access Method Version 1 Network Definition Language Reference Manual	60480000
Network Products Network Access Method Version 1/Communications Control Program Version 3 Host Application Programming Reference Manual	60499500
Network Products Network Access Method Version 1/Communications Control Program Version 3 Terminal Interfaces Reference Manual	60480600
Network Products Remote Batch Facility Version 1 Reference Manual	60499600
Network Terminal User's Instant	60459380
NOS Full Screen Editor User's Guide	60460420
NOS Screen Formatting Reference Manual	60460430
NOS Version 2 Applications Programmer's Instant	60459360
NOS Version 2 Diagnostic Index	60459390
NOS Version 2 Installation Handbook	60459320
NOS Version 2 Manual Abstracts	60485500

Control Data Publication	Publication Number
NOS Version 2 Reference Set, Volume 1 Introduction to Interactive Usage	60459660
NOS Version 2 Reference Set, Volume 4 Program Interface	60459690
NOS Version 2 Security Administrator's Handbook	60460410
NOS Version 2 System Overview	60459270
NOS Version 2 Systems Programmer's Instant	60459370
Remote Host Facility Access Method Reference Manual	60459990
Software Publications Release History	60481000
TAF Version 1 Reference Manual	60459500
TAF Version 1 User's Guide	60459520
TAF/CRM Data Manager Version 1 Reference Manual	60459510
Text Editor Reference Manual	60436100
Update 1 Reference Manual	60449900

DISCLAIMER

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APPENDIXES

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FIGURES

TABLES

PERMANENT FILE UTILITIES 1

Five utility processors maintain the NOS permanent file system. They control the dumping and loading of permanent files, the cataloging of permanent files in the system and on backup storage (archive) files, and the copying of archived files to a job as local files.

The utility processors are overlays under the control of the permanent file supervisor (PFS). PFS processes the parameters in the utility command and loads the correct processing overlay. The overlays interact with the permanent file utility routine PFU, which manages the catalogs, permits, data allocation on a device, and the data transfer between the device and the overlay. Figure 1-1 is an overview of this procedure.

The names and functions of the permanent file utilities follow. Detailed information about the call and operation of each utility is contained in the following sections.

Utility	Description
PFATC	Produces a cataloged directory of file information derived from an archive file.
PFCAT	Produces a cataloged directory of file information derived from catalog tracks on a permanent file device.
PFCOPY	Copies files from an archive file to a job as local files.
PFDUMP	Dumps files from a permanent file device to an archive file. Files created by this dump can be reloaded by the PFLOAD utility.
PFLOAD	Loads files from an archive file (created by PFDUMP) to a permanent file device.

DEFINITIONS

The descriptions of the permanent file utilities require some familiarity with the terms whose definitions follow.

ARCHIVE FILE (TAPE)

The permanent files accumulated on mass storage can be dumped as a whole or in part to a backup tape (or other type of backup medium) to protect the files from loss in case of a device malfunction or to free a device for temporary use during preventive maintenance. Each dump of permanent files is made to a file called an archive file; each permanent file dumped is called an archived file. Each archive file is a multirecord file in which each logical record is an archived file. If two or more dumps are made on one type of backup device, these archive files constitute a multifile archive file (refer to figure 1-2).

The archive file can be loaded back onto the permanent file system as a whole or in part and can also be used to generate reports. The individual archived files can be referenced for selective use. Refer to each utility for more information on how it uses the archive file.

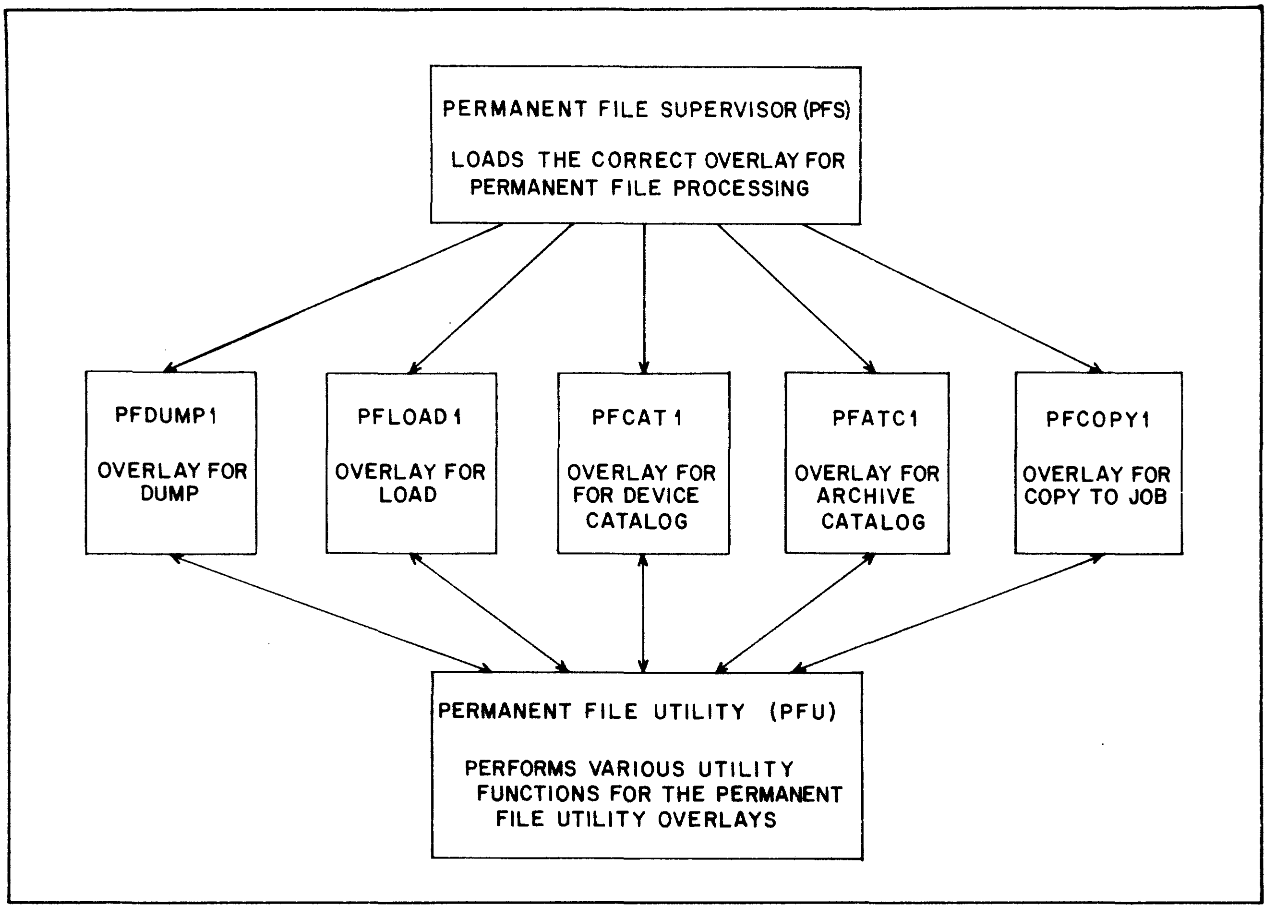


Figure 1-1. Functional Overview of the Permanent File Utility Overlays

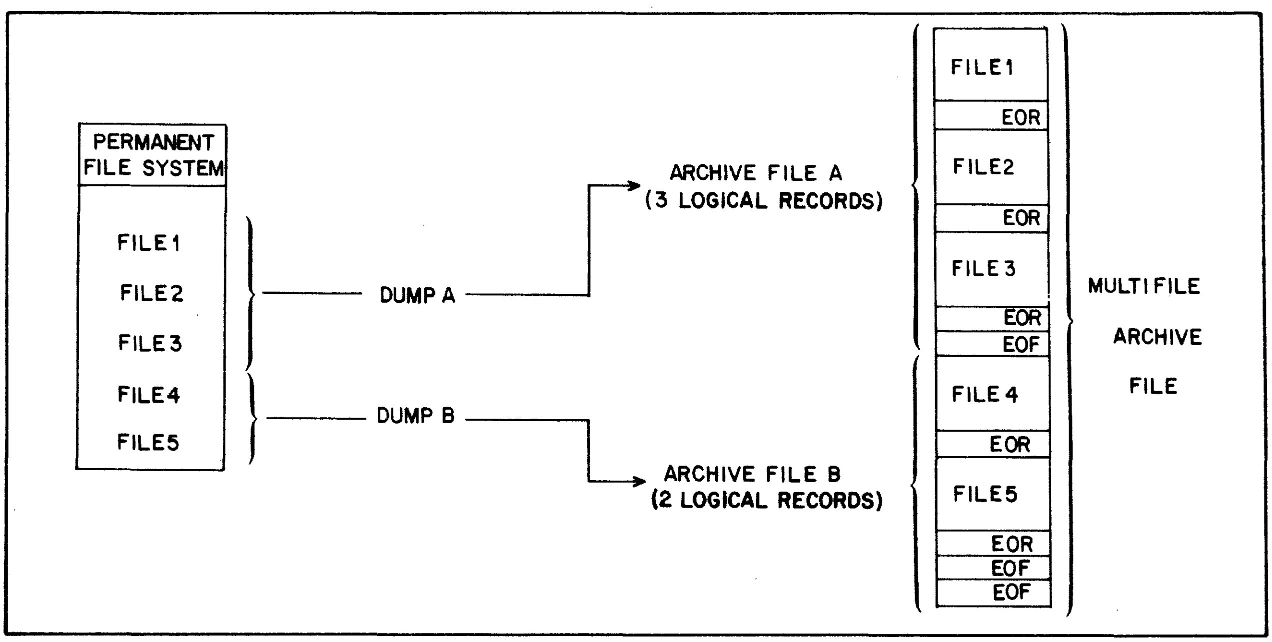


Figure 1-2. Example of Multifile Archive File Structure

USER INDEX

A 17-bit user index is associated with each user name created on the user validation file. This index is entered through MODVAL (refer to User Validation in section 5) with the UI identifier on the user name input directive (/username,UI=userindex) or MODVAL, by default, supplies the next available index.

Whenever a user submits a job, the related user index is placed in the control point area along with the user name and other parameters that link hardware, files, and job. The permanent file manager (PFM) identifies the master device and catalog track for this user by performing two masking operations which involve the user index and two sets of device parameters (device mask and number of catalog tracks) obtained from the mass storage table in central memory resident (CMR). One operation correlates the rightmost octal digit in the user index (bits 0 through 2) with the bit settings of the device mask for each device in the configuration to determine which device is the user's master device (refer to the device mask definition). The other operation performs a logical AND between the remaining portion of the index and the number of catalog tracks on the master device to determine which track contains the user's catalog (refer to the catalog track definition).

The lower 3 bits (rightmost octal digit) of the user index are used to group users together into subfamilies. Each permanent file family (refer to the definition of family later in this section) consists of eight subfamilies, subfamily 0 through subfamily 7. Any user whose index ends in 0 belongs to subfamily 0, any user whose index ends in 1 belongs to subfamily 1, and so forth. The concept of subfamily is important in a Mass Storage Subsystem (MSS) environment. Refer to section 3 for more information.

DEVICE MASKS

Two types of device masks exist for each device, the device mask (or primary mask) and the secondary mask.

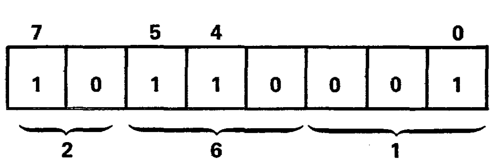
Device Mask

The device mask is an 8-bit quantity used to identify the group of users who have the particular device as their master device; that is, it identifies the device that contains their file catalogs, all their indirect access files, and possibly some or all of their direct access files. (The assigning of direct access files to a device is described in the section on secondary masks.)

If bit i is set in the mask of the device, any user whose index ends in i has this device as a master device.

Example:

The device identified by the mask 261_8 is the master device for any user whose index ends in 0, 4, 5, or 7, because these bits are set in the mask.



When masks are assigned at device initialization time, the following rules must be observed.

- Within a family the sum of all the device masks must be exactly 377_8.
- Each bit position (0 through 7) must be set exactly once for the masks of the devices in one family.

Example:

For a family of three devices, 221_8, 042_8, and 114_8 are valid device masks because their sum is 377_8 and each bit is accounted for only once.

```
1 0  0 1 0  0 0 1 = 221₈
0 0  1 0 0  0 1 0 = 042₈
0 1  0 0 1  1 0 0 = 114₈
-----------------   ----
1 1  1 1 1  1 1 1 = 377₈
```

If the sum of the device masks is less than 377_8, then at least 1 bit is not set in any of the device masks. Any user index ending in such a bit-position value does not reference a device. Therefore, if such a user tries to create a permanent file, the system issues an error message.

Example:

For a family of four devices, 142_8, 020_8, 010_8, and 204_8 are not valid device masks because their sum is less than 377_8. Any user whose index ends in 0 would have no master device and could not create a permanent file.

```
0 1  1 0 0  0 1 0 = 142₈
0 0  0 1 0  0 0 0 = 020₈
0 0  0 0 1  0 0 0 = 010₈
1 0  0 0 0  1 0 0 = 204₈
-----------------   ----
1 1  1 1 1  1 1 0 = 376₈
```

If the sum of the device masks is greater than 377_8, then at least 1 bit is set for more than one device mask. Any user index ending in such a bit-position value references more than one master device.

Example:

For a family of four devices, 212_8, 106_8, 040_8, and 021_8 are not valid device masks because their sum is greater than 377_8. Bit 1 is set twice, which indicates that any user whose index ends in 1 would have two master devices, one with mask 212_8 and one with mask 106_8.

$$
\begin{array}{llll}
1\ 0 & 0\ 0\ 1 & 0\ 1\ 0 & = 212_8 \\
0\ 1 & 0\ 0\ 0 & 1\ 1\ 0 & = 106_8 \\
0\ 0 & 1\ 0\ 0 & 0\ 0\ 0 & = 040_8 \\
0\ 0 & 0\ 1\ 0 & 0\ 0\ 1 & = 021_8 \\
\hline
1\ 1 & 1\ 1\ 1 & 1\ 1\ 1 & \ 401_8 \\
 & & \ 1 &
\end{array}
$$

It is a necessary but not sufficient condition that all masks for one family total 377_8. It is possible, but illegal, that in one family the device masks sum to 377_8 but that some bit is set in more than one device mask.

Example:

For a family of three devices, 261_8, 115_8, and 001_8 are not valid device masks because bit 0 is accounted for three times and bit 1 is not set at all. Any user whose index ends in 0 would have three master devices. Any user whose index ends in 1 would have no master device.

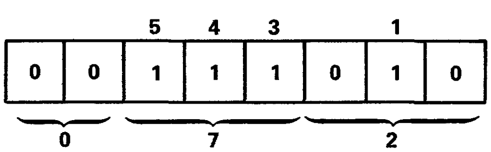
$$
\begin{array}{llll}
1\ 0 & 1\ 1\ 0 & 0\ 0\ 1 & = 261_8 \\
0\ 1 & 0\ 0\ 1 & 1\ 0\ 1 & = 115_8 \\
0\ 0 & 0\ 0\ 0 & 0\ 0\ 1 & = 001_8 \\
\hline
1\ 1 & 1\ 1\ 1 & 1\ 0\ 1 & \ 377_8 \\
 & & \ 1 & \\
 & & \ 1 &
\end{array}
$$

Secondary Mask

The secondary mask of a device is an 8-bit quantity used to identify groups of users who can place direct access files on the particular device. If bit i is set in the secondary mask of the device, any user whose index ends in i can place direct access files on this device.

Example:

A device whose secondary mask is 072_8 can contain direct access files of any user whose index ends in 1, 3, 4, or 5, because these bits are set in the mask.



Direct access files may or may not reside on a master device, depending on the user index and secondary mask. The appropriate bit must be set in the secondary mask of the device on which the user's direct access files are to reside. A direct access file is placed on a valid device with the most space available unless the user specifies a particular device.

Example:

The following situations occur for a device whose mask is 261_8 and secondary mask is 072_8.

$$\underbrace{\overset{7}{\boxed{1}}\,\boxed{0}}_{2}\;\underbrace{\overset{5}{\boxed{1}}\,\overset{4}{\boxed{1}}\,\boxed{0}}_{6}\;\underbrace{\boxed{0}\,\boxed{0}\,\overset{0}{\boxed{1}}}_{1}$$

- This device is the master device for, and can contain direct access files of, any user whose index ends in 4 or 5 (bits 4 and 5 are set in both the device mask and the secondary mask).

- This device is the master device for, but cannot contain direct access files of, any user whose index ends in 0 or 7 (bits 0 and 7 are set in the device mask but not in the secondary mask).

- This device is not the master device for, but can contain direct access files of, any user whose index ends in 1 or 3 (bits 1 and 3 are set in the secondary mask but not in the device mask).

- This device is not the master device for, and cannot contain direct access files of, any user whose index ends in 2 or 6 (bits 2 and 6 are not set in either the device mask or the secondary mask).

Existing files can be defined as direct access permanent files, regardless of the secondary mask, for user indexes above 377700_8 (AUIMX). However, PFLOAD will enforce the secondary mask check when loading these files. Direct access files for the mass storage facility (MSF) subfamily user indexes (377760 through 377767_8) are always loaded to their master devices regardless of previous residence or secondary mask values.

There are no restrictions on the number of devices in one family that can have the same bits set in the secondary mask or regarding the sum of the secondary masks for devices in the same family. The secondary mask must be a number between 0 and 377_8.

Example:

For a family of three devices, 000, 131_8, and 326_8 are possible secondary masks. Any user whose index ends in 0, 3, 4, or 6 can place direct access files on the device whose secondary mask is 131_8. Any user whose index ends in 1, 2, 4, 6, or 7 can place direct access files on the device whose secondary mask is 326_8. No user can place direct access files on the device whose secondary mask is 000. Any user whose index ends in 4 or 6 can place direct access files on two devices, and any user whose index ends in 5 cannot use direct access files.

$$
\begin{array}{lll}
0\ 0 & 0\ 0\ 0 & 0\ 0\ 0 = 000_8 \\
0\ 1 & 0\ 1\ 1 & 0\ 0\ 1 = 131_8 \\
\underline{1\ 1} & \underline{0\ 1\ 0} & \underline{1\ 1\ 0} = \underline{326_8} \\
1\ 1 & 0\ 1\ 1 & 1\ 1\ 1 \\
\ \ 1 & \ \ 1 &
\end{array}
$$

MASS STORAGE TABLE

The configuration of mass storage devices currently available to the system is defined by the CMR mass storage table (MST). Each logical device in this configuration has an entry in this table. Refer to the NOS 2 Systems Programmer's Instant for the MST format.

CATALOG TRACK

A user's catalog track is a track on his master device containing the catalog entries (definition follows) that define and specify the location of each permanent file created by that user. Users are assigned by groups to catalog tracks according to their user index and number of catalog tracks on their master device.

The number of catalog tracks on a device is established when the device is initialized or by default. Default values are as follows:

Type of Device	Default Number of Catalog Tracks
Extended memory (DE)	4
844 (DI, DJ, DK, DL)	40_8
885-11/12 (DM, DQ)	10_8
885-42 (DB)	10_8
819 (DV, DW)	10_8
DDP path to extended memory (DP)	4
Private device	1

The number of catalog tracks is always a power of 2; the maximum number is 200_8. Therefore, the possible numbers of catalog tracks on a device are:

1, 2, 4, 10_8, 20_8, 40_8, 100_8, 200_8

Reducing these numbers by 1 produces the following numbers, referred to as track masks.

0, 1, 3, 7, 17_8, 37_8, 77_8, 177_8

The track masks in binary form are:

```
            0
            1
          1 1
        1 1 1
     1  1 1 1
   1 1  1 1 1
 1 1 1  1 1 1
1  1 1 1  1 1 1
```

These track masks (except the first one) have all bits set and when bits 3 through 9 of the user index for a particular user are ANDed with the track mask for his master device, the user's catalog track number on that device is produced.

Example:

For a family of two devices, the following device masks, number of catalog tracks, and track masks are valid.

Device	Device Mask			Number of Catalog Tracks	Corresponding Track Mask		
1	221_8	or	10 010 001	40_8	$40_8-1=37_8$	or	11 111
2	156_8	or	01 101 110	20_8	$20_8-1=17_8$	or	1 111
	377_8		11 111 111				

A user whose index is 14224_8 is assigned device 1 as his master device because bit 4 (last digit in 14224_8) is set in the device mask for device 1. Therefore, device 1 contains this user's catalog track.

The binary form of 14224_8 is 001 100 010 010 100.

Therefore, the catalog track number for this user is 22_8 (on device 1) because the logical AND of bits 3 through 9 of the user index with the track mask for device 1 is as follows:

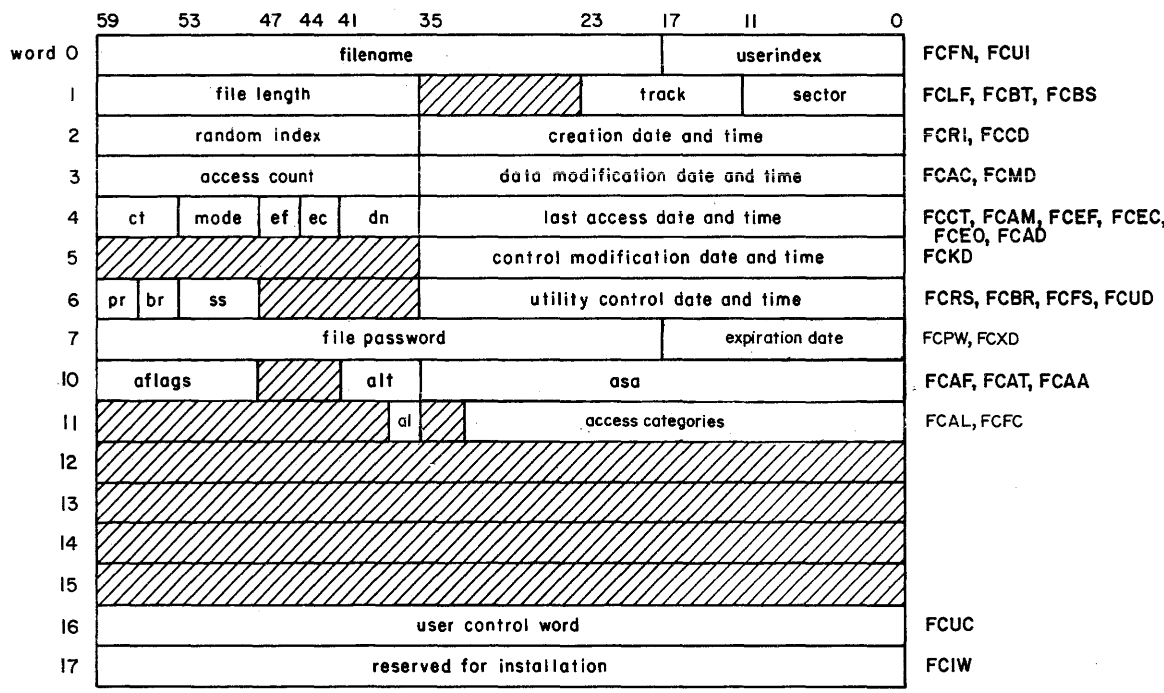
```
     1 0 0  0 1 0  0 1 0
AND           1 1  1 1 1
    ---------------------
              1 0  0 1 0     or     22₈
```

The end of a catalog track is indicated by an end of information (EOI) on the device. All catalog tracks are linked in the track reservation table (TRT) and appear as one logical chain. When catalog entries exceed the logical track, a continuation track is reserved at the end of the catalog track chain in the track reservation table. The disk linkage bytes for the overflowed track point to the continuation track.

PERMANENT FILE CATALOG ENTRY

Files in the permanent file system are referenced by dynamically updated permanent file catalog (PFC) entries on the catalog tracks of master devices. Whenever a user creates a permanent file, a catalog entry that specifies the characteristics of the file (access information about the file and its location) is entered on a catalog track on the user's master device. When the user modifies the file, the PFC entry is updated to reflect the modification.

The format of the PFC entry follows. The four-character names to the right of each word are symbols used by the system to reference the PFC entry fields. These symbols are defined in common deck COMSPFM.



Field	Word	Bits	Description
filename	0	59-18	Permanent file name.
userindex	0	17-0	User index of file creator.
file length	1	59-36	Length of the file in PRUs.
track	1	23-12	Beginning track of the file.

Field	Word	Bits	Description
sector	1	11-0	Beginning sector of the file.
random index	2	59-36	Random disk address of first permit sector.
creation date and time	2	35-0	yymmddhhmmss in octal when this file was first entered on the permanent file system. The year (yy) is biased by 70.
access count	3	59-36	Total number of times this file has been accessed.
data modification date and time	3	35-0	yymmddhhmmss in octal when data in this file was last modified. The year (yy) is biased by 70. For direct access files this field is updated only when the file is attached in a modifiable mode.
ct	4	59-54	File category: 0 Private. 1 Semiprivate. 2 Public.
mode	4	53-48	Mode of access for semiprivate and public files: 0 Write, read, execute, append, modify, and/or purge. 1 Read and/or execute. 2 Append. 3 Execute. 4 Negate previous permission. 5 Modify. 6 Read and/or execute, allow modify. 7 Read and/or execute, allow append. 10 Update. 11 Read and/or execute, allow update.

Field	Word	Bits	Description
ef	4	47-45	Error flag: 0 No error. 1 EOI changed by recovery.
ec	4	44-42	Error code: 0 No error. 1 Error in file data. 2 Error in permit entries for file. 3 Error in data and permit entries. 4 Error in file length. 5 Reserved. 6 Reserved. 7 Reserved.
dn	4	41-36	Device number (1 through 77_8) of the device on which the direct access file resides if other than the user's master device. If the file resides on the master device, dn is 0.
last access date and time	4	35-0	yymmddhhmmss in octal when this file was last accessed. The year is biased by 70.
control modification date and time	5	35-0	yymmddhhmmss in octal when this file's control information (catalog entry and permit record data) was last modified.

Field	Word	Bits	Description
pr	6	59-57	Preferred residence† for this file: 3 MSF residence preferred (PR=M specified by file owner). 4 No preferred residence (PR=N specified by file owner).
br	6	56-54	Backup requirement† for this file: 1 Backup required on dump tape (BR=Y specified by file owner). 2 Backup required on dump tape only if the current version of the file does not have an MSF image (BR=MD specified by file owner). 3 Backup on dump tape is not to be done (BR=N specified by the file owner).
ss	6	53-48	Subsystem code for this file: 0 Null subsystem. 1 BASIC subsystem. 2 FORTRAN subsystem. 3 FTNTS subsystem. 4 Execute subsystem. 5 Batch subsystem.

†Refer to Permanent File Commands in the NOS 2 Reference Set, Volume 3 for details on the PR and BR parameters.

Field	Word	Bits	Description
utility control date and time	6	35-0	yymmddhhmmss in octal set by PFM and PF utilities and used by PFDUMP in determining whether to dump the file when the OP=M option is specified. This field is updated when the data modification date and time field is updated or PFDUMP finds a file busy (attached in modifiable mode). This ensures that the file is selected on subsequent dumps even if the data modification date and time field does not change.
file password	7	59-18	Optional password.
expiration date	7	17-0	yymmdd in octal when this file's password expires. The year is biased by 70.
aflags	10	59-48	Alternate storage flags; refer to section 3, Mass Storage Subsystem, for details.

Flag	Bit	Description
AFTMP	53	Temporary error flag: 0 No temporary error conditions have been detected. 1 A temporary error condition prevented the MSF image of the file from being staged to disk. After the error condition is detected, this flag is cleared so that the file staging can be retried on the next request for the file.

Field	Word	Bits	Description		
			Flag	Bit	Description
			AFVER	52	Verification flag: 0 If alternate storage address (asa)=0, a successful stage/destage operation has occurred and system control errors should not be encountered. 1 The PFC entry with asa=0 was reloaded and a stage attempt has not yet been made. If a system control error is detected, the probable cause is that the asa value is obsolete and this is probably because an obsolete dump tape was used during the reload.
			AFPDR	51	Pseudo release flag: 0 The file can be attached immediately if it has a disk image. 1 The file has a disk image that cannot be attached until the MSF image of the file is staged to disk. After the stage attempt (whether or not it is successful), this flag is cleared.
			AFPDE	50	Data error flag: 0 No unrecoverable read errors have been detected. 1 An unrecoverable read error prevented the MSF image of the file from being staged to disk.

Field	Word	Bits	Description
			Flag / **Bit** / **Description**
			AFPSE 49 System control error flag: 0 No system error conditions have been detected. 1 A system error condition prevented the MSF image of the file from being staged to disk.
			AFOBS 48 Obsolete flag; set to 1 whenever the file is attached in write mode. 0 MSF image (if asa=0) is a current version of the file. 1 Disk image is the current version of the file; the MSF image (if asa=0) is obsolete.
alt	10	41-36	Alternate storage type: 0 File resides on disk only. 1 File has an MSF image.
asa	10	35-0	Alternate storage address: 0 An MSF image of the file does not exist. Non-zero Specifies the location of the beginning of the file on MSF. The AFOBS flag indicates whether or not this MSF image is current.

Field	Word	Bits	Description
al†	11	38-36	File access level: 0 Access level 0. 1 Access level 1. . . . 7 Access level 7.
access categories†	11	31-0	File access categories: Each bit indicates whether the file has the corresponding access category as part of its category set. Bit 0 corresponds to access category 0; bit 1 to access category 1, and so forth. A file's category set can be any, all, or none of the 32 available categories.
user control word	16	59-0	User control information.

†The 8 access levels and 32 access categories are referenced by names defined by or in micros in system common deck COMSMLS. The default names are LVL0 through LVL7 for access levels and CAT00 through CAT31 for access categories. Each site determines what the access levels and categories mean, and can change the corresponding names to clarify that relationship. For example, access level 3 may be defined as meaning secret, so the name for access level 3 can be changed from LVL3 to SECRET. If any of the COMSMLS micros are changed, all decks calling COMSMLS must be reassembled.

TRACK RESERVATION TABLE

Every device in a permanent file system has a label track (usually track 0) which contains a label sector describing the device (family name, device mask, secondary mask, location of permit information, catalog information, and indirect files) and a number of physical record units (PRUs) containing the TRT. The TRT describes the physical layout of data on the device and is the key to allocating information on the device.

The TRT contains single-word entries that define track linkage and bit-setting controls for those tracks (refer to figure 1-3). Each word has four 12-bit linkage bytes and three sets of 4-bit control settings that match the four bytes (refer to figure 1-4). Linkage format is given in figure 1-5.

The numbering of the 12-bit linkage bytes or cells corresponds to the numbering of tracks on the device, with the first track starting at 4000. The entry in a cell references the next cell and its associated track. This next track either continues the information or starts a new sequence depending on the first-track bit setting.

Figures 1-3 and 1-4 show a sequential linkage of tracks (in figure 1-4, from track 4000 to track 4001 to 4002 to 4003). This numerical sequence is purely illustrative. The linkage could just as well have been:

4000 → 4002 → 4015 → 4012

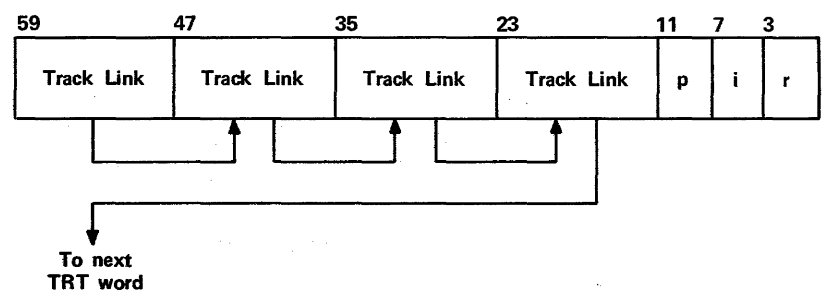


Figure 1-3. Track Reservation Table Word

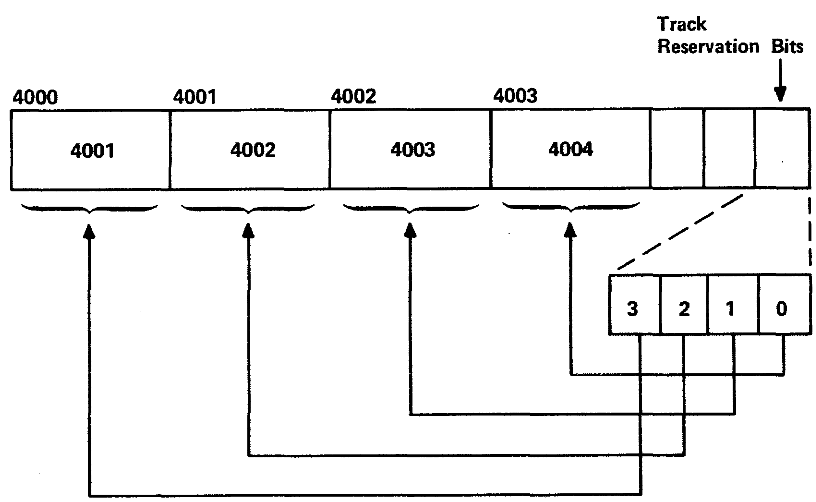
Each track reservation table word contains the following entries.

Entry	Description
Track Link	Address of the next track that is a logical continuation of this file. (The track links are shown as sequential within a word, but this is not a requirement.)
p	Bit settings for identifying the first track of a preserved file (permanent file chain or queued file).
i	Bit settings for establishing interlock of a track.
r	Bit settings for track reservation.

The first group of control settings (bits 8 through 11) is used to identify those tracks which begin a sequence of file information. If any one of these bits is set, the associated track is the first track of a chain that may extend across a number of tracks. This chain can be a direct access file, an indirect access file data chain, a catalog chain, a permit chain, a system dayfile, or a queued file.

The second group of control settings (bits 4 through 7) is used to interlock tracks. If any one of these bits is set, the associated track cannot be accessed as long as this bit remains set. Whenever a file is accessed, the system automatically interlocks the catalog track containing the file. The interlocking capability is necessary because PFM may be processing several requests directed at one file simultaneously. Without interlock, these requests could overlap.

The third group of control settings (bits 0 through 3) is used to identify reserved tracks. A track is reserved either because it has data written on it or it is a flawed track. A flawed track is removed from availability by reservation at deadstart, by subsequent initialization, or by reformatting with the FORMAT utility for 844 devices.



Matching of four reserve track bit settings with corresponding track link bytes. The same correspondence holds for the interlock bits (4 through 7) and the first-track bits (8 through 11).

Figure 1-4. Bit Settings for Track Link Bytes

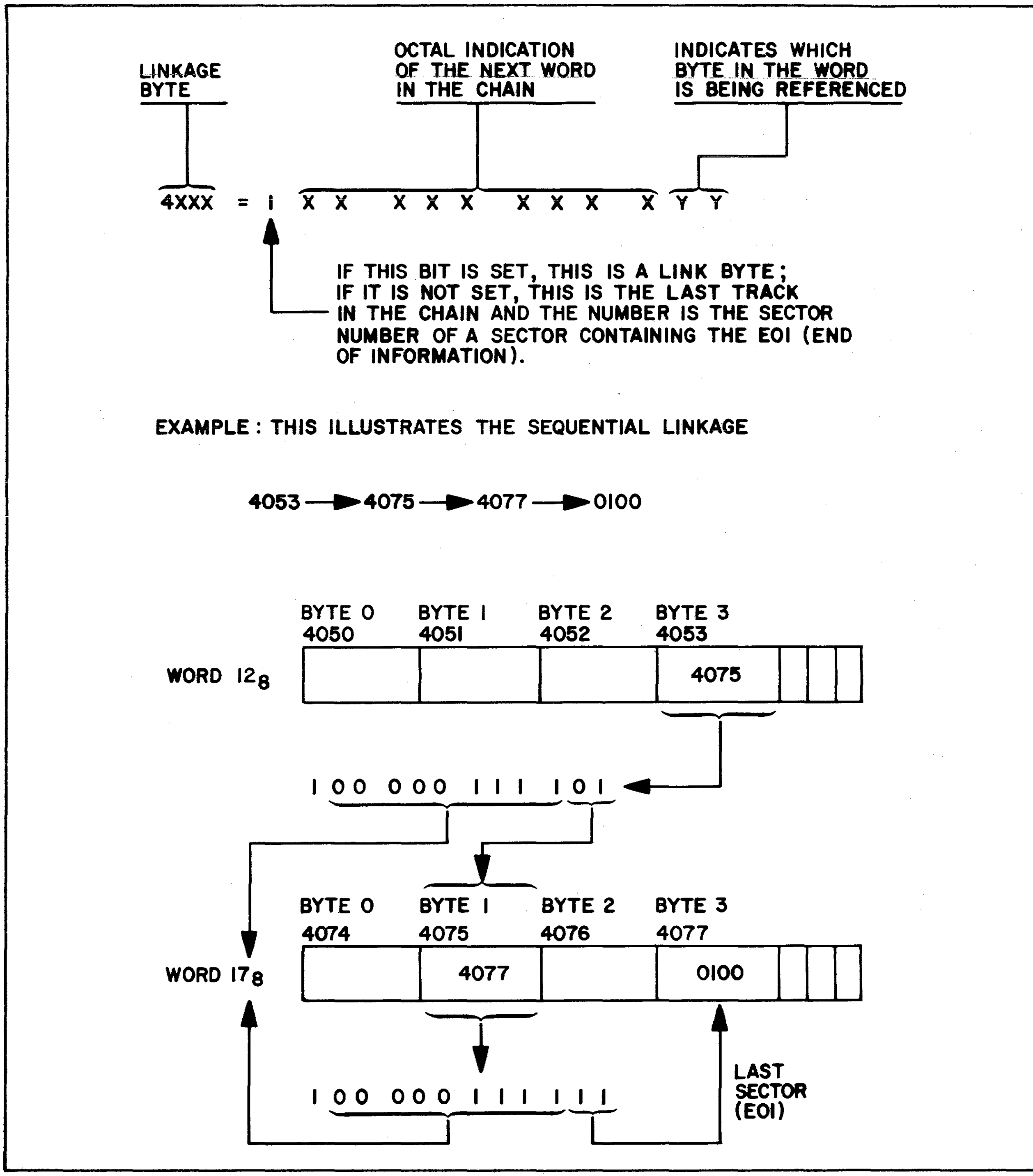


Figure 1-5. Linkage Format with Example

FAMILY

A family is a collection of 1 to 63 logical devices identified by a one- to seven-character family name. Users and their files are grouped together according to the family available to them. Usually, the grouping is within the configuration on which these users normally run jobs. However, a family can be connected to any configuration and still relate to the same users and files.

An auxiliary device, identified by a one- to seven-character pack name, is a single device that is not included in any family and can be accessed by validated users from any family. An auxiliary device provides users with an alternative to the master devices for storing and accessing permanent files. Use of auxiliary devices enables an analyst to provide special sets of permanent files for selected users or for designated periods. For example, an auxiliary device could be made available from 1200 to 1700 every day for any properly validated user.

A permanent file device is either a member of a family or an auxiliary device. Permanent files on a family device are accessed through user catalogs contained on a master device within the family. The user catalogs that reference permanent files on an auxiliary device are contained on that device; that is, an auxiliary device is a self-contained entity.

Families and auxiliary devices are defined at initialization time by the PF entry in the EQPDECK or by the INITIALIZE command entered by the operator.† Normally, a configuration has one family available. Additional families can be defined or introduced (on removable devices) in the same configuration. If more than one family is available in a configuration, the user supplies the family name at login or on the USER command. The default family is used if no family name is supplied.†† Any job can change its associated family name by using the USER command to specify the new family name.††† A system origin job can use the FAMILY command to change the family name associated with the job. If the FAMILY command is included in any nonsystem origin job, the job aborts.

The FAMILY command is valid for unsecured systems only.

The format of the FAMILY command is:

```
FAMILY,familyname.
```

Parameter	Description
familyname	One- to seven-character name of a family of permanent file devices. If omitted, the default family name specified at deadstart is assumed.

---

†Refer to the DSD command INITIALIZE in the NOS 2 Operator/Analyst Handbook.

††The default family name is specified at deadstart time with the EQPDECK FAMILY entry and cannot be changed dynamically.

†††Refer to the IPRDECK entry and DSD command ENABLE, SECONDARY USER CARDS in the NOS 2 Operator/Analyst Handbook and the USER command in the NOS 2 Reference Set, Volume 3.

If an alternate family of permanent file devices is introduced into the configuration without a user validation file, the job to create the user validation file could include a FAMILY command to identify the alternate family. If the familyname parameter is omitted, the default family name is assumed.

Figure 1-6 is an example of a typical set of configurations.

Example:

One configuration with six permanent file devices [equipment status table (EST) ordinals 6 through 13] is identified as system A. Three of the devices are grouped into a family with the name FAMA. They have device numbers 40, 41, and 42. The remaining three EST ordinals have been defined as removable. This means that the system will allow family and auxiliary devices to be introduced on this equipment during system operation.

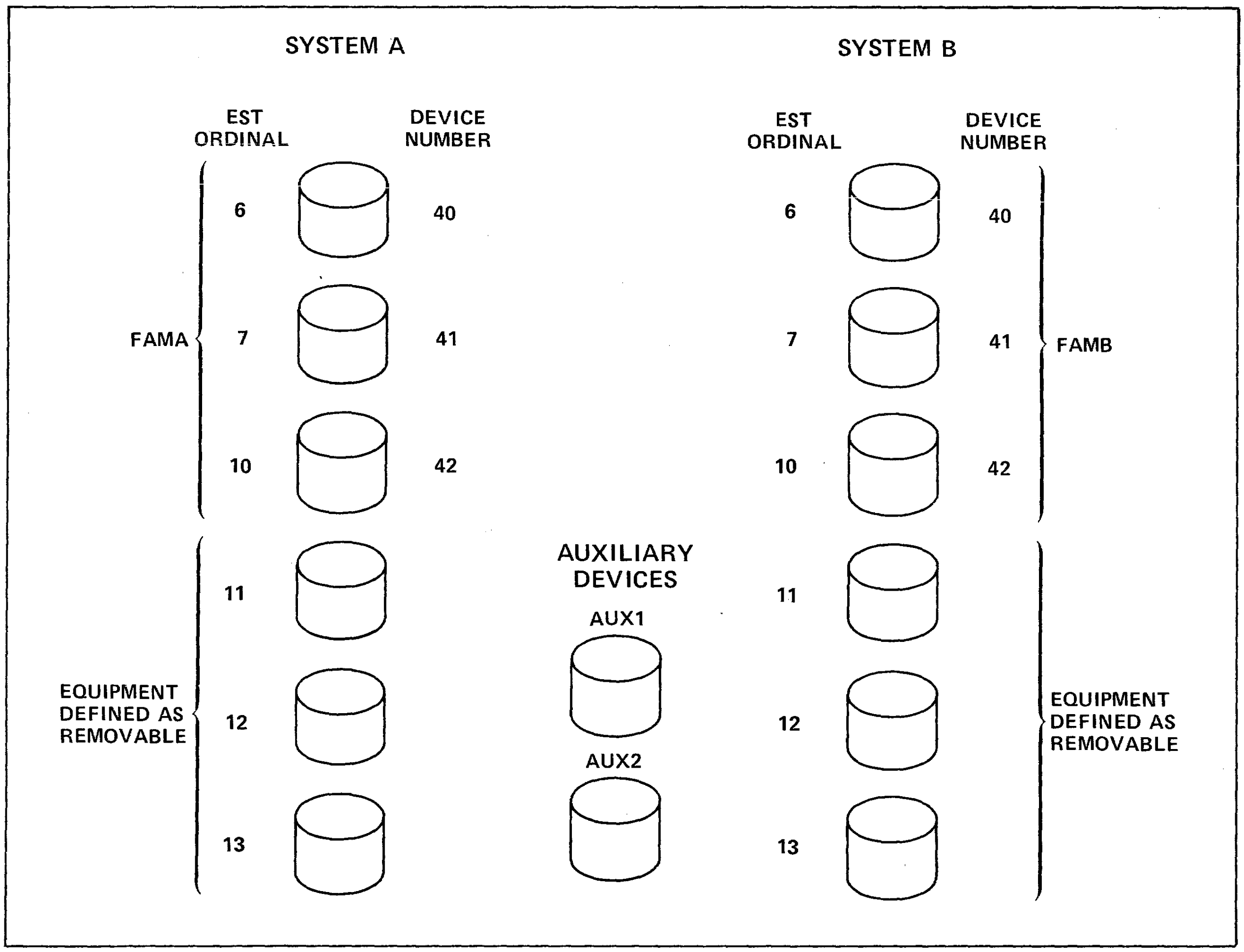


Figure 1-6. Example of Families in Two Configurations

A second configuration with six permanent file devices is identified as system B. Three of the devices have been grouped into a family with the name FAMB. They also have device numbers 40, 41, and 42. The remaining three pieces of equipment have been defined as removable.

Two auxiliary devices are available to both systems. These have the pack names AUX1 and AUX2.

Users of FAMA would normally run jobs on system A. Users of FAMB would normally run jobs on system B.

The removable equipment on system A (EST ordinals 11, 12, and 13) could be used for two purposes:

- To mount auxiliary devices AUX1 and/or AUX2 as required by users of FAMA. If users of FAMB need access to AUX1 and/or AUX2, these auxiliary devices will have to be mounted on some combination of equipment defined by EST ordinals 11, 12, and 13 on system B.

- To mount FAMB devices when they are no longer accessible through system B. In this case, users of FAMB will have to transfer their access to system A. This transfer could involve moving disk packs from equipment defined by EST ordinals 6, 7, and 10 in system B to equipment defined by EST ordinals 11, 12, and 13 in system A, or system A could already have alternate channel connections to equipment defined by EST ordinals 6, 7, and 10 in system B but would define them as EST ordinals 11, 12, and 13 in its own system. If the users of FAMB access their files through system A, they submit their jobs to system A or dial into system A using a different telephone number. (They would dial the same number if switching of the communication gear is done.) The ISF command must be used to make the validation file from FAMB available on system A.

  Assuming that access to all of FAMB is transferred from system B to system A, the new array of system A will be as illustrated in figure 1-7. System A now has two families, its original default family FAMA and the newly attached family FAMB whose devices now have the EST ordinals 11, 12, and 13. Its device numbers (40, 41, and 42) remain the same. The device numbers happen to be the same as those used within FAMA but device numbers provide uniqueness only among devices within a family. Accordingly, total uniqueness of a device is provided by the combination of family name and device number.

  Users of FAMA will still be able to access their files without specifying the family name since FAMA is still the default for system A. However, users of FAMB will have to specify to system A that they belong to FAMB either at login or on the USER command.

  If another equipment (EST ordinal 14) were available on system A, either auxiliary pack AUX1 or AUX2 could be mounted on it and users from either family could access files on this pack.

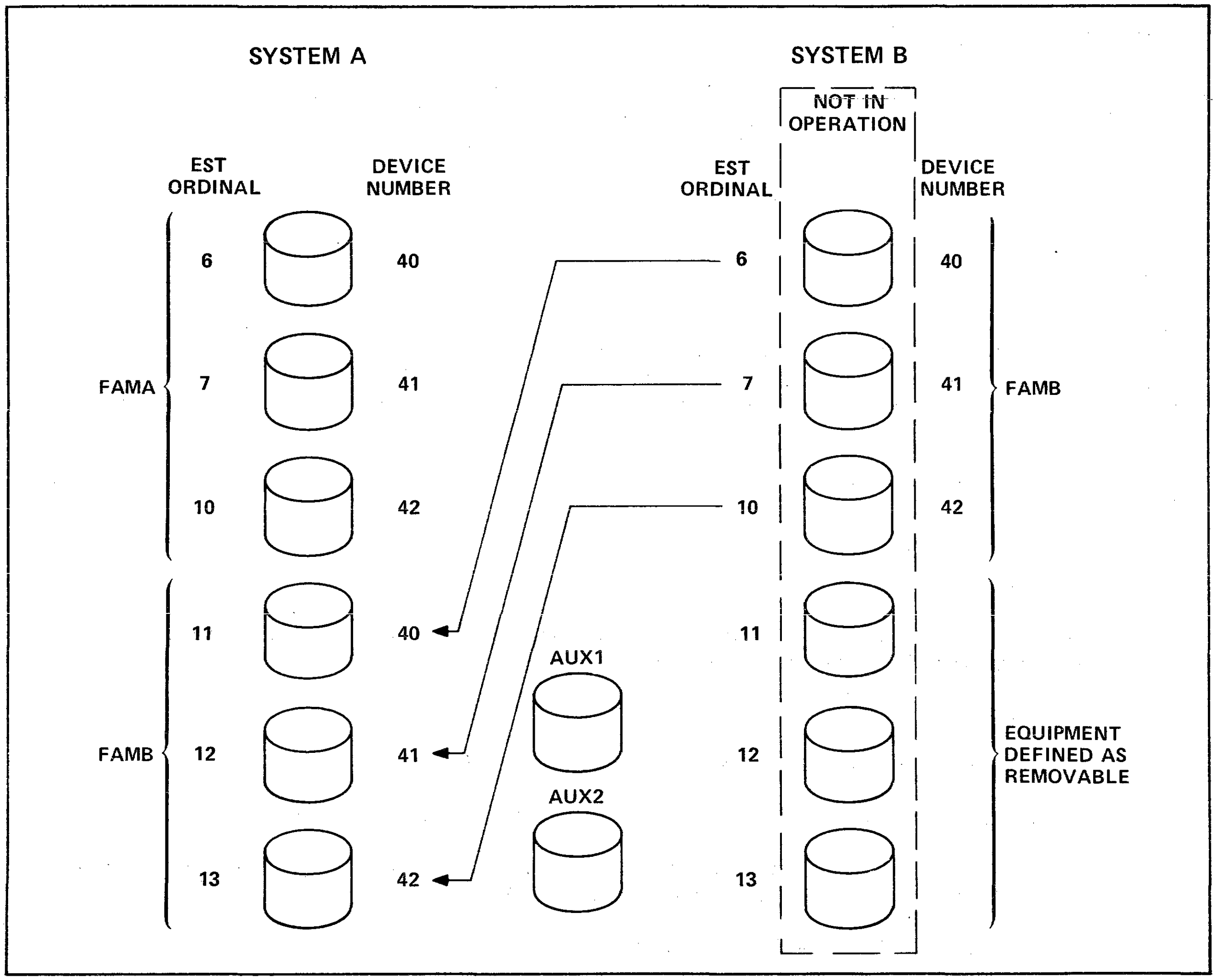


Figure 1-7. Example of Transfer of Family Access

CALLING THE UTILITIES

Permanent file utility operations can be initiated through console input or DIS input to a K display, batch input, terminal input, or procedure files. However, for batch or terminal input, the user must be validated for system origin privileges and the system must be in debug mode.

CONSOLE INPUT

It is not possible to preassign an archive file when using the console input sequence. Since a preassigned archive file is usually required, this type of call to the utilities should be avoided in most cases (refer to DIS Input later in this section). However, the console input sequence can be used when an archive file is not required, as with the PFCAT utility.

Input from the console requires the following sequence of entries and responses.

1. Call PFS by typing:

   X.PFS.

   The B display indicates the job sequence name (jsn) of PFS. To the right of the entry appears the intensified message:

   REQUEST *K* DISPLAY

2. Activate the K display for that control point by typing:

   K,jsn. (jsn is the job sequence name of PFS as specified on the B display)

   The display shown in figure 1-8 appears on the left screen. Instructions at the bottom of the display describe how to select the desired utility.

3. Activate the right K display by typing:

   KK.

   The display shown in figure 1-9 appears on the right screen. A description of the permanent file utility options is shown.

4. Select the desired utility by typing:

   K.uo.

   where uo is one of the following:

uo	Description
AT	Catalog archive file.
CA	Catalog permanent files.
CP	Copy archived files to a job as local files.
DU	Dump permanent files.
LD	Load permanent files.

```
                 *** UTILITY OPTIONS ***

             CURRENT
        OPTION VALUE             DESCRIPTION










           ENTER K.UO. WHERE *UO* IS

           AT - TAPE CAT   CA - DEVICE CAT
           CP - TAPE COPY  DU - DUMP  LD - LOAD
```

Figure 1-8. Initial Permanent File Utilities Left K Display

```
*** PERMANENT FILE UTILITY OPTION DESCRIPTION ***

  OPTION                DESCRIPTION

  UT *UTILITY*          *LD* - PFLOAD
                        *DU* - PFDUMP
                        *CA* - PFCAT
                        *AT* - PFATC
                        *CP* - PFCOPY

  LO *LIST OPTION*      T - FILES PROCESSED CATALOG
                        C - PERMANENT FILE
                            DEVICES CATALOG
                        E - ERRORS
                        S - SUMMARY

  OP *UTILITY OPTIONS*  C - CREATION*
                        A - LAST ACCESS*
                        M - LAST MODIFICATION*
                        I - INDIRECT ACCESS**
                        D - DIRECT ACCESS**
                        L - LOAD LEVELING
                        P - PURGE AFTER DUMP
                        R - REPLACE
                        Q - ADD CATALOG AND PERMIT RECORDS
                        E - EXTRACT CATALOG IMAGE RECORD
                        O - OMIT CATALOG IMAGE RECORD
                        S - SUPRESS MSF STAGING
                        Z - ZERO OUT ASA LINKAGE

NOTE - OPTIONS ENTERED AS FOLLOWS -

   LO = TCS      OR
   OP = CIP

*   ONLY ONE TYPE OF DATE MAY BE SPECIFIED
**  ONLY ONE ACCESS OPTION MAY BE SPECIFIED
```

Figure 1-9. Permanent File Utilities Right K Display

The parameter options available under the chosen utility appear on the left screen. Figure 1-10 shows the left screen after the DU utility has been called (1). The TCE appearing after the LIST OPTIONS VALID (2) indicates that

T	Files processed
C	Catalog image record (CIR) files
E	Errors

are the listings available for the PFDUMP utility. Different combinations of list options are available with the other utilities.

The CAMIDPS (3) appearing after the OPTIONS VALID indicates that

C	Creation
A	Last access
M	Last modification
I	Indirect access files
D	Direct access files
P	Purge after dump
S	Suppress MSS staging

are the options available for the dump utility. Different combinations of utility options are available with the other utilities.

5. Select the desired parameter options by typing:

   K.opt_1=val_1,opt_2=val_2,...,opt_n=val_n.

   where the opt_i=val_i are selected from the parameter option list on the left screen. The selected parameters replace the default values listed on the left screen (refer to Description of Permanent File Utility Parameters later in this section).

6. Initiate execution by typing:

   K.GO.

   The lower lines of the left display (4) disappear and are replaced by:

   ```
   DEVICE      MASK
   DATE        TIME
   ```

   Values appear with these identifiers as processing continues.

```
               *** PFDUMP OPTIONS (1)† ***
      CURRENT
OPTION VALUE              DESCRIPTION

 FM = 0                   FAMILY NAME
 PN = 0                   PACK NAME
 DN = 0                   DEVICE NUMBER
 TD = 0                   TRUE DEVICE NUMBER
 UN = 0                   USER NUMBER
 UI = 0                   USER INDEX
 DD = -- N/A --           DESTINATION DEVICE NUMBER
 DI = -- N/A --           DESTINATION USER INDEX
 LO = 0                   LIST OPTIONS VALID - TCE  (2)
 L  = OUTPUT              OUTPUT FILE NAME
 OP = 0                   OPTIONS VALID - CAMIDPS  (3)
 EO   PROCESS             ERROR OPTION
 SD   NO SETTING          DISK SPACE RELEASE DATE
 UD   -- N/A --           UTILITY CONTROL DATE
 AD = 0                   AFTER DATE   YYMMDD
 AT = 0                   AFTER TIME   HHMMSS
 BD = 0                   BEFORE DATE  YYMMDD
 BT = 0                   BEFORE TIME  HHMMSS
 PF = NAME                PERMANENT FILE NAMES - 24 ALLOWED
 PF =
 PF =
 PF =
 PF =
 PF =

      NOTE - N/A DENOTES INVALID PARAMETER (4)
```

†The circled numbers are identified in the text.

Figure 1-10. PFDUMP Left K Display (Sheet 1 of 2)

```
                ***    PFDUMP OPTIONS    ***
      CURRENT
OPTION VALUE                 DESCRIPTION

 T  = TAPE                    ARCHIVE FILE NAME
 SF = 0                       NUMBER OF FILES TO SKIP
 N  = -- N/A --               NUMBER OF FILES TO PROCESS

 VF = 0                       VERIFY FILE NAME

 MF = -- N/A --               MASTER FILE NAME

 RD = 0                       RELEASE DATA FILE NAME

 LA = 0                       LOWER ACCESS LEVEL
 UA = 0                       UPPER ACCESS LEVEL



      NOTE - N/A DENOTES INVALID PARAMETER
```

Figure 1-10. PFDUMP Left K Display (Sheet 2 of 2)

DIS INPUT

The following DIS input sequence is the recommended method of calling PF utilities from the system console. Refer to the NOS 2 Operator/Analyst Handbook for a description of DIS operations.

1. Call DIS by typing:

   X.DIS.

2. If the utility requires an archive file, it must be preassigned before calling the utility. This can be done with a LABEL or ASSIGN command or by using an existing procedure file.

3. Call the utility either by typing:

   PFS.

   which leads to the same sequence of entries and responses previously described under Console Input, or by typing:

   PFuo,opt_1=val_1,opt_2=val_2,...,opt_n=val_n.

   where uo is one of the following utility options, and opt_i=val_i is a desired parameter option and value for the selected utility (refer to Parameters for the Permanent File Utilities).

uo	Description
ATC	Catalog archive file.
CAT	Catalog permanent files.
COPY	Copy archive file to job as local files.
DUMP	Dump permanent files.
LOAD	Load permanent files.

If an error in parameters is detected at initiation of a utility, control is returned to PFS and the correct parameters can then be entered via the K display.

BATCH INPUT

To call a utility from a batch job, the user must be validated for system origin privileges and the system must be in debug mode. The following sequence of commands is used to call a utility.

```
ujn.
USER,username,password,familyname.
CHARGE,*.
PFuo,opt1=val1,opt2=val2,...,optn=valn.
```

where uo and opt_i=val_i are the same as for DIS input.

TERMINAL INPUT

The format of terminal input for calling the permanent file utilities is substantially the same as that for batch input. The user must be validated for system origin privileges and the system must be in debug mode. The user enters the batch subsystem (or uses the X command), calls the desired utility, and enters the appropriate parameters with the command

PFuo,opt_1=val_1,opt_2=val_2,...,opt_n=val_n.

where uo and opt_i=val_i are the same as for DIS input.

PROCEDURE FILES

Calling the PF utilities can be made simpler with site defined procedure files. If these procedures are defined on file PROCFIL under user name SYSTEMX (user index 377777_8), they can be called by operator entry from DSD. Since user name SYSTEMX is valid only from system origin jobs, the file PROCFIL should be write-permitted to another user name; this will allow easier maintenance of site defined procedures.

For example, when called in the following manner, the procedure DUMPIT provides a full dump of device 1 of the system default family on archive tapes with VSNs of PFB11, PFB12, ..., PFB16.

```
X.BEGIN(DUMPIT,,DEVICE=1,SET=B)
```

The SETJOB command is used to set the UJN of the job so that the banner page indicates the dump operation performed. In this case it is FULL1B.

```
.PROC,DUMPIT,DEVICE=0,LISTOP=E,SET=A.

SETJOB,UJN=FULL_DEVICE_SET.

VSN,TAPE=PF_SET_DEVICE_1/PF_SET_DEVICE_2/PF_SET_DEVICE_3/

PF_SET_DEVICE_4/PF_SET_DEVICE_5/PF_SET_DEVICE_6.

LABEL,TAPE,D=GE,PO=W,W,FI=$FULL DUMP$.

PFDUMP,DN=DEVICE,LO=LISTOP.
```

PARAMETERS FOR THE PERMANENT FILE UTILITIES

Table 1-1 indicates the parameter options accepted by each permanent file utility. An X indicates that the parameter option is accepted; a blank indicates that the parameter option is not accepted. Refer to the following descriptions of parameters for more information.

Table 1-1. Permanent File Utility Parameter Options

Parameter	Utility				
	PFATC	PFCAT	PFCOPY	PFDUMP	PFLOAD
AD	X	X	X	X	X
AT	X	X	X	X	X
BD	X	X	X	X	X
BT	X	X	X	X	X
DD					X
DI					X
DN		X		X	X
EO				X	X
FM		X		X	X
L	X	X	X	X	X
LA	X	X	X	X	X
LO	X	X	X	X	X
MF			X		
N	X		X		X
OP†	X	X	X	X	X
PF	X	X	X	X	X
PN		X		X	X
RD				X	
SD				X	
SF	X		X	X	X
T	X		X	X	X
TD				X	X
UA	X	X	X	X	X
UD					X
UI	X	X	X	X	X
UN	X	X	X	X	X
VF				X	

†The parameters valid with the OP option depend upon the utility being called, as explained in the OP=opt description.

DESCRIPTION OF PERMANENT FILE UTILITY PARAMETERS

Parameter	Description
AD=yymmdd	After date in the form of year, month, day. Files having a last access date (if OP=A), a creation date (if OP=C), or a utility control date (if OP=M) more recent than this date are to be processed. If AT=hhmmss is specified, the default is the current date. If neither AD nor AT are specified, after date and time are not used as selection criteria.
AT=hhmmss	After time in the form of hour, minute, second. Files meeting the AD=yymmdd criterion and having a last access time (if OP=A), a creation time (if OP=C), or a utility control time (if OP=M) more recent than this time are to be processed. If AD=yymmdd is specified, the default is 000000 (midnight). If neither AD nor AT are specified, after date and time are not used as selection criteria.
BD=yymmdd	Before date in the form of year, month, day. Files having a last access date (if OP=A), a creation date (if OP=C), or a utility control date (if OP=M) prior to this date are to be processed. If BT=hhmmss is specified, the default is the current date. If neither BD nor BT are specified, before date and time are not used as selection criteria.
BT=hhmmss	Before time in the form of hour, minute, second. Files meeting the BD=yymmdd criterion and having a last access time (if OP=A), a creation time (if OP=C), or a utility control time (if OP=M) prior to this time are to be processed. If BD=yymmdd is specified, the default is 000000 (midnight). If neither BD nor BT are specified, before date and time are not used as selection criteria.
DD=dn	One- or two-digit number which specifies the alternate device to which PFLOAD loads files when the device on which a file is to be loaded cannot be found, is not defined in the system, or cannot accept the file because of secondary mask restrictions. Default is 0 (no device is the alternate). This parameter is assumed octal unless the D radix or a nonoctal digit is specified.
DI=userindex	One- to six-digit number which specifies the destination user index under which PFLOAD loads all files being processed. Default is 0 (the destination user index is the user index from which the file was dumped). This parameter is assumed octal unless the D radix or a nonoctal digit is specified.
DN=dn	One- or two-digit octal number which specifies the device within the family to be cataloged, dumped, or loaded. For PFLOAD, refer to PFLOAD Selection Process in the description of PFLOAD for more information. For PFCAT or PFDUMP, the following distinctions are made. If the specified device is a master device, all files cataloged on it (whether or not they reside on the device) are processed if they also meet all other specified selection criteria. However, files that reside on the device that are cataloged elsewhere are not processed. If the specified device is not a master device, all files residing on it are processed if they also meet all other specified selection criteria. (For nonmaster devices the DN and TD parameters have the same effect.) Default is 0 for PFDUMP and PFLOAD (all devices are to be dumped or loaded). DN should always be specified for PFCAT (no default).

Parameter	Description
EO	Specifies that PFDUMP or PFLOAD does not process files with mass storage errors. If EO is not specified, PFDUMP dumps files, and PFLOAD loads files, regardless of mass storage errors.
FM=familyname	One- to seven-character name of the family of permanent file devices to be cataloged, dumped, or loaded. This parameter option is not required if only one family of devices is active in the system. Default is the default system family name.
L=filename	One- to seven-character name of the file on which reports are to be written. Default is OUTPUT.
LA=level	One- to seven-character name which specifies the lower limit of the range of access levels to process. If this parameter is specified, the UA parameter must also be specified. If neither LA nor UA is specified, the default is that all access levels are selected. Refer to PFDUMP in a Secured System later in this section.
LO=opt	Character(s) specifying the type of information which the permanent file utility should include in its output report. Default is 0 (no options selected).

opt	Description
C	List all files in the catalog image record. This option is used only with PFATC, PFDUMP, and PFLOAD.
E	List errors.
S	List cumulative statistics. This option is used only with PFCAT.
T	List PFC data for all files processed.

Parameter	Description
MF=filename	One- to seven-character name of the master file to which PFCOPY copies all the files extracted from a designated archive file. Default is no name; that is, the archived files are copied as individual files retaining their permanent file names. This option allows the user to extract a file from an archive file and change its name as a local file.
N=n	One- or two-digit number which specifies the number of archive files on a multifile archive file to be processed. If n=0, one file is processed. Default is 1. This parameter is assumed decimal unless the B radix is specified.
OP=opt	One- to seven-character string specifying the utility options which control the processing of files. Many of the options require additional parameters to complete the definition of the OP selection. Default is 0 (no options selected). Only one of options A, C, or M can be used at a time. Each requires AD, AT, BD, or BT parameters to establish a dividing time before or after which all files that meet the criteria of the option are singled out for processing.

Parameter	Description

opt	Description
A	Make selection according to time of last access.
C	Make selection according to time of creation.
M	Make selection according to time of last modification.

The following rules apply when OP=M is used. If the utility control date and time field meets the specified date/time criteria, the file is selected. If the date/time criteria are not met, the file can still be selected if the control modification date and time field meets the date/time criteria and is more recent than the utility control date and time field. Refer to Permanent File Catalog Entry in this section for descriptions of the PFC fields.

Only one of the following two options can be used at a time. They can be used in conjunction with the A, C, or M option.

opt	Description
D	Select direct access files only.
I	Select indirect access files only.

The following options are used only with PFDUMP. Only one of them can be used at a time.

opt	Description
P	Purge after dump. All files included in the dump are purged after the dump is completed. If this option is specified, backup requirement parameters are ignored when selecting files to process. Files with no backup requirement (BR=N) are processed, and files with media-dependent backup requirement (BR=MD) are copied to disk and fully dumped. Refer to Permanent File Catalog Entry in this section for a description of the backup requirement field.
S†	Suppress staging of files. If a file to be dumped resides on MSF and not on disk, it is not staged to disk and only its PFC and permit entries are copied to the archive file. If OP=S is omitted, the MSF file is copied to disk and included in the dump. This option should normally be specified for full dumps.

†Refer to section 3, Mass Storage Subsystem, for more information.

Parameter	Description
	The following five options are used only with PFLOAD.

opt	Description
R	Load with the replace option. If R is specified, PFLOAD loads all selected files from the archive file. If R is not specified, PFLOAD loads only those files selected from the archive file for which no corresponding files (files with identical file names and user indexes) already exist in the permanent file system.
E	Extract only the CIR. Refer to the PFLOAD description for information about the CIR. PFLOAD reads the CIR from the archive file, generates a random file and directory, and requests the next archive file without processing any of the files after the CIR on the first archive file.
L	Load each direct access file on the device with the most available space of those devices where the file is eligible to reside. This option overrides the DD parameter if it is also specified.
O	Do not read the CIR. PFLOAD does not read the CIR for the specified archive file but processes the records in this archive file. PFLOAD then terminates normally without requesting another archive file.
Z†	Zero the asa field in the PFC entry when the PFC entry is loaded, if the asa field points to an MSF image. Also suppresses the loading of PFC only files. Default is to leave the asa field intact and to load PFC only files. OP=Z should normally be omitted if the device has to be recovered and should be specified if data for the file is being reloaded.

The following option is used only with PFCOPY.

opt	Description
Q	Select leading records. The archived file that is copied to the job as a local file includes two header records, one with the catalog entry for the file and the second with the permit information for the file.

Parameter	Description
PF=filename	One- to seven-character name of a permanent file to be processed. The operator can enter up to 24 permanent file names. The selected file names appear on the bottom of the first page of the left K display screen (refer to figure 1-10). To delete a permanent file name that has been entered, enter the same file name again. When used from one of the utility commands, up to 10 file names can be entered. The format of the parameter is PF=filename_1,PF=filename_2,...,PF=filename_n for both the K display and the utility commands. PF is associated with UI. Default is that permanent file names are not selection criteria.

†Refer to section 3, Mass Storage Subsystem, for more information.

Parameter	Description
PN=packname	One- to seven-character name of the auxiliary device to be cataloged, dumped, or loaded. The device must be mounted and available. Default is that pack name is not a selection criterion.
RD=filename†	One- to seven-character name of the release data file (RDF) to be created by PFDUMP, which identifies those MSF-resident files that are pointed to by PFC entries at the time of the dump. The MSS utility ASVAL uses this file to identify unneeded MSF-resident files whose space can be released. If RD alone is specified, the release data file created is named ZZZZRDF. Default is that PFDUMP does not create an RDF.
SD†	Specifies that PFDUMP is to enter the date and time when the dump was initiated into the inhibit date/time field of the master device. This date/time entry is used by the MSS utility ASMOVE to inhibit the releasing of the disk image of any file with a BR=Y attribute which was last modified after this date/time. The disk space can be released after the next incremental or full dump is taken.
SF=n	One- or two-digit number which specifies the number of archive files on a multifile archive file to be skipped before processing begins. Default is 0. This parameter is assumed decimal unless the B radix is specified.
T=filename	One- to seven-character name of the file on which to store or read archive files. Usually, filename is a tape, but it can be a mass storage device. Default is TAPE.
TD=dn	One- or two-digit octal number which specifies the device within the family to be dumped or loaded. For PFLOAD refer to PFLOAD Selection Process in the description of PFLOAD for more information. For PFDUMP, the following distinctions are made. If the specified device is a master device, all files cataloged and/or residing on it are processed if they meet all other specified selection criteria. If the specified device is not a master device, all files residing on it are processed if they also meet all other specified selection criteria. (For nonmaster devices the DN and TD parameters have the same effect.) Default is 0 (all devices are to be dumped or loaded).
UA=level	One- to seven-character name which specifies the upper limit of the range of access levels to process. If this parameter is specified, the LA parameter must also be specified. If neither LA nor UA is specified, the default is that all access levels are selected. Refer to PFDUMP in a Secured System later in this section.
UD†	Specifies that PFLOAD is to update the utility control date and time field in the PFC entry for the file being loaded. This ensures that the file will be considered for inclusion in the next incremental dump. UD should normally be specified when a particular user's files are being reloaded, but should normally be omitted when a full device is being reloaded.

†Refer to section 3, Mass Storage Subsystem, for more information.

Parameter	Description
UI=userindex	One- to six-digit number which specifies the user index under which files to be processed are located. If UI is specified, DN need not be specified because the utility will locate the proper device. Default is that user index is not a selection criterion. This parameter is assumed octal unless the D radix or a nonoctal digit is specified.
UN=username	One- to seven-character user name associated with the PN parameter. The user name must match information in the MST for the specified pack name. If UN is specified and PN is not, the utility will convert username to a user index. If, in addition, DN is not specified, the utility will locate the proper device in the family. Default is that user name is not a selection criterion.
VF=filename	One- to seven-character name which specifies that PFDUMP is to produce a verify file which is a duplicate of the archive file it creates. If VF alone is specified, the verify file is named PFVER. Default is that no verify file is written.

Example:

The following series of commands creates a two-file archive file (AA) and a matching verify file (BB). The VERIFY command compares the accuracy of the duplication. (Refer to the NOS 2 Reference Set, Volume 3 for a complete description of VERIFY.)

Command	Description
PFDUMP,T=AA,VF=BB.	The dump is written on archive file AA. A duplicate is written on the verify file BB. PFDUMP does not rewind after processing.
PFDUMP,T=AA,VF=BB.	A second dump is written after the first on both the archive (AA) and the verify (BB) files. Each dump produces a separate file on the archive and verify files.
VERIFY,AA,BB,N=0,A,R.	A binary comparison of AA and BB is performed. If words do not match, this command lists: Record number Word number within the record Words from both files that do not match N=0 specifies that the verify terminates when the first empty file is encountered. The A parameter specifies an abort if a mismatch is found. R rewinds both files before and after the verify.

PREASSIGNING THE ARCHIVE FILE

In all permanent file utilities except PFCAT, the archive file must be preassigned. This can be done by using the LABEL or ASSIGN command. For example, file assignment can be made with the following commands.

```
LABEL,TAPE,VSN=PFDUMP,NT,D=1600.
      or
ASSIGN,NT,TAPE.
```

If no archive file is present, PFDUMP will write on a local mass storage file. The other utilities will attempt to read an empty archive file and terminate. PFLOAD will automatically request the assignment of any incremental or full dump archive tapes needed after the first tape; the request will be for the same track type and density as the first archive tape.

NOTE

The archive file is not rewound or unloaded before or after processing by any of the utilities.

PERMANENT FILE UTILITY ROUTINES

This section and its subsections describe the permanent file utility routines. The parameter options available for each of the routines are listed in table 1-1.

The LO option allows each permanent file utility to produce a cataloged directory of file information. This catalog information is either derived from the catalog tracks on the permanent file device or from the archive tape. Although the header information may differ from utility to utility, the format of the catalog information remains the same. The following is the general format of the information listed for each file on the directory.

```
filename   type    cat              length   dn    cdate   ladate  dmdate  cmdate  ucdate
password   count    userindex mode    subsystem    time    time    time    time    time
exp date   level    pr br rs                               flags           at asa  amsg
```

Figure 1-11 illustrates a typical page from a cataloged directory. Although this directory was produced using the command PFATC,LO=T., directories in similar format could be produced using the other utilities. Each of the following fields is shown and cross-referenced on the figure.

Header Information		Description
1	filename	Permanent file name.
2	type	Type of permanent file. This field can be either direct access (DIR) or indirect access (IND).
3	cat	File category. This field can be either PRIVATE, SPRIV, or PUBLIC. These categories are described in the NOS 2 Reference Set, Volume 3.
4	length	Length of the file in decimal PRUs.
5	dn	For direct access files, the device number of the mass storage device on which the file resides if other than the master device. If the file resides on the master device, this field is replaced by an *.
6	password	Password associated with the file.
7	count	Count which specifies the number of times the file has been accessed.
8	userindex	User index of the user on whose catalog this file resides.
9	mode	Permission mode. This field can be WRITE, MODIFY, UPDATE, APPEND, READ, READMD, READUP, READAP, or EXECUTE. These modes are explained in detail in the NOS 2 Reference Set, Volume 3.
10	subsystem	Subsystem under which the file was saved. Possible entries include FORT., FTNTS, BASIC, EXEC., or BATCH. If this field contains no entry, a subsystem is not associated with the file.
11	cdate time	Date and time of file creation. The format is: yy/mm/dd. hh.mm.ss.
12	ladate time	Date and time of the last access to the file.
13	dmdate time	Date and time of the last data modification to the file.
14	cmdate time	Date and time of the last control information modification made in the file's PFC entry or permit entries.
15	ucdate time	Utility control date and time set by PFM or a PF utility to ensure that the file will be included in the next incremental (OP=M) dump.
16	exp date	Expiration date associated with the file password.
17	level	Security access level assigned to the file.
18	pr	Preferred residence for the file specified by the file owner. This field can be either M (MSF residence preferred) or N (no preferred residence).

Header Information		Description
19	br	Backup requirement for the file specified by the file owner. This field can be either Y (backup required on dump tape), MD (backup required only if current version of file does not reside on MSF), or N (no backup is to be performed).
20	rs	Current residence of the file. This field can be D (disk only), A (MSF only), or B (both disk and MSF).
21	flags	Alternate storage flags set for the file (refer to the description of PFC entry earlier in this section for details). If a flag is not set, a dash is listed. If an undefined flag is set, an asterisk is displayed. This field can be:

Field	Description
D	Data error flag.
O	Obsolete flag.
R	Pseudo release flag.
S	System control error flag.
T	Temporary error flag.
V	Verification flag.

22	at	Alternate storage type. This field can be NONE (no MSF image) or MSF (file resides on MSF).
23	asa	Alternate storage address of the file.
24	amsg	Appended message, *PFC ONLY, indicating when a PFC ONLY file (that is, an entry with PFC and permit entries, but no data) has been processed on the archive file.

```
   P. F. ARCHIVE CATALOG      PFDUMP                  PAGE  24
                              EQ. MASK   377      YY/MM/DD. HH.MM.SS.

   FILE NAME   FILE TYPE        LENGTH DN  CREATION  ACCESS    DATA MOD  CONTROL   UTILITY
    PASSWORD   COUNT  INDEX  PERM. SUBSYS  DATE/TIME DATE/TIME DATE/TIME DATE/TIME DATE/TIME
     EXPIRES    LEVEL   PR BR RS                     ASA FLAG CODES        TYPE ASA VALUE

 300 BIN (1)   IND. PRIVATE         13     83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                   0   3006   READ         15.32.46. 15.32.46. 15.32.46. 15.32.46. 15.32.46.
                LVL0    N  Y  D                      --- --- --- ---     NONE
             (2)          (3)
 301 ISDWRK    IND. PRIVATE         12     83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                   0   3006  WRITE         15.32.46. 15.32.46. 15.32.46. 15.32.46. 15.32.46.
                LVL0    N  Y  D                      --- --- --- ---     NONE
                                 (4)
 302 DATA83    IND. PRIVATE         17     83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                   0   3006  WRITE         15.32.47. 15.32.47. 15.32.47. 15.32.47. 15.32.47.
                LVL0    N  Y  D                      --- --- --- ---     NONE

 303 DATAD     IND. PRIVATE        111     83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                   0   3006   READ         15.32.48. 15.32.48. 15.32.48. 15.32.48. 15.32.48.
                LVL0    N  Y  D                      --- --- --- ---     NONE

 304 STMKFR    IND. PRIVATE          1     83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                   1   3006  WRITE         15.32.50. 15.32.51. 15.32.50. 15.32.50. 15.32.50.
                LVL0    N  Y  D                      --- --- --- ---     NONE
                                   (5)
 305 MODSETS   DIR. PUBLIC         236  *  83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                   0   3006   READ         15.32.48. 15.32.48. 15.32.48. 15.32.48. 15.32.48.
                LVL0    N  Y  D                      --- --- --- ---     NONE

 306 IBLKFR    IND. PRIVATE          6     83/07/08. 83/07/12. 83/07/12. 83/07/08. 83/07/12.
            (7) 11  (8) 1    READ (9)      10.01.25. 12.26.49. 12.26.40. 10.01.25. 12.26.40.
                LVL0    N  Y  D                      --- --- --- ---     NONE

 307 SCBIN     IND. PRIVATE          2     83/01/27. 83/01/27. 83/01/27. 83/01/27. 83/01/27.
 (6) PASSW          0    11   READ BATCH   14.56.09. 14.56.09. 14.56.09. 14.56.09. 14.56.09.
(16) 83/07/20.  LVL0    N  Y  D     (10)             --- --- --- ---     NONE
                                              (11)      (12)      (13)      (14)      (15)
 308 PF254A    IND. PRIVATE          1     83/07/08. 83/07/08. 83/07/08. 83/07/08. 83/07/08.
                    0    13  WRITE         12.55.12. 12.55.12. 12.55.12. 12.55.12. 12.55.12.
          (17)  LVL0    N  Y  D                      --- --- --- ---     NONE
                     (18)(19)(20)
 309 A         IND. PRIVATE          0     78/11/06. 78/11/06. 78/11/06. 78/11/06. 78/11/06.
                    0    13  WRITE         15.48.31. 15.48.31. 15.48.31. 15.48.31. 15.48.31.
                LVL0    N  Y  D        (21)          --- --- --- ---  (22) NONE

 310 G         IND. PRIVATE          1     79/08/21. 79/09/10. 79/08/21. 79/08/21. 79/08/21.
                    2    15  WRITE         13.20.23. 12.26.44. 13.20.23. 13.20.23. 13.20.23.
                LVL2    N  Y  D                      --- --- --- ---     NONE (23)
                                                                                     (24)
 311 X         IND. PRIVATE          1     79/02/05. 79/02/05. 79/02/05. 79/02/05. 79/02/05.
                    1    13  WRITE         16.51.07. 16.55.59. 16.51.07. 16.55.59. 16.51.07.
                LVL0    N  Y  D                      --- --- --- ---     NONE

 312 Y         IND. PRIVATE          1     79/02/05. 79/02/05. 79/02/05. 79/02/05. 79/02/05.
                    1    13  WRITE         16.51.07. 16.56.00. 16.51.07. 16.56.00. 16.51.07.
                LVL0    N  Y  D                      --- --- --- ---     NONE
```

Figure 1-11. Sample Directory Produced by PFATC,LO=T.

CATALOG ARCHIVE FILE (PFATC)

PFATC produces a cataloged directory of file information derived from an archive file previously created by the PFDUMP utility. The format of the directory depends upon the parameter options selected.

If LO=T (list all files processed) is specified, the directory produced is similar to that shown in figure 1-11. If LO=C (list all files in catalog image record) is specified and the archive file to be cataloged was produced by an incremental dump (refer to the PFDUMP utility), the directory produced is similar to that shown in figure 1-16.

CATALOG PERMANENT FILE DEVICE (PFCAT)

PFCAT produces a cataloged directory of file information derived from catalog tracks on a master device. The format of the directory depends upon the parameter options selected.

If LO=T (list all files processed) is specified, a directory of file information and a mass storage table report are produced. The directory is similar to that shown in figure 1-12. However, the files are listed according to user index, and totals are given after the files for each user index. The mass storage table report gives information about each mass storage device in the system. Figure 1-13 is an example of a mass storage table report. Messages issued with this report give information concerning the type and status of the device cataloged. The following status messages can be issued.

```
ACCOUNT INITIALIZE PENDING.
CATALOG TRACK OVERFLOW.
DAYFILE INITIALIZE PENDING.
ERRLOG INITIALIZE PENDING.
FORMAT PENDING.
I/O QUEUE INITIALIZE PENDING.
MAINLOG INITIALIZE PENDING.
PF INITIALIZE PENDING.
TOTAL INITIALIZE PENDING.
UNAVAILABLE FOR PF ACCESS.
8 WORD CATALOG ENTRIES.
```

The following types of devices can be listed.

```
ALTERNATE SYSTEM
REMOVABLE DEVICE
SYSTEM
```

If LO=S (list cumulative statistics for catalog) is specified, summary reports of file information for each user index and for the entire device are produced. Figure 1-14 lists a page of the information given for each user index. Figure 1-15 lists the general device information.

```
      CATALOG FILE                                       YY/MM/DD. HH.MM.SS.
DIRECTORY OF PERMANENT FILE DEVICE   40 SYS606           PAGE         1
CATALOG OF USER INDEX    4054
   FILE NAME  FILE TYPE       LENGTH DN CREATION  ACCESS    DATA MOD  CONTROL   UTILITY
    PASSWORD  COUNT INDEX  PERM. SUBSYS DATE/TIME DATE/TIME DATE/TIME DATE/TIME DATE/TIME
     EXPIRES   LEVEL  PR BR RS                    ASA FLAG CODES        TYPE ASA VALUE

   1 VERVAL   IND. PRIVATE         1    83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0        WRITE        13.01.32. 13.01.32. 13.01.32. 13.01.32. 13.01.32.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   2 AUCTEST  IND. PRIVATE         2    83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0        WRITE        13.01.29. 13.01.29. 13.01.29. 13.01.29. 13.01.29.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   3 SETB     DIR. PRIVATE        56  * 83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0         READ        13.01.34. 13.01.34. 13.01.34. 13.01.34. 13.01.34.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   4 CATLI7   IND. PUBLIC          5    83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0        WRITE        13.01.29. 13.01.29. 13.01.29. 13.01.29. 13.01.29.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   5 TESTINP  IND. PRIVATE         6    83/03/02. 83/03/30. 83/03/02. 83/03/02. 83/03/02.
                  6        WRITE        15.29.09. 10.30.17. 15.29.09. 15.29.09. 15.29.09.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   6 HISTORY  IND. PRIVATE         6    83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0         READ        13.01.32. 13.01.32. 13.01.32. 13.01.32. 13.01.32.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   7 WRKTEST  IND. PRIVATE         3    83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0         READ        13.01.30. 13.01.30. 13.01.30. 13.01.30. 13.01.30.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   8 NS2104B  DIR. PRIVATE       231  * 83/07/12. 83/07/12. 83/07/12. 83/07/12. 83/07/12.
                  0         READ        13.01.36. 13.01.36. 13.01.36. 13.01.36. 13.01.36.
               LVLO    N  Y  D                    --- --- --- ---       NONE

   TOTALS         8  FILE(S),      310  SECTORS
```

Figure 1-12. Sample Directory Produced by PFCAT,LO=T,DN=40,UI=4054.

```
MASS STORAGE TABLE REPORT                          YY/MM/DD. HH.MM.SS.

FAMILY/PACK NAME   SYST64

DEVICE NUMBER      =         1        DEVICE TYPE        =         DJ
DEVICE MASK        =       377        NUMBER UNITS       =          1
SECONDARY MASK     =       377        USER NUMBER        =----------
D/A USER COUNT     =         0        EQUIPMENT STATUS   = ACTIVE

SYSTEM.
```

Figure 1-13. Mass Storage Table Report

```
               SUMMARY REPORT                               82/01/11. 12.48.50.
      DIRECTORY OF PERMANENT FILE DEVICE   40 SYS964           PAGE          1

               (* = DAF RESIDENT ON OTHER THAN MASTER DEVICE.)
         USER        INDEX      FILES    SECTORS  AVE.SEC.

                      1000          4         21         5
                      3000         30       1163        38
                      6000         44        602        13
                     60000          1          5         5
                      2020          1          0         0
                      4420          2          2         1
                        60          7         75        10
                       530         21        443        21
                       160          2        240       120
                      2160         14         25         1
                       260         37       5024       135
                       270         70       6352        90
                      2750        251       1386         5
                    377760          1         68        68
                      2370         22        626        28
                    377770          1         53        53

                                  508      16085   (GROUP TOTAL)

                         1         34        153         4
                        21         96       1256        13
                        31         15         87         5
                        51          5          5         1
                      3511          1         21        21
                       201          7         77        11
                     22201          3        362       120
                      3641         40       1788        44
                       301         27       1020        37
                       311          1          3         3
                      3331          8        168        21
                     43331         36        296         8
                      2741         15       1399        93

                                  288       6635   (GROUP TOTAL)
```

Figure 1-14. Cumulative Statistics by User Index PFCAT,LO=S,DN=40.

```
          SUMMARY REPORT                                  82/01/11. 12.33.41.
DIRECTORY OF PERMANENT FILE DEVICE   40 SYS964          PAGE          4

                   INDIRECT ACCESS FILE HOLES

               CATALOG   NUMBER              NUMBER
                TRACK    HOLES               SECTORS

                   0         8                  501
                   2        52                  849
                   3         1                   35
                   4         6                   68
                   5        36                  745
                   6         1                    1
                  11       111                 1787
                  13         4                  187
                  17         1                   18
                  20        12                  204
                  25        12                  202
                  26        28                  321
                  32       142                 2095
                  34        39                 1225
                  36       603                 7026

               TOTAL      1056                15264

          SUMMARY REPORT                                  82/01/11. 12.33.41.
DIRECTORY OF PERMANENT FILE DEVICE   40 SYS964          PAGE          5

          PERMANENT FILE STATISTICS SUMMARY

  MASTER DEVICE USAGE

    GROUP TOTALS

    GROUP     TOTAL    TOTAL   PERCENT OF
              FILES   SECTORS  TOTAL USAGE

      0         508    16085       24
      1         288     6635       10
      2         371    11546       17
      3         176     5506        8
      4         144     4317        6
      5         371     7277       10
      6         226     5276        7
      7         394     9513       14

                                  TOTAL       IAF       DAF

         TOTAL SECTORS            66155     25588     40567
         TOTAL FILES               2478      2121       357
         TOTAL USERS                113
         AVE. FILES/USER             21        18         3
         AVE. SEC/FILE               26        12       113
         DEVICE TYPE  -  DI
         PERCENT DEVICE USAGE        38        15        24

  DIRECT ACCESS DEVICE USAGE

     DEVICE   DEVICE   TOTAL   TOTAL    PERCENT
     NUMBER    TYPE    FILES  SECTORS    USAGE

       40      DI       357    40567       24
```

Figure 1-15. Cumulative Statistics for Entire Device PFCAT,LO=S,DN=40.

COPY ARCHIVE FILE (PFCOPY)

PFCOPY extracts files from an archive file and copies them to one or more files local to the job. The way the files are copied depends upon the parameter options selected.

If MF=filename is specified, all the files extracted from the archive file are copied to one master file (filename) local to the job and they do not retain their permanent file names.

In a secured system, the access level from the file's PFC entry is used to assign each file to be copied to an appropriate mass storage device. If no device can be found that allows the file to reside there, the PFCOPY utility skips the file and issues a diagnostic message.

DUMP PERMANENT FILE (PFDUMP)

PFDUMP copies (dumps) permanent files to backup storage (an archive file). Dumps can be reloaded by the PFLOAD utility and can be accessed by the PFATC and PFCOPY utilities for cataloging and copying. PFDUMP issues messages to the dayfile indicating how many files were dumped and how many files were not dumped due to errors. The type of dump taken depends upon the purpose of the dump and is determined by the parameters selected. Table 1-2 shows the defining characteristics of the three types of dumps.

Table 1-2. PFDUMP Types

Incremental Dump	Partial Dump	Full Dump
OP=M is specified and BD=yymmdd and BT=hhmmss are not specified.	Any dump that is not incremental and not full.	OP=0 is specified or OP is not specified.

If PFDUMP encounters an unrecoverable parity error while writing the archive file, several options are available via the K display. These options are described on the K display. If the option to continue the dump on another reel of tape is selected (K.GO.), it may not be possible to recover in such a way as to ensure that the PFLOAD utility can successfully read the archive tape. At least the archived file being written at the time of the error cannot be reloaded correctly.

PFDUMP in a Secured System

In a secured system, PFDUMP determines the maximum range of access levels that can be dumped. If the LA and UA parameters have been used to select access level limits, these limits will be used. If no access level limits were selected, PFDUMP uses the device limits determined by taking the lowest lower access limit and the highest upper access limit of all the devices to be dumped. The range of possible access levels must be within the system access level limits or PFDUMP aborts the job and issues a diagnostic message. The range of possible access levels must also be within the equipment access level limits for the equipment (tape or mass storage) assigned to the archive file and verify file (if one is being written). If not within the equipment access level limits, PFDUMP aborts the job and issues a diagnostic message.†

Incremental Permanent File System Dump

An incremental dump copies those permanent files modified after a specified date; that is, the OP=M option is specified together with the date (AD) and time (AT) options but BD=yymmdd and BT=hhmmss are not specified. Other options specified on the PFDUMP call can restrict the dump even further.

For example, the command

```
PFDUMP,OP=MI,AD=790101,AT=100000.
```

causes only indirect access files (I parameter) modified after the specified date and time to be dumped. Normal procedure at a site is to follow up this dump with successive incremental dumps (usually with a periodic advancement of date and/or time). This produces a series of archive files containing successive updating of all files in the defined category. (These files can reside on one file - a multifile archive file.) The archive files can then be incrementally loaded (refer to the PFLOAD utility) to return the most recently modified versions of the archived files to the permanent file system.

Each incremental dump writes a record (or records) at the beginning of the archive file it creates. The record contains catalog images (refer to Catalog Image Record in the PFLOAD section) of all files active in the permanent file system when the dump took place. Files with no backup requirement (BR=N) are not included on the catalog image record. This enables a future incremental load of these files on a system or a device basis.

An example of incremental dumping is given in the PFLOAD section.

Partial Permanent File System Dump

A partial dump copies permanent files according to any specified option(s), except those defining a full or incremental dump (refer to table 1-2). For example, the command

```
PFDUMP,OP=D.
```

is a partial dump of all direct access permanent files. Similarly, a dump of all files created (OP=C) or accessed (OP=A) after a certain date is a partial dump.

---

†The system access level limits are displayed as part of the left screen header. The device access level limits (for mass storage) and equipment access level limits (for magnetic tape) are displayed on the E, A display. Refer to the NOS 2 Operator/Analyst Handbook for display formats.

A partial dump can dump files from a certain device (DN or TD option) or can dump all files in the system (DN and TD not specified) that meet the criteria of the specified options.

Full Permanent File Dump

A full dump copies all files in the system or those cataloged on a specified device. That is, the OP option is not specified (or OP=0), and either a particular device is specified (device dump) or no device (DN=0 or TD=0) is specified (system dump).

PFDUMP interlocks a catalog track during the time it takes to dump all files whose PFC entries reside on that catalog track. No files whose PFC entries reside there are accessible until PFDUMP begins processing the next catalog track. For this reason, full permanent file dumps should not be done during heavy system use. An incremental dump provides adequate backup with less interference to the running system.

PFDUMP in a Mass Storage Subsystem Environment

In an MSS environment, the data for a permanent file to be dumped may reside on MSF and not on disk. However, if the file is to be copied to a dump file, it must have a disk image. The analyst can either stage the file to disk from MSF in order to include its data on the dump file (OP=S omitted), or copy to the dump file only the PFC and permit entries for the file and not the file data (OP=S specified). Typically, OP=S is specified for full dumps; otherwise, all MSF files would be included in the dump, which is not feasible because of the time involved to dump such a large permanent file base.

As described in the NOS 2 Reference Set, Volume 3, the file owner can supply a backup requirement for a file via the BR parameter on the DEFINE, CHANGE, or SAVE command. Options include backup on a dump file, backup only if the current version of the file is not on MSF, or no backup on a dump file. This partially determines whether or not a file is included in a particular PFDUMP run. Refer to section 3, Mass Storage Subsystem, for further information on how the PFDUMP utility is used in an MSS environment.

PFDUMP Protected Files

When PFDUMP specifies purging of files by access date, files whose user indexes are greater than PGUI (default value is 300000_8) are not purged. This is done to prevent files such as critical recovery files, applications, and system utilities from being purged from the system due to lack of use.

LOAD PERMANENT FILE (PFLOAD)

PFLOAD loads archived files produced by the PFDUMP utility back into the permanent file system. The load can reestablish the permanent file system exactly as it was at the time of the dump, or can load only a desired subset of files on the archive file (as indicated by specified parameter options). PFLOAD issues messages to the dayfile indicating how many files were loaded and how many files with errors were encountered.

If LO=T (list all files processed) is specified, the listing produced is similar to that shown in figure 1-11. If LO=C (list all files in the catalog image record) is specified, the listing produced is similar to that shown in figure 1-16.

PFATC CATALOG OF CATALOG IMAGES ON YY/MM/DD. AT HH.MM.SS. PAGE 4

	FILE NAME	USER INDEX	ACCESS COUNT	LAST ACCESS DATE	LAST ACCESS TIME	DEVICE NUMBER
76	SYSB	6000	11	79/11/04.	12.42.09.	
77	IBL2	1	6	82/09/23.	03.12.33.	
78	IBL4	1	3	82/09/23.	03.12.33.	
79	SET2	3	0	83/02/08.	06.31.35.	
80	OVWO	3	0	83/02/08.	06.36.17.	
81	PROCFIL	1	24	82/02/22.	17.26.11.	
82	OVWRTLD	3	1	83/02/08.	06.43.56.	
83	PACBIN	3006	2	82/06/01.	00.34.46.	
84	PRB150	1	32	83/03/21.	12.50.37.	
85	FNTNOS	1000	0	81/10/21.	10.04.42.	
86	MODVMOD	1000	3	81/10/27.	13.01.14.	
87	LIST	1000	0	81/11/07.	13.14.07.	
88	FNT2MOD	1000	0	81/11/07.	13.17.22.	
89	OVWRTMZ	3	1	83/02/08.	06.44.08.	
90	OVWRTNL	3	1	83/02/08.	06.44.08.	
91	MOD	3006	1	83/06/16.	14.42.54.	
92	JOB	1	1	83/04/27.	08.10.28.	
93	IBL	1	3424	83/06/14.	05.18.48.	
94	IBLFNT	1	47	82/01/07.	13.41.20.	
95	XED	3006	0	83/07/08.	15.32.31.	
96	XEDITH	3006	0	83/07/08.	15.32.41.	
97	STM150	1	3	83/03/29.	18.56.16.	
98	IBLFNT3	1	0	82/01/06.	18.51.52.	
99	PRB200	1	15	82/06/03.	03.36.05.	
100	PACOPL	3006	2	82/07/15.	01.19.15.	

Figure 1-16. Catalog of Catalog Image Record

The two types of loads available are incremental and nonincremental. An incremental load builds up (increments) an accumulation of the most recently modified versions of the files extracted from the archive files for loading. A series of archive files is read in the reverse order of creation. The CIR (refer to next section) created by the most recent incremental dump is read and checked against the archived files on these files. If a file matches an entry on the CIR, that file is a candidate for loading. A nonincremental load does no CIR checking and uses only parameter options specified on the PFLOAD call, if any, to select candidates for loading.

Catalog Image Record

Each incremental dump (OP=M) writes a CIR at the beginning of the archive file on which the permanent files are dumped. The other types of dumps (full and partial) do not produce a CIR. The CIR is composed of two-word entries for every permanent file in the family being dumped at the time of the incremental dump (not just files included in the dump).

The format of each entry is as follows:

59	41	35	17 0
filename			userindex
access count	dn	date time	

Field	Description
filename	Name of the permanent file.
userindex	User index under which filename was cataloged.
access count	Number of times filename was accessed.
dn	Device number of the device on which filename resides if it is a direct access file and resides on a device other than the user's master device. If it resides on the master device, dn=0. If the file is indirect access, dn is ignored.
date time	Date and time filename was last accessed.

When a file is loaded, this CIR information is placed in the permanent file catalog of the device being loaded. No other information can be changed over dumps and loads without updating the utility control date and time.

Figure 1-16 contains a partial listing of the CIR. This listing can be obtained after a selective dump if the LO=C option is specified on a PFDUMP, PFLOAD, or PFATC call. A listing similar to the one in figure 1-11 can be obtained after a selective dump if the LO=T option is specified on a PFDUMP, PFLOAD, or PFATC call. In both cases, the headings vary but the format of the information is the same.

PFLOAD Selection Process

Execution of the PFLOAD utility involves the following stages to determine which permanent files (from the archive file) should be loaded and on which devices they should reside.

1. If the DN, TD, or DD parameters are used, the device number specified must exist in the family being loaded or PFLOAD aborts and issues the following message:

   PFLOAD - DEVICE nn NOT FOUND.

2. If the specified parameters logically imply that no files can be selected (such as OP=I, DN=n where n is not a master device), PFLOAD aborts and issues the following message:

   PFLOAD - NO FILES SELECTED.

3. The user index mask for selecting files (based on the device mask of the device specified by the DN and DI parameters) must be such that it is possible for some files to be on the archive file. There must be some common bits between the archive file mask (written in the header record by PFDUMP) and the load selection mask. If no common bits exist, PFLOAD aborts and issues the following message:

   PFLOAD - SELECTED FILES NOT ON ARCHIVE FILE.

4. For nonincremental loads, this stage of checking is bypassed and the entire archive file to be loaded is passed on to the next stage.

   The first step is to read the CIR from the most recent selective incremental dump file and place it on a random file. Then the archive files are read in the reverse order in which they were created (the most recently created file is read first).

   Each file on an archive file is checked against the CIR on the random file for a match of file name and user index (these fields describe a file uniquely in a family). If a match is found, the file is a candidate for loading and moves to the next stage of checking. Also, the file name and user index are zeroed out in the corresponding CIR entry to prevent subsequent loading of older versions of the same file. If a match is not found, the file is skipped because it has already been accepted (it appeared on a previous archive file and a match with the CIR was found) or has been purged. This process passes on only the latest versions of files obtained from the archive files.

5. Only files that satisfy the criteria specified by the parameters on the PFLOAD command are selected (date/time, direct or indirect, user index, file name, and so forth). All other files are skipped.

6. The DN and TD parameters are used to select files from the archive file and to determine the device on which the files should be loaded.

   Indirect access files, if selected, are always loaded on the appropriate master device (based on user index). Direct access files, if selected, are loaded on the device on which they previously resided. This is the device number contained in the file's PFC entry on the archive file. If the device number is 0, the file previously resided on the master device and will be reloaded there.

It may not be possible to load a direct access file on the device on which it previously resided because the device number may no longer exist or its secondary mask may not allow it. (Refer to Device Masks in this section for additional information.) Either of these situations can occur as a result of a reconfiguration of the permanent file system. In either case, if a direct access file cannot be loaded, the DD parameter is checked. If an alternate device is specified and its secondary mask allows it, the file is loaded on the alternate device. Otherwise, the OP=L option is checked (see step 7). If the OP=L option is not specified, PFLOAD skips the file and issues the following message:

PFLOAD - ALTERNATE DEVICE NOT FOUND,FN=filename,UI=userindex.

The DN parameter is used to select files from the archive file in the following manner. If the device specified by DN is a master device, all files (direct and indirect) cataloged on the master device (files with user indexes corresponding to that device's device mask) are selected. If the device specified by DN is not a master device, only direct access files that previously resided on the device (files with a device number of DN in their PFC entry) are selected.

Similarly, the TD parameter is used to select files from the archive file in the following manner. If the device specified by TD is a master device, all files that were cataloged on it and all direct access files that previously resided on it are selected. (This corresponds to the way the TD parameter is processed by PFDUMP.) If the device specified by TD is not a master device, only direct access files that previously resided on it are selected.

If neither the DN nor TD parameters are specified, all files meeting other selection criteria are selected. If both the DN and TD parameters are specified, only files that meet the previously described criteria for both parameters are selected.

In all cases, the device masks and master device status for the devices specified by the DN or TD parameters refer to the system in which PFLOAD is running, not the system in which the files were dumped. The user index and device number from the PFC on the archive file reflect the situation that existed at the time the files were dumped.

7. If the OP=L option is specified, the device selected in step 6 (or the failure to select a device) for the residence of a direct access file is ignored. PFLOAD determines the device, among those devices where the file may reside (based on the device mask), which has the most available space. The OP=L option is not applicable to indirect access files since they must reside on the appropriate master device.

8. When a device has been selected to receive a direct access file, PFLOAD determines if the file will fit on the device. If the file is too large, PFLOAD skips the file and issues the following message:

   PFLOAD - NO SPACE FOR FILE,FN=filename,UI=userindex.

9. In secured systems, PFLOAD verifies before loading a file that the device where the file is to reside (as selected in steps 7 and 8) is appropriate for the file's access level. If the device is not appropriate, PFLOAD skips the file and issues the following message:

   PFLOAD - NO DEVICE FOUND FOR FILE,FN=filename,UI=userindex.

   If PFLOAD is loading direct access files to the device with the most available space (OP=L), PFLOAD selects the device with the most space that also allows the required access level.

10. PFLOAD determines the catalog track where the files to be loaded are to reside and builds an index file with a one-word entry for each file on the track. The format of the entry follows.

59	17 0
filename	userindex

PFLOAD checks each candidate file against this entry to determine whether it is in the permanent file system. If it is not, the file is loaded. If it is, loading depends upon the OP=R option. If OP=R was specified on the PFLOAD call, the archive duplicate replaces the one in the permanent file system. If OP=R was not specified, archive duplicates are skipped.

Family Reconfiguration

When reconfiguring a permanent file family by adding or subtracting devices, or changing the device masks, use the PFLOAD OP=L parameter to greatly simplify the procedure. The following sequence accomplishes the required operations to reconfigure a permanent file family.

1. PFDUMP,FM=familyname.

2. Initialize all devices in the family.

3. PFLOAD,OP=L,FM=familyname.

PFLOAD in a Mass Storage Subsystem Environment

In an MSS environment, an incremental load as described previously is the typical reload procedure. PFLOAD uses the CIR from the first incremental dump file to control the loading of file data and PFC and permit entries. Files that resided only on MSF at the time of the dump may or may not have been copied to the dump tape. If OP=S was specified on the PFDUMP call, then only the PFC and permit entries for the MSF files were included on the dump tape. PFLOAD reloads only what was dumped by PFDUMP. Thus, if the file data was included on the dump tape, it will be reloaded to disk. If the file data was omitted from the dump tape, only the PFC and permit information for the files will be reloaded. Refer to section 3, Mass Storage Subsystem, for further information on how the PFLOAD utility is used in an MSS environment.

EXAMPLE

In this example, permanent files created and modified on three devices are dumped nine times. The action runs from March 1, 1982 (82.3.1) to March 10, 1982 (82.3.10). For simplification, the time of day is not shown. Before the last dump, one of the devices becomes inoperable. The example then shows how this device can be loaded from the archive tapes. The following are the three devices.

Device	Description
40	A master device containing indirect access files only. Users with this master device have their direct access files written on 41 or 42.
41	A master device containing indirect and direct access files. Direct access files cataloged on this device may be written on 42 or this device.
42	A nonmaster device containing direct access files only. All files written on this device will be cataloged on 40 or 41.

File names consist of a letter and a number. The letter identifies which device contains the catalog entry for this file (A=device 40 and B=device 41). The number is the same as the device on which the file is written.

Each file name is followed by a date in parentheses. This indicates either the day on which the file was created or when it was last modified.

Figure 1-17 outlines the creation, modifications, and dumps that were made. There is one particular action per column. The top of the column identifies the action and the key parameters used by the utility. If an archive tape is produced, it is shown at the bottom of the column. All files in the system are listed in each column. Those files affected by the action are underscored.

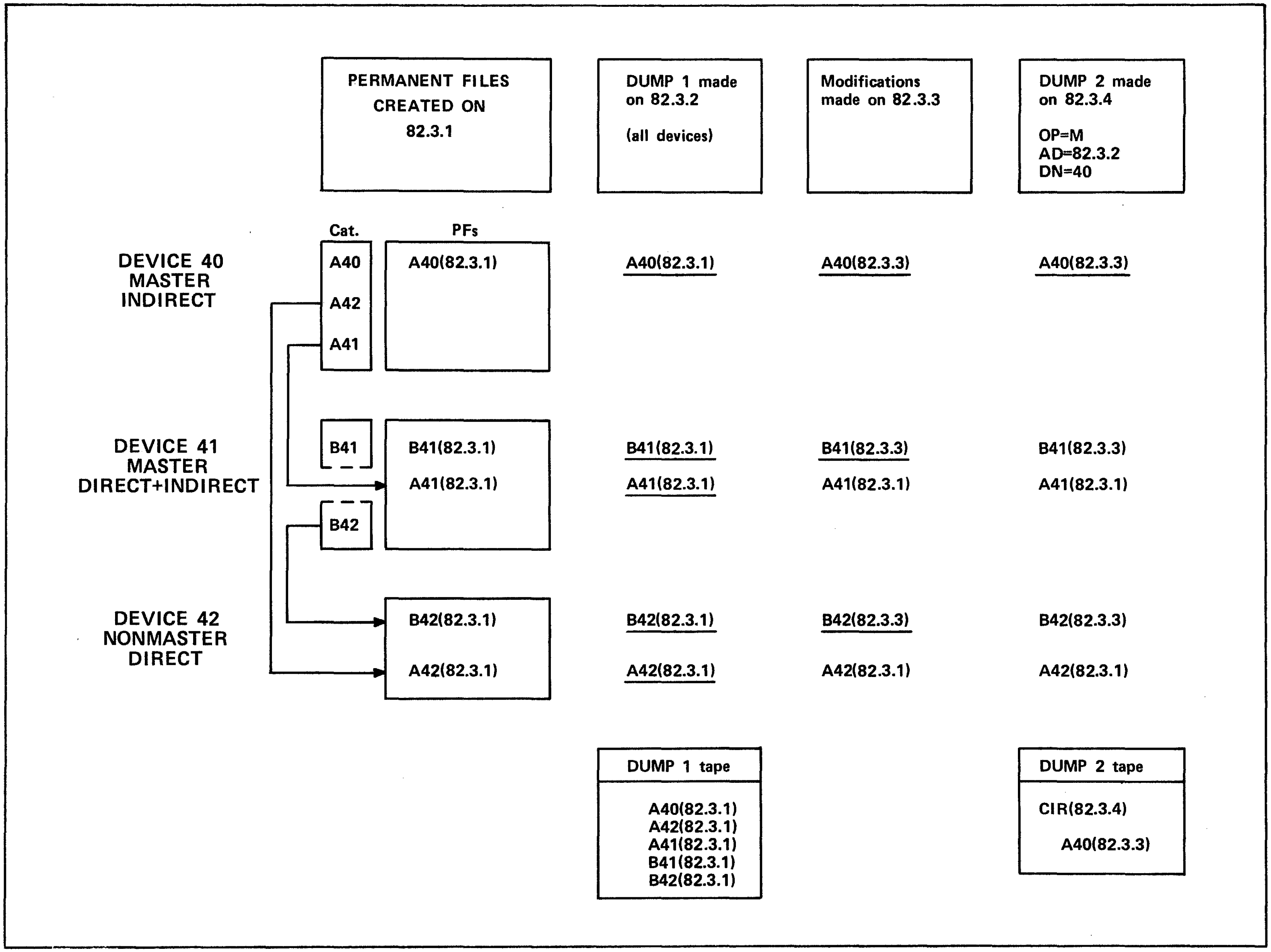


Figure 1-17. PFDUMP/PFLOAD Example (Sheet 1 of 3)

	DUMP 3 made on 82.3.4 OP=M AD=82.3.2 DN=41	DUMP 4 made on 82.3.4 OP=M AD=82.3.2 DN=42	Modifications made on 82.3.5	DUMP 5 made on 82.3.6 OP=M AD=82.3.4 (all devices)	DUMP 6 made on 82.3.7 OP=M AD=82.3.4 DN=42
DEVICE 40 MASTER INDIRECT	A40(82.3.3)	A40(82.3.3)	<u>A40(82.3.5)</u>	<u>A40(82.3.5)</u>	A40(82.3.5)
DEVICE 41 MASTER DIRECT+INDIRECT	<u>B41(82.3.3)</u> A41(82.3.1)	B41(82.3.3) A41(82.3.1)	<u>B41(82.3.5)</u> A41(82.3.1)	<u>B41(82.3.5)</u> A41(82.3.1)	B41(82.3.5) A41(82.3.1)
DEVICE 42 NONMASTER DIRECT	<u>B42(82.3.3)</u> A42(82.3.1)	<u>B42(82.3.3)</u> A42(82.3.1)	<u>B42(82.3.5)</u> A42(82.3.1)	<u>B42(82.3.5)</u> A42(82.3.1)	<u>B42(82.3.5)</u> A42(82.3.1)
	DUMP 3 tape CIR(82.3.4) B41(82.3.3) B42(82.3.3)	DUMP 4 tape CIR(82.3.4) B42(82.3.3)		DUMP 5 tape CIR(82.3.6) A40(82.3.5) B41(82.3.5) B42(82.3.5)	DUMP 6 tape CIR(82.3.7) B42(82.3.5)

Figure 1-17. PFDUMP/PFLOAD Example (Sheet 2 of 3)

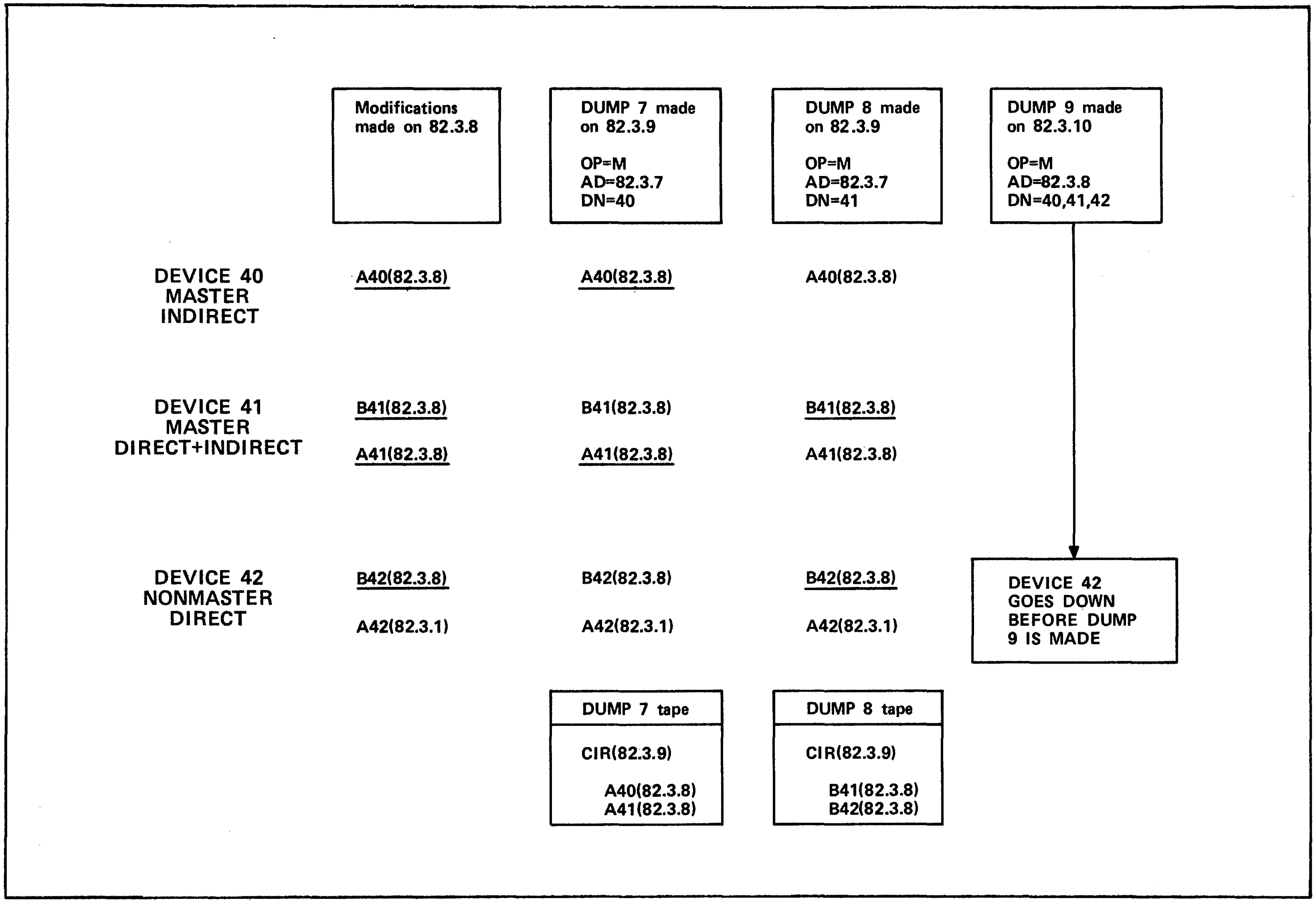


Figure 1-17. PFDUMP/PFLOAD Example (Sheet 3 of 3)

Actions during the 10 days in March in which the dumps and modifications were made run as follows:

Date	Action
82.3.1	Five permanent files are created on this date. File A40 (indirect) is written on device 40 and cataloged on device 40. File A42 (direct) is written on device 42 and cataloged on device 40. File A41 (direct) is written on device 41 and cataloged on device 40. File B41 (indirect) is written on device 41 and cataloged on device 41. File B42 (direct) is written on device 42 and cataloged on device 41.
82.3.2	DUMP 1. A full permanent file system dump. No CIR is written on the archive file.
82.3.3	Three files (A40, B41, and B42) are modified on this date. This is indicated by the modification date in parentheses following the file name.
82.3.4	DUMP 2. This is an incremental dump of device 40 that specifies permanent files modified after 82.3.3. The files for this device are the ones listed on its catalog track. The utility scans this catalog which contains entries for files A40, A42, and A41. File A40 is on device 40 and the other two are on the devices indicated by their names. Only file A40, which was modified on 82.3.3, qualifies for this dump. It is written on an archive tape after a CIR for this date (82.3.4). The CIR gives a current description of all five files in the permanent file system.
82.3.4	DUMP 3. This is an incremental dump of device 41 that specifies all files modified after 82.3.2. The catalog for this device contains entries for files B41 and B42. Both files were modified on 82.3.3 and qualify for this dump. They are written on an archive file after a CIR for this date.
82.3.4	DUMP 4. This is an incremental dump of device 42 that specifies all files modified after 82.3.2. The PFDUMP utility scans the catalogs on devices 40 and 41 to locate the files on 42. One file, B42 (82.3.3), falls in this category.
82.3.5	Three files are modified on this date.
82.3.6	DUMP 5. This is an incremental dump of each of the three devices. All files modified after 82.3.4 are specified by the AD option. Since no DN is specified, all devices are dumped in turn, producing a dump tape with three archive files.
82.3.7	DUMP 6. This incremental dump of device 42 specifies all files modified after 82.3.4. Since 42 is nonmaster, the dump routine scans the catalogs of the other two devices.
82.3.8	Four files are modified on this date.
82.3.9	DUMP 7. An incremental dump of device 40 is made with AD=82.3.7. Two files qualify.

Date	Action
82.3.9	DUMP 8. An incremental dump of device 41 is made with AD=82.3.7. The catalog on device 41 contains entries for files B41 and B42. File B41 is an indirect access file located on device 41, and file B42 is a direct access file located on device 42. Both files were modified after 82.3.7 and are dumped.
82.3.10	DUMP 9. An incremental dump of devices 40, 41, and 42 is specified, but device 42 becomes inoperable before the dump is made.

To reestablish permanent files on device 42 with the most recent modifications available, the device is first initialized and then incrementally loaded, beginning with the most recent incremental dump tape. Archive dump 8 is the most recent incremental dump tape and accordingly contains the most recent CIR. This reel is assigned first and then the CIR read onto a random file. The dump tapes are read in reverse order with each file on each tape being checked against the CIR. Dump tapes 2 and 3 are omitted since they do not involve device 42.

For each catalog track on device 42 that is to receive file entries, PFLOAD builds and maintains an index file. Before each file can be loaded, PFLOAD checks the index file to see if the file has already been loaded. If it has, the archive duplicate is skipped; if not, the archive file is loaded and another entry goes into the index file.

After initialization of device 42, the loading runs as follows:

Archive File	Action
DUMP8 tape	The analyst assigns DUMP8 tape and enters the command:
CIR(82.3.9)	PFLOAD,T=DUMP8,DN=42.
B41(82.3.8) B42(82.3.8)	The utility reads the CIR from this tape onto a random file. It then looks for files for device 42 on this tape. B42 qualifies, and its entry in the CIR is removed. The file B42 is loaded on device 42. The catalog of this file on device 41 is created. After loading this file, the utility makes an entry in the index file as follows:

B42	userindex

The utility then requests the next reel.

Archive File	Action
DUMP7 tape CIR(82.3.9) A40(82.3.8) A41(82.3.8)	The analyst assigns this tape, and the utility reads the archive file and checks it against the CIR loaded from DUMP8 above. No match is found. The next reel is requested.
DUMP6 tape CIR(82.3.7) B42(82.3.5)	This tape is assigned and then compared with the CIR. B42 is a file from device 42. However, its entry in the CIR was removed when it was read from DUMP8.

Archive File	Action
DUMP5 tape CIR(82.3.6) A40(82.3.5) B41(82.3.5) B42(82.3.5)	This tape is assigned and then compared with the CIR. B42 is from device 42 but it has already been removed from the CIR and the utility skips this version.
DUMP4 tape CIR(82.3.4) B42(82.3.3)	This tape is assigned and compared with the CIR originally read from DUMP8 tape. It has been removed from the CIR and this file is skipped.
DUMP1 tape A40(82.3.1) A42(82.3.1) A41(82.3.1) B41(82.3.1) B42(82.3.1)	This tape, produced by a full dump, contains all the files that were on the permanent file system when the dump was made (82.3.1). These files are checked against CIR (82.3.9). A match is found with A42. This file is loaded. Device 42 now has the same files with the same update status that they had on 82.3.9 when the last incremental dump was made.

QUEUE/DAYFILE UTILITIES 2

Several utility programs provide control over queued input and output files and over system, account, error log, and binary maintenance dayfiles. The utility programs are divided into two groups, according to the type of selective processing they provide.

- The queue file utilities are 10 utilities under the control of the queue file supervisor program QFSP. These utilities select for processing queued files or dayfiles that share certain user-specified characteristics such as device residence, file destination, and job sequence name.

- The dayfile dumping utilities are five independent utilities that dump all or selected parts of the active system, account, error log or binary maintenance log dayfiles. These utilities each process the contents of a single file according to user-specified criteria.

QUEUE FILE UTILITIES

The names and functions of the queue file utilities follow. Detailed information about the call and operation of each utility is contained in the following sections.

Utility	Description
DFLIST	Lists dayfiles that have been made permanent files by the DFTERM utility.
DFTERM	Terminates an active or inactive dayfile and retains it as a direct access permanent file.
LDLIST	Lists queued files present on a QDUMP dump tape.
QALTER	Alters routing information associated with active queued files; purges active queued files.
QDUMP	Dumps queued files to tape or mass storage.
QFTLIST	Lists detailed information about active queued files.
QLIST	Lists inactive queued files.
QLOAD	Loads files dumped by QDUMP as queued files.
QMOVE	Moves queued files from one mass storage device to another.
QREC	Deactivates or activates selected queued files; purges inactive queued files.

CALLING THE QUEUE FILE UTILITIES

All queue file utility operations, except for DFLIST, LDLIST, and QLIST, can be initiated through console input to a K display. All queue utilities except DFLIST, DFTERM, QALTER, and QFTLIST can be initiated through direct keyboard entries (under DIS or DSD control, including procedure files), card input (batch), or terminal entries. DFTERM, DFLIST, QALTER, and QFTLIST operation can be initiated only through direct keyboard entries. However, in all cases, for batch and terminal input, the user must be validated for system origin privileges, the system must be in debug mode, and the user must observe certain parameter order dependencies. Since LDLIST, QDUMP, and QLOAD require preassignment of the dump file, only DIS, batch, or terminal input is appropriate for these utilities.

Console Input

Input from a console through a K display requires the following sequence of entries and responses. These procedures do not apply to DFLIST, QLIST, or LDLIST, because K displays are not available for these utilities.

1. Call QFSP by typing:

   X.QFSP.

   The B display indicates the job sequence name of QFSP. To the right of the entry the following message appears:

   REQUEST *K* DISPLAY

2. Activate the K display for that control point by typing:

   K,jsn. (jsn is the job sequence name of QFSP as specified on the B display.)

   The display shown in figure 2-1 appears on the left screen. Instructions at the bottom of the display describe how to select the desired utility.

```
              *** QUEUED FILE SUPERVISOR ***


         UTILITY  DESCRIPTION
          QDUMP   - QUEUED FILE DUMP PROCESSOR.
          QLOAD   - QUEUED FILE LOAD PROCESSOR.
          QMOVE   - QUEUED FILE MOVE PROCESSOR.
          QREC    - PROCESS QUEUED FILES.
          DFTERM  - TERMINATE DAYFILES.
          QFTLIST - LIST ACTIVE QUEUED FILES.
          QALTER  - ALTER ACTIVE QUEUED FILES.

   SELECT DESIRED UTILITY BY ENTERING K.OPTION
   WHERE OPTION IS ONE OF THE UILITIES LISTED
   ABOVE.
```

Figure 2-1. QFSP Display

3. Select the desired utility by typing:

   K.utility. (utility is one of the utilities shown in the K display, figure 2-1.)

   The parameter options available under the chosen utility appear on the left screen as the initial K display for the utility. Figures 2-3, 2-9, 2-12, 2-14, and 2-17 exhibit initial K displays for the various utilities. Different parameter options are available with the different utilities. (Refer to Description of Queue Utility Options described later in this section.)

   It is also possible to call each utility directly by substituting the following for steps 1, 2, and 3.

   a. Call the desired utility by typing:

      X.utility. (utility is one of the utilities shown in figure 2-1.)

      The B display indicates the job sequence name of the chosen utility. The following message also appears.

      REQUEST *K* DISPLAY

   b. Activate the initial K display for the chosen utility by typing:

      K,jsn. (jsn is the job sequence name as specified on the B display.)

4. Several commands are available to aid in the use of the utilities and direct processing. A right screen display lists and defines each available command. Activate this K display by typing:

   KK.

   Figure 2-2 illustrates this queue file utility commands display.

   The following is a list of the queue file utility commands included on the display and a description of each.

Command	Description
GO	Directs the active utility to proceed with the processing of the entered parameters. When the processing is complete, the left screen K display is reset to the default values.
STOP	Terminates the active utility and ends the K display interaction.
RESET	Resets all options displayed on the left screen K display to their default values.
LIST	If the DFTERM utility is active, this command displays a list of all permanent dayfiles (refer to figure 2-4). The list of files displayed is also written on the output file specified by the DFTERM L option.

Command	Description
	If the QALTER or QFTLIST utility is active, this command displays a list of active queued files on the right screen K display (refer to figure 2-6). The list of files is also written on the output file specified by the QALTER or QFTLIST L option. If the QREC utility is active, this command displays a list of inactive queued files on the right screen K display (refer to figure 2-18). The list of files displayed is also written on the output file specified by the QREC L option.
LIST=qft	Displays detailed information about the active queued file at QFT ordinal qft on the right screen K display (refer to figure 2-7) and writes the information to the output file specified by the QALTER or QFTLIST L option. This form of LIST is accepted only by QALTER and QFTLIST.
+	Used in conjunction with the LIST command and displays succeeding pages (screens) of the information listed. This command applies only to the QREC, QALTER, and QFTLIST utilities.
*	Enables the user to page the left screen K display. This command applies only to the QREC, QDUMP, QLOAD, QMOVE, QFTLIST, and QALTER utilities.
CLEAR	Used in conjunction with the LIST command and returns the right screen K display to the list of processing commands initially displayed (refer to figure 2-2) and returns the left screen K display to the first page.
OUT	Sends the output file specified by the L option of each utility to the print queue for immediate printing. Any information that has been or is currently displayed on the right screen K display via the LIST command is also included with the disposed output. In addition, if the LIST command is currently active, the list displayed on the right screen is disposed, and the initial right screen K display shown in figure 2-2 is returned automatically.
FAMILY	Enables users of utilities which enter files in the active queue (QLOAD, QREC, and QMOVE) to specify whether or not files are queued when creation or destination families are not active [not in family ordinal table (FOT)]. Default is not to queue these files. When the FAMILY command is specified, entries are made in the FOT for inactive families and the files are queued.
LID	Enables users of utilities which enter files in the active queue (QLOAD, QREC, and QMOVE) to specify whether or not files are queued when the creation logical identifier (LID) is not in the LID table. Default is not to queue these files. When the LID command is specified, entries are made in the LID table and the files are queued.

Command	Description
REWIND	Rewinds the load or dump file specified by the FN option before processing. This command applies only to the QLOAD and QDUMP utilities.
ERROR	If the QDUMP utility is active, enabling this command causes files on which unrecoverable read errors were encountered to be dumped with the errors listed on the output file. Disabling this command causes these files to be ignored. The default under QDUMP is enabled. If the QLOAD utility is active, enabling this command causes such files to be loaded with the errors listed on the output file. Disabling the command causes such files to be ignored. The default under QLOAD is disabled. If the QMOVE utility is active, enabling this command causes such files to be moved with errors listed on the output file. Disabling this command causes such files to be ignored. The default under QMOVE is disabled. The entry of this command toggles the setting of this command.

```
              *** QUEUE FILE UTILITY COMMANDS ***  PAGE 1 OF 2

THE FOLLOWING COMMANDS ARE PROVIDED-

  GO     -  PROCEED WITH PROCESSING (FM MUST BE SPECIFIED).
            (ALL UTILITIES)
  STOP   -  TERMINATE INPUT, END RUN. (ALL UTILITIES)
  RESET  -  RESET PARAMETERS TO DEFAULT VALUES.
            (ALL UTILITIES)
  LIST   -  DISPLAY JOBNAMES OF ACTIVE/INACTIVE QUEUED FILES
            ON RIGHT SCREEN.  (QREC, DFTERM, QALTER, QFTLIST).
  +      -  PAGE RIGHT SCREEN.  (QREC, QALTER, QFTLIST, QFSP).
  *      -  PAGE LEFT SCREEN.
            (QREC, QDUMP, QLOAD, QMOVE, QFTLIST, QALTER).
  CLEAR  -  SET BOTH SCREENS TO FIRST PAGE OF K-DISPLAY.
            (QREC, DFTERM, QFTLIST, QALTER).
  OUT    -  RELEASE FILE SPECIFIED BY L PARAMETER TO
            PRINTER. (ALL UTILITIES)
  FAMILY-   IF ENTERED, ENTRIES WILL BE MADE IN THE FOT FOR
            THE INACTIVE FAMILIES AND THE FILES WILL BE QUEUED.
            (QREC, QLOAD, QMOVE).
  LID    -  IF ENTERED, ENTRIES WILL BE MADE IN THE LID TABLE
            FOR THE INACTIVE LIDS AND THE FILES WILL BE QUEUED.
            (QREC, QLOAD, QMOVE).
  REWIND-   IF ENTERED, DUMP/LOAD FILE WILL BE REWOUND WHEN
            *GO* COMMAND IS ENTERED. (QDUMP AND QLOAD ONLY).
  ERROR  -  TOGGLE STATUS OF ERRORED FILE PROCESSING.
            (QDUMP, QLOAD, QMOVE ONLY).
```

Figure 2-2. Queue File Utility Commands Display (Sheet 1 of 2)

```
               *** QUEUE FILE DIRECTIVE FORMATS ***  PAGE 2 OF 2

THE FOLLOWING DIRECTIVES MAY HAVE ONE OF SEVERAL FORMS-

  DA=YYMMDD          PROCESS THIS DATE ONLY.
  DA=YYMMDD-YYMMDD   PROCESS ALL DATES IN SPECIFIED RANGE.
  DA=ALL             PROCESS ALL DATES.

  UI=XXXXXX          PROCESS THIS USER INDEX ONLY.
  UI=XXXXXX-YYYYYY   PROCESS ALL INDICES IN SPECIFIED RANGE.

  TUI=XXXXXX         PROCESS THIS USER INDEX ONLY.
  TUI=XXXXXX-YYYYYY  PROCESS ALL INDICES IN SPECIFIED RANGE.

  FS=XXXXXX          PROCESS THIS FILE SIZE ONLY.
  FS=XXXXXX-YYYYYY   PROCESS ALL SIZES IN SPECIFIED RANGE.
     IF 777777B IS SPECIFIED, ALL SIZES LARGER ARE INCLUDED.

  ID=XX              PROCESS THIS ID ONLY.
  ID=XX-YY           PROCESS ALL ID,S IN SPECIFIED RANGE.

  FC=FORMS CODE.
     FC=F1/F2/F3     SPECIFY FORMS CODE LIST.
     FC=F1-F2        SPECIFY FORMS CODE RANGE.

  DS=DT  FILE DESTINATION=DISPOSITION TYPE.
    FILE DESTINATION TYPES INCLUDE THE FOLLOWING-
     BC - BATCH      RB - REMOTE BATCH
    DISPOSITION TYPES INCLUDE THE FOLLOWING-
     IN - INPUT               PU - PUNCH
     PL - PLOT                PR - ANY PRINTER
     P2 - 512 PRINTER         LR - 580-12 PRINTER
     LS - 580-16 PRINTER      LT - 580-20 PRINTER
     WT - WAIT QUEUE          SF - SPECIAL QUEUE TYPES
     ALL - ALL QUEUES         PRINT - ALL PRINT QUEUES
     NONE - NO QUEUES
```

Figure 2-2. Queue File Utility Commands Display (Sheet 2 of 2)

5. Select the desired parameter options by typing:

    K.opt_1=val_1,opt_2=val_2,...,opt_n=val_n.

   where the opt_i=val_i are selected from the parameter option list on the initial K display for the chosen utility.

   The option parameter entries are issued to the job dayfile, which is included in the output file specified by the L option for each utility (refer to Parameters for the Queue File Utilities).

   If the FM option is specified for QDUMP, QMOVE, or QREC (indicating the processing of queue files for only the specified family of devices), the initial left screen display (refer to figures 2-9, 2-14, and 2-17) is replaced by the secondary left screen display (refer to figures 2-10, 2-15, and 2-19). This display closely resembles the initial left screen for the utility but restricts processing to the family of devices specified. Each device in the specified family containing inactive queued files is indicated. In addition, any option entered for the utility is reflected in this display. Options not entered remain at default values.

   If the FM option is not specified, the initial K display remains on the left screen. However, the display is modified to reflect the parameter options entered. Options not entered remain at the default values.

   The displays are modified in this manner to provide an opportunity to double-check the entry. If it is necessary to modify the entry, reenter those options that are to be changed. Entry of illegal data causes an error message to appear at the bottom of the left screen K display. In this case, the portion of the entry up to the point where the error was encountered is processed; the remainder of the entry (from left to right) is ignored.

6. Initiate execution by typing:

    K.GO.

   When processing is complete, the left screen K display is reset to default values, the message

    option COMPLETE   (option is the name of the utility processed)

   appears at the bottom of the screen, and the right screen returns to the original display.

7. Terminate use of the chosen utility and end K display interaction by typing:

    K.STOP.

   An output file is generated indicating the disposition of queued files or dayfiles processed. Examples of output files generated by each utility are shown in figures 2-4, 2-11, 2-13, 2-16, and 2-20.

It is also possible to call each utility and specify appropriate options without the use of K displays; this is the only way to call DFLIST. This is accomplished using a single keyboard entry in the following format.

X.utility(opt_1=val_1,opt_2=val_2,...,opt_n=val_n,I=filename,PO=N)

Parameter	Description
utility	Any queue or dayfile utility.
opt_i=val_i	Parameter options (refer to Parameters for the Queue File Utilities).
I=filename	Name of alternate input file (optional). This file may contain K display utility commands (GO, STOP, RESET, and so on) and/or valid option parameters.
PO=N	Specifies that no K display input is allowed. The use of the PO=N parameter and proper parameter selection allows the utility to run without additional operator intervention. This parameter is not needed and should not be entered for QLIST, LDLIST, and DFLIST.

The specified utility processes parameter options on the command before the alternate input file, if any. If the utility is QLIST, LDLIST, or DFLIST or if PO=N is specified, the requested queue/dayfile processing proceeds after all command and/or alternate input file parameters have been processed (unless a STOP command is encountered on the alternate input file). If PO=N is omitted from the command and the utility is not one previously mentioned, the utility requests the K display after processing the command and alternate input file (unless a STOP command is encountered on the alternate input file). The K display then reflects the status of all parameter options after processing of the command and alternate input file is complete. If the utility encounters an error while processing the command or alternate input file, a request for the K display appears on the DSD B display (except for QLIST, LDLIST, and DFLIST). The operator may then activate the K display, enter the correct parameter options, and continue processing. However, if errors are encountered and the utility was invoked by a nonsystem origin job, a message is issued to the dayfile, and utility processing is terminated.

Batch Input

To call the utilities from a batch job, the user must be validated for system origin privileges, and the system must be in debug mode. The following sequence of commands is used to call a utility.

```
ujn.
USER,username,password,familyname.
CHARGE,*.
utility,opt1=val1,opt2=val2,...,optn=valn,I=filename,PO=N.
```

Parameter	Description
utility	Any of the following utilities: QREC, QDUMP, QLOAD, QMOVE, QLIST, or LDLIST.
$opt_i=val_i$	Parameter options (refer to Parameters for the Queue File Utilities).
I=filename	Name of alternate input file (optional). This file may contain K display utility commands (GO, STOP, RESET, and so on) and/or valid option parameters.
PO=N	Specifies that no K display input is allowed. The use of the PO=N parameter and proper parameter selection allows the utility to run without additional operator intervention. This parameter is not needed and should not be entered for QLIST or LDLIST.

The DFLIST, DFTERM, QALTER, and QFTLIST utilities cannot be called from a batch job. They must be initiated from the system console.

Terminal Input

The format of terminal input for calling the queue utilities is substantially the same as that for batch input. The user must be validated for system origin privileges, and the system must be in debug mode. At login, the user enters the batch subsystem, calls the desired utility, and enters the appropriate parameters with the command

```
utility,opt1=val1,opt2=val2,...,optn=valn,I=filename,PO=N.
```

The utility, opt=val, I=filename, and PO=N parameters are as described for batch input.

PARAMETERS FOR THE QUEUE FILE UTILITIES

Table 2-1 indicates the parameter options accepted by each queue file utility. (DFLIST is not included because it does not accept any parameters.) An X indicates that a parameter option is accepted; a blank indicates that a parameter option is not accepted. Refer to the following descriptions of parameters for more information.

Table 2-1. Queue File Utility Parameter Options

Parameter	Utility								
	QREC	QDUMP	QLOAD	QMOVE	QALTER	LDLIST	QFTLIST	DFTERM	QLIST
BC	X	X	X	X	X	X	X		X
DA	X	X	X	X		X			X
DD			X	X		X			
DF			X	X	X	X	X		
DN	X	X		X	X		X	X	X
FC	X	X	X	X	X	X	X		X
FM	X	X		X	X		X	X	X
FN		X	X			X			
FS	X	X	X	X		X			X
FT								X	
FU	X	X	X	X		X			X
ID	X	X	X	X	X	X	X		X
JSN	X	X	X	X	X		X		X
L	X	X	X	X	X	X	X	X	X
LA	X	X	X	X	X	X	X		X
LD	X	X	X	X	X	X	X		X
LO					X		X		
MI	X	X	X	X		X			X
NAL					X				
NDC					X				
NDF					X				
NEC					X				
NF		X	X			X			
NFC					X				
NID					X				
NLD					X				
NM								X	
NPR					X				
NRC					X				
NUN					X				
OP	X		X	X	X			X	
PO	X	X	X	X	X		X	X	
RB	X	X	X	X	X	X	X		X
SC			X			X			
TF	X	X	X	X					
TP		X		X					
TUI	X	X	X	X		X			X
UA	X	X	X	X	X	X	X		X
UI	X	X	X	X		X			X
UJN					X		X		
UN					X		X		

Description of Queue Utility Options

Option	Description
BC=dt	Queued files destined for local batch devices can be selected for processing by disposition type (dt).

dt	Description
ALL	Files of all disposition types.
IN	Input files.
LR	580-12 printer files.
LS	580-16 printer files.
LT	580-20 printer files.
NONE	No files.
PH,PU	Punch files.
PL	Plot files.
PR	Files that can print on any printer.
PRINT	All printer files.
P2	512 printer files.
SF	Installation-defined special files; cannot be used with QALTER or QFTLIST.
WT	Queued files with a wait disposition.

The BC entry can be specified more than once, with each successive entry reversing the previously established condition. By default, all disposition types are selected; so any entry actually clears the automatic selection. For example, BC=PU means local batch destined punch files are not to be processed. However, a second BC=PU entry reenables processing of local batch destined punch files.

If BC=ALL or BC=NONE is specified, processing of all disposition types is either enabled or disabled, respectively. If all disposition types are currently enabled, entering BC=ALL has no effect. Likewise, entering BC=NONE has no effect if all disposition types are disabled.

DA=yymmdd

Processing date in the form of year, month, day. If one date is specified, only queued files created on that day are processed. If two dates, separated by a hyphen, are specified (for example, 820130-820213), all queued files created within the specified range (including the end dates) are processed. If DA=ALL is specified, all queued files are processed. If this option is omitted with utilities other than QLIST, queued files created five days prior to the current date are processed. If this option is omitted with QLIST, all inactive queued files, regardless of creation date, are processed.

Option	Description
DD=dn	Destination device to which files are to be loaded or moved. The DF option must be specified before the DD option. If DF is specified, DD must also be specified. Since QMOVE requires DF, DD must also be specified.
DF=familyname	Family of devices to which files are to be loaded or moved. With QMOVE, this option must be specified. With QALTER or QFTLIST, DF must be used with the UN option. The utility will process files belonging to the remote terminal identified by these options.
DN=dn	One- or two-digit device number (1 through 77_8). With utilities other than DFTERM, this option specifies the device to be processed, dumped, or loaded. The FM option must be specified before the DN option. Default is all devices. With DFTERM, this option specifies the device on which the inactive dayfile resides or on which the new dayfile will reside if the active dayfile is terminated. Default is the device on which the current dayfile resides.
FC=fc	Forms code for output files considered for processing. This option does not deselect input files.

fc	Description
ALL	All files are considered for processing regardless of forms codes.
$fc_1/fc_2/fc_3$	fc_i is two alphanumeric characters or **, indicating null forms codes. Up to three forms codes or ** can be specified; files with the specified forms code(s) are considered for processing.
fc_1-fc_2	fc_i is two alphanumeric characters or **. The 6-bit display code value of fc_1 must be less than or equal to the 6-bit display code value of fc_2. fc_2 can be ** only if fc_1 is also **. Files in the range fc_1 through fc_2 are considered for processing; if fc_1 equals **, files with no forms code are (also) considered for processing.

A subsequent FC entry replaces any FC entry previously made. Default is to consider all files for processing regardless of forms codes.

Option	Description
FM=familyname	Name of family to be processed. Default is to process all queued files on all devices in all families. With DFTERM, this option specifies the family of devices on which the inactive dayfile resides or on which the new dayfile will reside if the active dayfile is terminated. If an active dayfile is terminated, default is the same family as that in which the dayfile being terminated resides.

Option	Description
FN=filename	File name of dump or load file. Default is FN=QFILES.
FS=x	File size in PRUs. The value can be entered as a single file size (FS=100) or as a range of file sizes (FS=10-400). $x \leq 777777_8$. Default is to consider all files for processing regardless of file size.
FT=t	Type of dayfile to be terminated by the DFTERM utility.

t	Description
ACCOUNT	Account dayfile.
DAYFILE	System dayfile.
ERRLOG	Error log dayfile.
MAINLOG	Binary maintenance log dayfile.

This option causes the FM and DN options to be updated to reflect the current family and device number of the dayfile specified by FT. Default is FT=DAYFILE.

Option	Description
FU=familyname	Name of family under which the queued files to be processed were created. Queued files created by users of one family can reside on nonremovable devices of another family. The FM option specifies the family of devices that will be searched for queued files created by users validated in the family specified by the FU option. Default is to process queued files created by users in all families.
ID=id	One- or two-digit octal number (0 through 67_8) specifying that only local batch destined queued files assigned that identifier are to be processed. This parameter does not deselect remote batch destined files. If two identifiers, separated by a hyphen, are specified (for example, ID=6-30), any queued file with an identifier in the specified range (including the end points) is processed. Default is to process all queued files regardless of identifier.
JSN=jsn	Four-character job sequence name of queued files to be processed, dumped, loaded, or moved. At most, five job sequence names can be specified. If a job sequence name is specified more than once, it is removed from the list. Default is to process all queued files regardless of job sequence name.
L=outfile	One- to seven-character name of the file to receive output. Default is L=OUTPUT.
LA=level	One- to seven-character name which specifies the lower limit of the range of access levels to process. If this parameter is specified, the UA parameter must also be specified. If neither LA nor UA is specified, the default is that all access levels are selected.

Option	Description
LD=lid	Three-character logical identifier of the mainframe with which the file is associated. LD=0 means process all files without LIDs. A subsequent LD entry replaces any LD entry previously made. Default is to process all queued files regardless of logical identifier.
LO=opt	List option associated with the output file specified by the L option. **opt** / **Description** F — All routing information for each file. S — Condensed listing of each selected queued file.
MI=id	Two-character machine identifier indicating the mainframe on which the queued files to be processed currently reside. If MI=ALL is specified, any queued file residing on any mainframe is processed. The MI entry is cleared if previously specified; that is, specifying two identical MI entries is the same as not specifying any at all. If the MI entry is cleared on the K display, the id is not checked. Default is machine identifier of the mainframe where the utility is being run.
NAL=level	QALTER can change the access level of a queued file. The new access level must be within the origin type limits for the file and within the device limits of the device on which the file resides. This option is restricted to users with security administrator privileges.
NDC=dt	QALTER can change a print file's disposition type while the file is in the queue. New disposition types that can be selected include the following. **dt** / **Description** LP — Any printer. LR — 580-12 printer. LS — 580-16 printer. LT — 580-20 printer. NONE — No device code specified. PR — Any printer. P2 — 512 printer.
NDF=familyname	New destination family name associated with selected output files. This option is meaningful only in the altering of files routed to or changed to remote batch. A subsequent NDF entry replaces any previous NDF entry. Default is no change in destination family name.

Option	Description
NEC=ex	QALTER can change an output file's external characteristics. New external characteristics that can be selected include the following. For print files: A4 ASCII graphic 48-character set. A6 ASCII graphic 63/64-character set. A9 ASCII graphic 95-character set. B4 BCD graphic 48-character set. B6 BCD graphic 63/64-character set. For punch files: AS Punch ASCII. PB Punch system binary. PH Punch 026 mode. P8 Punch 80-column binary. P9 Punch 029 mode. For plot files: T6 Transparent 6-bit. T8 Transparent 8-bit.
NF=n	Decimal number of media files to skip. A media file contains all queued files which are dumped by one QDUMP operation. Each of these dumped queued files exists as a record on the media file. If two QDUMP operations are performed, the dumped queued files exist as records on two files. This option can be used in conjunction with the SC option. Default is 0.
NFC=fc	Two alphanumeric characters or ** (null forms code) specifying the new forms code associated with selected output files. The NFC entry is cleared if previously specified; that is, specifying two identical NFC entries is the same as not specifying any at all. Default is no change in forms code.
NID=id	One- or two-digit number (0 through 67_8) specifying the new file identifier associated with selected output files. This option is meaningful only in the altering of files routed to or changed to local batch. The NID entry is cleared if previously specified; that is, specifying two identical NID entries is the same as not specifying any at all. Default is no change in file identifier.
NLD=lid	Three-character logical identifier specifying the new logical identifier associated with selected files. NLD=0 will remove the LID from selected files. A subsequent NLD entry replaces any NLD entry previously made. Default is no change in logical identifier.

Option	Description
NM=filename	One- to five-character name of the direct access permanent file on which DFTERM writes the terminated dayfile. DFTERM adds a two-character prefix indicating the type of dayfile being terminated (AC, DF, ML, or ER). Default is automatic naming of the file by DFTERM according to the following. • The first two characters indicate the type of dayfile being terminated (AC, DF, ML, or ER). • The third character is a sequence number (A through 9). • The next two characters indicate the month. • The last two characters indicate the day of the month.
NPR=p	One- to four-digit number (0 through 7777_8) specifying the new queue priority associated with selected output files. The NPR entry is cleared if previously specified; that is, specifying two identical NPR entries is the same as not specifying any at all. Default is no change in queue priority.
NRC=c	One- or two-digit number (0 through 37_8) specifying the new repeat count associated with selected output files. The NRC entry is cleared if previously specified; that is, specifying two identical NRC entries is the same as not specifying any at all. Default is no change in repeat count.
NUN=username	New destination user name associated with selected output files. This option is meaningful only in the altering of files routed to or changed to remote batch. The NUN entry is cleared if previously specified; that is, specifying two identical NUN entries is the same as not specifying any at all. Default is no change in destination user name.
OP=opt	Processing option specifying the function to be performed by each utility. With QREC, opt can be any of the following. Default is OP=RI.

opt	Description
DI	Selected active queued files are made inactive and the remaining active queued files are ignored.
PI	Selected inactive queued files are purged, and the remaining inactive queued files are ignored.
RI	Selected inactive queued files are activated (requeued), and the remaining inactive queued files are ignored.
RP	Selected inactive queued files are activated (requeued), and the remaining inactive queued files are purged.

Option	Description
	With QALTER, opt specifies the destination to which the selected queued files should be changed, and can be one of the following. Default is OP=NC.

opt	Description
BC	Change to local batch.
NC	Do not change file destination.
PR	Purge files.
RB	Change to remote batch.

With DFTERM, opt specifies whether active or inactive dayfiles will be terminated. With QLOAD and QMOVE, opt specifies whether the loaded or moved queued files will be active or inactive. With these utilities, opt can be one of the following. Default is OP=A.

opt	Description
A	Active queues/dayfiles are specified.
I	Inactive queues/dayfiles are specified.

PO=opt — Processing option specifying the function to be performed.

opt	Description
N	Only command directives are processed. The K display is available to monitor utility progress, but no K display input is allowed. The N option is implied on all nonsystem origin jobs.
R	The dump or load file is rewound before processing begins.
E	Errored file processing status is toggled. Default conditions for queue utilities include:

Default	Utility
Dump file.	QDUMP
Do not load file.	QLOAD
Do not move file.	QMOVE

opt	Description
F	Entries are made in FOT for inactive families and the files are queued.
L	Entries are made in the LID table for inactive LIDs and the files are queued.

Option	Description
RB=dt	Queued files destined for remote batch devices can be selected for processing by disposition type (dt).

dt	Description
ALL	Files of all disposition types.
IN	Input files.
LR	580-12 printer files.
LS	580-16 printer files.
LT	580-20 printer files.
NONE	No files.
PH,PU	Punch files.
PL	Plot files.
PR	Files that can print on any printer.
PRINT	All printer files.
P2	512 printer files.
SF	Installation-defined special files; cannot be used with QALTER or QFTLIST.
WT	Queued files with a wait disposition.

The RB entry can be specified more than once, with each successive entry reversing the previously established condition. By default, all disposition types are selected; so any entry actually clears the automatic selection. For example, RB=PU means remote batch destined punch files are not to be processed. However, a second RB=PU entry reenables processing of remote batch destined punch files.

If RB=ALL or RB=NONE is specified, processing of all disposition types is either enabled or disabled, respectively. If all disposition types are currently enabled, entering RB=ALL has no effect. Likewise, entering RB=NONE has no effect if all disposition types are disabled.

Option	Description
SC=n	Decimal number of queued files (and hence records on the dump file) to be skipped before the queue selection begins. Skipping begins at the point on the dump file indicated by the NF option. This option allows a restart load to begin from the last aborted queue loaded by QLOAD. Default is SC=0.
TF=familyname	Name of family for remote batch destined files to be selected. By using the TF parameter with the TUI parameter, files destined for a particular remote batch terminal can be selected. Local batch destined files are not deselected by this parameter. Default is all families selected.

Option	Description
TP=t	Type of files to move or dump. Default is TP=ALL. **t** — **Description** A — Active files. ALL — Active and inactive files. I — Inactive files.
TUI=userindex	One- to six-digit value plus a radix which specifies the destination terminal user index for remote batch destined output files. If one userindex is specified (xxxxxx), only that user index is processed. If a range is specified (xxxxxx-yyyyyy), all indexes in the specified range are processed. If TUI=0, no terminal user index is specified. Default is TUI=0.
UA=level	One- to seven-character name which specifies the upper limit of the range of access levels to process. If this parameter is specified, the LA parameter must also be specified. If neither LA nor UA is specified, the default is that all access levels are selected.
UI=userindex	User index under which queued files to be processed were created. If two user indexes, separated by a hyphen, are specified (for example, 75-162), all queued files created by all users having indexes within this range (including the end points) are processed. Default is to process all queued files regardless of user index.
UJN=ujn	One- to seven-character user job name specified on Job commands associated with queued files being listed or altered. Only one name can be specified. A subsequent UJN entry replaces any UJN entry previously made. This option in conjunction with the JSN option uniquely describes which files are to be processed. Default is no UJN specified.
UN=username	Destination user name within the family specified by the DF option. UN and DF must be specified together. The utility (QALTER or QFTLIST) will process files belonging to the remote terminal identified by these options. The UN entry is cleared if previously specified; that is, specifying two identical UN entries is the same as not specifying any at all.

NOTE

If the currently displayed value for JSN, NFC, NID, NPR, NRC, NUN, or UN is reentered, the value for the specified option is cleared.

File Preassignment

When using the LDLIST, QDUMP, and QLOAD utilities, the dump or load file must be preassigned. This can be done by using a LABEL or an ASSIGN command. For example, the following commands can be used.

```
LABEL,QFILES,VSN=DMP1,D=HY.
        or
ASSIGN,MS,QFILES.
```

If no dump file is present, QDUMP will write on a local mass storage file; LDLIST and QLOAD will attempt to read an empty file and terminate.

Active and Inactive Queued Files

A queued file can be active or inactive. All queued files are originally active upon entering a queue. A queued file is deactivated (made inactive) when its entry is removed from the queued file table (QFT) and a corresponding entry is created in the inactive queued file table (IQFT) on the mass storage device where the queued file resides. An inactive queued file is activated when the entry from the IQFT is removed and a corresponding entry is created in the QFT. Inactive queued files are not considered for processing (other than by the queue utilities), nor do they appear on any DSD display.

Three queue file utilities can deactivate or activate queued files (QLOAD, QMOVE, and QREC). QLOAD and QMOVE each transfer queued files from either tape or mass storage to a mass storage device. Upon completion of the transfer, the utility leaves the queued files active or inactive according to parameters specified by the analyst or operator. QREC does not perform any file transfer but only adjusts table entries as described in the preceding paragraph. These three utilities have uses other than deactivation and activation of queued files (refer to the description of the appropriate utility and parameter options).

Queued files are also deactivated when they are recovered during a level 0 deadstart. Such files can be activated automatically by an IPRDECK entry that invokes QREC during a level 0 deadstart. Refer to the NOS 2 Installation Handbook for further information on IPRDECK.

QUEUE FILE UTILITY ROUTINES

This section describes the queue file utility routines. The parameter options available for each of the routines are listed in table 2-1. The K displays (if any) for each utility are shown and contain lists of applicable parameter options. The output formats for each utility are also shown.

DFLIST

DFLIST generates a printer listing of all permanent files created by the DFTERM utility.

DFLIST can be initiated only from the system console directly through the following command.

```
X.DFLIST.
```

The output generated by DFLIST is the same as that produced by the LIST command available under the DFTERM utility (refer to figure 2-4).

DFTERM

DFTERM terminates an active or inactive dayfile and retains it as a direct access permanent file on user name SYSTEMX for later interrogation or processing. When an active dayfile (that is, the current system, account, error log, or binary maintenance log dayfile) is terminated, information in the central memory buffer for that dayfile is written to mass storage to be included with the permanent file, and a new active dayfile is started. The new dayfile can reside on the same device, or a new device can be specified.

Terminating an inactive dayfile has no effect on the currently active dayfiles. Inactive dayfiles are not used by the system. Furthermore, the presence of an inactive dayfile in the system is possible only under unusual conditions. For example, if the system is deadstarted and the device which previously contained the account dayfile is turned off, a new account dayfile is started on another device. Two devices in the system now contain account dayfiles. If both devices are turned on when the system is next deadstarted, two account dayfiles are recovered. The most recent account dayfile is made active and is used by the system. The remaining account dayfile is made inactive.

The DFTERM utility can be initiated only from the system console through a K display or directly through the DFTERM command. No batch or terminal input is allowed.

When DFTERM is selected at the system console, the DFTERM K display appears on the left screen. This display contains a list of all applicable options associated with DFTERM, their default values, and a short description of each (refer to figure 2-3).

A list of the permanent dayfiles is displayed on the right screen when the following command is entered.

```
K.LIST.
```

When this command is processed, the right screen K display is automatically replaced with the dayfile list K display (refer to figure 2-4). The information presented in this display is the same as that generated by the DFLIST utility.

```
                  *** DAYFILE TERMINATION ***

ACTIVE DAYFILES-
      TYPE       FAMILY     DN
       DAYFILE    SYST72     1B
       ACCOUNT    SYST72     1B
       ERRLOG     SYST72     1B
       MAINLOG    SYST72     1B

INACTIVE DAYFILES-
      TYPE       FAMILY     DN



OPTIONS               DESCRIPTION
 FT = DAYFILE          FILE TYPE TO BE TERMINATED.
                        (DAYFILE, ACCOUNT, ERRLOG, MAINLOG)
 FM = SYST72           FAMILY FOR NEW DEVICE NUMBER THAT NEW
                        DAYFILE IS TO RESIDE ON (1-7 CHARACTERS).
 DN = 1B               DEVICE NUMBER OF NEW DEVICE (1-77B).
                         FM AND DN DENOTE RESIDENT DEVICE
                         DAYFILE IS INACTIVE.

 OP = A                ACTIVE OR INACTIVE FILE TO BE TERMINATED
                        (A OR I).

 NM =                  NAME OF PERMANENT FILE. OVERRIDES
                       AUTOMATIC NAMING (1-5 CHARACTERS).
 L  = OUTPUT           FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
```

Figure 2-3. DFTERM Display

```
                  *** PERMANENT DAYFILE CATALOG ***

NO.  TYPE      FM/PN     DN  PFNAME    DATE      TIME      LENGTH

 1.  DAYFILE   SYST72    01  DFA0331  80/03/31  13.35.33   1171
 2.  ACCOUNT   SYST72    01  ACA0331  80/03/31  13.35.42    402
 3.  ERRLOG    SYST72    01  ERA0331  80/03/31  13.35.49     55
 4.  MAINLOG   SYST72    01  MLA0331  80/03/31  13.35.52   1032
```

Figure 2-4. DFTERM Dayfile List

If there are more files than can be displayed on one screen (page), a message appears at the bottom of the screen indicating that more files exist. When the LIST command is entered, a complete list of permanent dayfiles is written to the output file specified by the DFTERM L option; thus, a complete printer listing is provided when the DFTERM utility is terminated. If it is necessary to obtain the output listing immediately, the following command should be entered.

K.OUT.

When this command is processed, the initial right screen K display (list of the queue file utility commands) is automatically returned. However, if the OUT command is not entered, the original right screen K display can be returned by entering the CLEAR command.

After DFTERM processing is completed, an output file indicating the results of this processing is generated if the LIST command has been entered at any time during DFTERM operations. (Refer to figure 2-4, which shows essentially the same format.) If the LIST command was not entered, no output file is generated.

LDLIST

LDLIST generates a printer listing of queued files present on a QDUMP dump tape.

Since LDLIST requires a QDUMP dump tape to be preassigned, it should be entered from DIS or in a batch or terminal job in the following format:

LDLIST,opt_1=val_1,opt_2=val_2,...,opt_n=val_n.

where opt_i=val_i are parameter options available for LDLIST.

The output generated by LDLIST is the same as that produced by QLOAD (refer to figure 2-13).

QALTER

QALTER displays, lists, and/or alters routing and other information about active queued files. The utility selects files for processing according to a variety of user-specified criteria. QALTER purges selected files from the system when the user specifies OP=PR.

The user may alter the following information associated with the selected files.

- Access level (requires security administrator privileges).
- File destination.
- File identifier (local batch destined files).
- Destination family (remote batch destined files).
- Destination user name (remote batch destined files).
- Forms code.
- Priority of a queued file.

- Repeat count.
- Disposition type.
- External characteristics.
- Destination LID.

When QALTER is selected at the system console, the QALTER K display appears on the left screen. This display contains a list of all applicable parameters associated with QALTER, their default values, and a short description of each (refer to figure 2-5). The following procedure should be performed to alter active queued files.

1. Enter the selection criteria specifying which files are to be altered (parameters FM, DN, JSN, LD, UJN, ID, DF, UN, FC, LA, UA, BC, and RB).

2. Ensure that the desired files are selected by inspecting the list of files produced by the K display commands LIST or OUT (refer to figures 2-6, 2-7, and 2-8). If the file produced by OUT is to be other than OUTPUT or contain a detailed listing of the selected files, specify such with the L and/or LO parameters before entering K.OUT.

3. Enter the new information to be associated with the selected files (parameters OP, NDC, NEC, NLD, NDF, NUN, NID, NFC, NPR, NRC, and NAL. QALTER changes only information specified via parameter entry.

4. Enter K.GO. QALTER makes the requested changes, issues the message *QALTER COMPLETE.*, and resets the K display parameters to their default values.

5. Repeat steps 1 through 4 to alter additional files, or enter K.STOP. to terminate QALTER activity.

```
*** LIST ACTIVE QUEUED FILES ***   PAGE 1 OF 2

OPTIONS          DESCRIPTION
 FM = ALL         FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL         DEVICE NUMBER (1-77B,ALL).
 JSN=             JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                     JOB SEQUENCE NUMBER WILL BE CLEARED IF
                     PREVIOUSLY ENTERED.


 LD =             DESTINATION LID (3 CHARACTERS).
 UJN=             USER JOB NAME (1-7 CHARACTERS).
 ID = 0B          ID OF FILE TO LIST (0-67B).
      67B
 LA =              LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =              UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).

 DF =             DESTINATION FAMILY (1-7 CHARACTERS).
 UN =             DESTINATION USER (1-7 CHARACTERS).
 FC =             FORMS CODE.
 L  = OUTPUT      FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 LO = S           LIST OPTION (S=SHORT,F=FULL).

 OP = NC           OPTION (BC,RB,NC,PR).
NAL =              NEW ACCESS LEVEL.
NDC =              NEW DEVICE CODE.
NEC =              NEW EXTERNAL CHARACTERISTICS.
NLD =              NEW DESTINATION LID (3 CHARACTERS).
NDF =              NEW DESTINATION FAMILY (1-7 CHARACTERS).
NUN =              NEW DESTINATION USER (1-7 CHARACTERS).
NID =              NEW FILE IDENTIFIER (0-67B).
NFC =              NEW FORMS CODE (AA-99,**).
NPR =              NEW PRIORITY FOR OUTPUT (0-7760B).
NRC =              NEW REPEAT COUNT (0-37B).
```

Figure 2-5. QALTER/QFTLIST Left K Display (Sheet 1 of 2)

```
*** LIST ACTIVE QUEUED FILES ***   PAGE 2 OF 2


(DS=DT)              SELECT BY FILE DESTINATION AND
                           DISPOSITION TYPE.
                            OPTION WILL BE CLEARED
      S I P P P P L L L W   IF PREVIOUSLY SELECTED.
      F N U L R 2 R S T T   * = OPTION SELECTED.
   BC * * * * * * * * * *
   RB * * * * * * * * * *
```

Figure 2-5. QALTER/QFTLIST Left K Display (Sheet 2 of 2)

```
*** ACTIVE QUEUE FILE LIST ***

ORD.   JSNS. DT LID FAMILY  USERNAM TUI/ID  FC  EXTCH LENGTH

  1.  AAAOS. PL                        55       T6      4
  2.  AAAPB. LS                        22       A9      6
  3.  AAAQR. LP     SYS964  GAK1234  1234  AX   LP     41
  4.  AAARB. LS                        22       A9      5
  5.  AAASB. LS                        22       A9      4
  6.  AAATR. LP     SYS964  GAK1234  1234  AX   LP     41
  7.  AAAUR. LP     SYS964  GAK1234  1234  AX   LP     41
 10.  AAAVB. LP                        55       LP      7
 11.  AAAWR. LP     SYS964  GAK1234  1234  AX   LP     41
 12.  AAAXB. LS M64                    22       A9      5
 13.  AAAYR. LP     SYS964  GAK1234  1234  AX   LP     41
 16.  AABBR. LP LBK SYS964  GAK1234  1234  AX   LP     41
 17.  AABCB. LS                        22       A9      3
 20.  AABDB. LS                        22       A9      2

 END OF DISPLAY.
```

Figure 2-6. QALTER/QFTLIST LIST Command Display

```
*** ACTIVE QUEUE LIST ***

  JSN        = AADU         ORDINAL    = 7
  SERVICE    = SYSTEM       QUEUE      = PRINT

DESTINATION                CREATION
  FAMILY     =              FAMILY     = SYS964
  LID        = M42          LID        = M64
  USER       =              USER       =
  TUI/ID     = 0            USR INDX   = 0

  FORMS      = AX           USR JOBNM  = DIS
  DISP CODE  = LP           DATE       = 83/08/08
  EXT.CHR.   = LP           LENGTH     = 2
  INT.CHR.   = DIS          REPEAT     = 0

RESIDENCE                   INTERRUPT  = NO
  FAMILY     = SYST64       PRIORITY   = 7110
  DEVICE     = 3            ACCESS LV  =
```

Figure 2-7. QALTER/QFTLIST LIST=qft Command Display

```
QALTER - ALTER/PURGE ACTIVE QUEUED FILES.                                   83/07/07. 13.35.42.     PAGE        1


             OPTION = NC                   NEW DESTINATION FAMILY NAME = --N/A--          NEW EXTERNAL CHAR = --N/A--
      NEW FORMS CODE = --N/A--               NEW DESTINATION USER NAME = --N/A--          NEW FILE ID       = --N/A--
        NEW PRIORITY = 5103                     NEW DISPOSITION CODE = --N/A--            NEW ACCESS LEVEL  = --N/A--
    NEW REPEAT COUNT = --N/A--                     NEW DESTINATION LID = --N/A--

          CURRENT                     DESTINATION                                CREATION                          RESIDENCE
    ******************  **************************************  **************************************  ******************

 1. JSN     = AACG      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = ICLASS2   USER    = BMS4247  DEVICE    = LP       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= NO        PRIORITY = 55
    ORDINAL = 3         DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 13
                                                                                                         ACCESS LV=

 2. JSN     = AACI      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = TIMESHR   USER    = BMS4247  DEVICE    = LP       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= NO        PRIORITY = 55
    ORDINAL = 5         DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 5
                                                                                                         ACCESS LV=

 3. JSN     = AACJ      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = REMOTE    USER    = BMS4247  DEVICE    = LT       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= NO        PRIORITY = 56
    ORDINAL = 6         DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 15
                                                                                                         ACCESS LV=

 4. JSN     = AACW      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = BATCH     USER    = BMS4247  DEVICE    = LP       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= YES       PRIORITY = 56
    ORDINAL = 23        DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 13
                                                                                                         ACCESS LV=

 5. JSN     = AACY      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = TIMESHR   USER    = BMS4247  DEVICE    = LP       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= YES       PRIORITY = 56
    ORDINAL = 25        DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 5
                                                                                                         ACCESS LV=

 6. JSN     = AACZ      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = ICLASS2   USER    = BMS4247  DEVICE    = LP       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= YES       PRIORITY = 56
    ORDINAL = 26        DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 13
                                                                                                         ACCESS LV=

 7. JSN     = AADB      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = REMOTE    USER    = BMS4247  DEVICE    = LT       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= YES       PRIORITY = 56
    ORDINAL = 30        DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 15
                                                                                                         ACCESS LV=

 8. JSN     = AADF      FAMILY  = SYS964   FORMS     =          FAMILY   = SYS964   USR JOBNM= DIS       FAMILY   = SYST64
    SERVICE = BATCH     USER    = BMS4247  DEVICE    = LP       USER     = BMS4247  DATE     = 83/07/07  DEVICE   = 2
    QUEUE   = PRINT     TUI/ID  = 4247     EXT.CHR.  = LP       USR INDX = 4247     INTERRUPT= NO        PRIORITY = 57
    ORDINAL = 34        DLID    =          INT.CHR.  = DIS      SLID     =          REPEAT   = 0         LENGTH   = 13
                                                                                                         ACCESS LV=
```

Figure 2-8. QALTER Printer Listing

Example:

The analyst can use the QALTER utility to divert output files from the local printers to a remote terminal. The following command alters the routing of all batch output files with forms code of AD. These files are routed to a remote terminal with family name FAM1 and user name USRNAM. The BC and RB options explicitly disable input file selection.

```
QALTER,PO=N,BC=IN,RB=IN,FC=AD,OP=RB,NDF=FAM1,NUN=USERNAM.
```

The QFTLIST utility can be used in conjunction with QALTER to ensure that the files were properly altered. The following command generates a list of all active queued files belonging to the remote terminal with family name FAM1 and user name USRNAM.

```
QFTLIST,PO=N,LO=F,DF=FAM1,UN=USRNAM,BC=NONE.
```

QDUMP

QDUMP dumps selected queued files from a single device, a family of devices, or all devices on the system. These queued files can be dumped either to tape or to mass storage. When active queued files are dumped, the QFT is searched to obtain the proper file. When inactive queues are dumped, the IQFT is searched. QDUMP also provides a listing of all files dumped with information about each file processed.

For a secured system, QDUMP determines the maximum range of access levels that can be dumped. If the LA and UA parameters have been used to select access level limits, these limits will be used. If no access level limits were selected, QDUMP uses the device limits determined by taking the lowest lower access limit and the highest upper access limit of all the devices to be processed. If this range of access levels is not within the system access level limits, QDUMP issues a diagnostic message.

When QDUMP is selected at the system console, the initial QDUMP K display appears on the left screen. This display contains a list of all applicable options associated with QDUMP, their default values, and a short description of each (refer to figure 2-9).

```
              *** QUEUE FILE DUMP ***  PAGE 1 OF 2

INACTIVE QUEUES RESIDE ON FOLLOWING FAMILIES.
      SYST64    SYS964    PACKV2

OPTIONS           DESCRIPTION     (ERRORED FILE DUMPING SET)
 MI = 64           MACHINE ID (1-2 CHARACTERS,ALL).
 FM = ALL          FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL          DEVICE NUMBER (1-77B,ALL).
 FU = ALL          FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B           USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.    DUMP DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B           FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=              JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                     JOB SEQUENCE NUMBER WILL BE CLEARED IF
                     PREVIOUSLY ENTERED.

 LD =              DESTINATION LID (3 CHARACTERS).
 ID = 0B           ID OF FILES TO DUMP (0-67B).
      67B
 LA =              LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =              UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B           DESTINATION USER INDEX (0-377777B).
      377777B
 TF = ALL          FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL          FORMS CODE.
 L  = OUTPUT       FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 FN = QFILES       DUMP FILE NAME (1-7 CHARACTERS).
 NF = 0D           NUMBER OF MEDIA FILES TO SKIP.
 TP = ALL          TYPE ( A-ACTIVE,I-INACTIVE,ALL).
```

Figure 2-9. Initial QDUMP Display (Sheet 1 of 2)

```
              *** QUEUE FILE DUMP ***  PAGE 2 OF 2

(DS=DT)           DUMP BY FILE DESTINATION AND
                            DISPOSITION TYPE.
                               OPTION WILL BE CLEARED
       S I P P P P L L L W     IF PREVIOUSLY SELECTED.
       F N U L R 2 R S T T     * = OPTION SELECTED.
    BC * * * * * * * * * *
    RB * * * * * * * * * *
```

Figure 2-9. Initial QDUMP Display (Sheet 2 of 2)

If the FM option is specified, indicating dumping of queued files from a specified family of devices, the initial QDUMP left screen K display is replaced by the secondary QDUMP K display (refer to figure 2-10). This display closely resembles the initial QDUMP display but restricts QDUMP processing to the family of devices specified. Each device in the specified family containing inactive queued files is indicated. In addition, any option entered for the QDUMP utility is reflected in this display. Options not entered remain at default values.

```
              *** QUEUE FILE DUMP ***     PAGE 1 OF 2

INACTIVE QUEUES RESIDE ON FOLLOWING DEVICES IN FAMILY - SYST64
      01 02 03

OPTIONS              DESCRIPTION     (ERRORED FILE DUMPING SET)
 MI = 64              MACHINE ID (1-2 CHARACTERS,ALL).
 FM = SYST64          FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL             DEVICE NUMBER (1-77B,ALL).
 FU = ALL             FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B              USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.       DUMP DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B              FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=                 JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                        JOB SEQUENCE NUMBER WILL BE CLEARED IF
                        PREVIOUSLY ENTERED.


 LD =                 DESTINATION LID (3 CHARACTERS).
 ID = 0B              ID OF FILES TO DUMP (0-67B).
      67B
 LA =                 LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =                 UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B              DESTINATION USER INDEX (0-377777B).
      377777B
 TF = ALL             FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL             FORMS CODE.
 L  = OUTPUT          FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 FN = QFILES          DUMP FILE NAME (1-7 CHARACTERS).
 NF = 0D              NUMBER OF MEDIA FILES TO SKIP.
 TP = ALL             TYPE ( A-ACTIVE,I-INACTIVE,ALL).
```

Figure 2-10. Secondary QDUMP Display (Sheet 1 of 2)

```
                    *** QUEUE FILE DUMP ***    PAGE 2 OF 2

      (DS=DT)              DUMP BY FILE DESTINATION AND
                                     DISPOSITION TYPE.
                                        OPTION WILL BE CLEARED
              S I P P P P L L L W       IF PREVIOUSLY SELECTED.
              F N U L R 2 R S T T       * = OPTION SELECTED.
          BC  * * * * * * * * * *
          RB  * * * * * * * * * *
```

Figure 2-10. Secondary QDUMP Display (Sheet 2 of 2)

After QDUMP processing has been completed and K display interaction has been terminated by

K.STOP.

an output file is generated, indicating all files dumped. Figure 2-11 contains an example of this output.

QDUMP PROCESSOR. 83/07/07. 13.33.19. PAGE 1

*** DUMPED QUEUE FILE DISPOSITION ***

NO.	JSNS	MID	FAMILY	DN	DT	DS	DATE	LENGTH (PRUS)	ACCESS LEVEL	DISPOSITION	ERRORS
1.	AABAB	64	SYST64	2	PR	BC	83/07/07.	1		ACTIVE	
2.	AABBB	64	SYST64	2	LS	BC	83/07/07.	12		ACTIVE	
3.	AABDB	64	SYST64	2	LT	BC	83/07/07.	13		ACTIVE	
4.	AABGT	64	SYST64	2	LT	BC	83/07/07.	14		ACTIVE	
5.	AABJS	64	SYST64	2	PR	BC	83/07/07.	15		ACTIVE	
6.	AABOB	64	SYST64	2	PR	BC	83/07/07.	17		ACTIVE	
7.	AABCB	64	SYST64	3	PR	RB	83/07/07.	13		ACTIVE	
8.	AABE2	64	SYST64	3	PR	RB	83/07/07.	13		ACTIVE	
9.	AABFT	64	SYST64	3	PR	RB	83/07/07.	5		ACTIVE	
10.	AABHR	64	SYST64	3	LT	RB	83/07/07.	15		ACTIVE	
11.	AABIS	64	SYST64	3	LT	BC	83/07/07.	1		ACTIVE	
12.	AABK2	64	SYST64	3	LT	BC	83/07/07.	1		ACTIVE	
13.	AABLB	64	SYST64	3	PR	BC	83/07/07.	1		ACTIVE	
14.	AABPB	64	SYST64	3	PR	BC	83/07/07.	20		ACTIVE	

Figure 2-11. QDUMP Output File

QDUMP does not purge files upon completion. If purging is desired, the following sequence of commands is recommended.

Command	Description
QREC,OP=DI.	Dequeues the files.
QDUMP,TP=I.	Dumps the inactive files. The dump file (default name = QFILES) should be preassigned before this command.
QREC,OP=PI.	Purges the files.

QFTLIST

QFTLIST displays and/or lists routing and other information about active queued files. Its operation is similar to that of QALTER, except file alteration or purging is not allowed. When QFTLIST is selected at the system console, the QFTLIST K display appears on the left screen. This display contains a list of all applicable options associated with QFTLIST, their default values, and a short description of each (refer to figure 2-5). The output generated by QFTLIST LIST and OUT K display commands (both printed and right screen K display) is similar or identical to that produced by QALTER.

Example 1:

The analyst can use the QFTLIST utility to determine what actions are necessary to get queued files processed by the RBF or BIO subsystems. The following QFTLIST entry generates a detailed list of queued files, from which forms code, id, and other destination routing information can be determined. This information indicates what action must be taken to have the files processed.

```
X.QFTLIST(PO=N,LO=F)
```

Example 2:

The analyst can use the QFTLIST utility to determine what queued files are routed to a particular device. The following QFTLIST entry generates a list of all print files with forms code of AA that are routed to a 580-20 (LT) printer. Input file selection is explicitly disabled.

```
X.QFTLIST(PO=N,FC=AA,RB=IN,BC=NONE,BC=LT)
```

QLIST

QLIST lists inactive queued files, which may include all inactive queued files in the system or a selected subset based on options specified when the utility is called.

The QLIST utility is not restricted to use from the system console. However, from the system console, QLIST must be called directly with the following command. No K display interaction is available.

X.QLIST(opt$_1$=val$_1$,opt$_2$=val$_2$,...,opt$_n$=val$_n$)

The applicable options associated with QLIST are the same, except for the OP option, as those used with the QREC utility. The OP option is not valid with QLIST.

If all current inactive queued files are to be listed, no options need be specified. In this case, the format of the QLIST call is as follows:

X.QLIST.

The output generated by QLIST is the same as that produced by the LIST command available under the QREC utility (refer to figure 2-18).

QLOAD

QLOAD processes the dump files generated by QDUMP or other utilities using the same format. QLOAD can selectively load the queued files from these dump files. QLOAD can also list the contents of a dump file without loading any files.

For secured systems, the access level for each file selected to be loaded must be within the file's origin type limits and the file must be assigned to an appropriate mass storage device. If a selected file cannot be loaded, QLOAD issues a diagnostic message and skips that file.

When QLOAD is selected at the system console, the QLOAD K display appears on the left screen. This display contains a list of all applicable options associated with QLOAD, their default values, and a short description of each (refer to figure 2-12).

After QLOAD processing has been completed and K display interaction has been terminated by

K.STOP.

an output file is generated, indicating all queued files which were contained on the dump file, and whether they were loaded or not. Figure 2-13 contains an example of this output.

```
          *** QUEUE FILE LOAD ***    PAGE 1 OF 2

OPTIONS              DESCRIPTION     (ERRORED FILE LOADING NOT SET)
 MI = 64              MACHINE ID (1-2 CHARACTERS,ALL).
 DF = ALL             DESTINATION FAMILY (1-7 CHARACTERS).
 DD = ALL             DESTINATION DEVICE (1-77B).
 FU = ALL             FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B              USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.       LOAD DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B              FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=                 JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                        JOB SEQUENCE NUMBER WILL BE CLEARED IF
                        PREVIOUSLY ENTERED.

 LD =                 DESTINATION LID (3 CHARACTERS).
 ID = 0B              ID OF FILES TO LOAD (0-67B).
      67B
 LA =                 LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =                 UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B              DESTINATION USER INDEX (0-377777B).
      377777B
 TF = ALL             FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL             FORMS CODE.
 L  = OUTPUT          FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 FN = QFILES          LOAD FILE NAME (1-7 CHARACTERS).
 NF = 0D              NUMBER OF MEDIA FILES TO SKIP.
 SC = 0D              NUMBER OF QUEUED FILES TO SKIP.
 OP = A               LOAD OPTION (1 CHARACTER).
                    A-LOAD/ACTIVATE. I-LOAD/INACTIVATE
```

Figure 2-12. QLOAD Display (Sheet 1 of 2)

```
          *** QUEUE FILE LOAD ***    PAGE 2 OF 2

(DS=DT)              LOAD BY FILE DESTINATION AND
                               DISPOSITION TYPE.
                                  OPTION WILL BE CLEARED
       S I P P P P L L L W        IF PREVIOUSLY SELECTED.
       F N U L R 2 R S T T        * = OPTION SELECTED.
    BC * * * * * * * * * *
    RB * * * * * * * * * *
```

Figure 2-12. QLOAD Display (Sheet 2 of 2)

```
QLOAD/LDLIST PROCESSOR.        83/07/07. 13.33.38.            PAGE    1 .
                                                  LENGTH ACCESS
    NO.   JSNS MID FAMILY  DN DT DS   DATE        (PRUS) LEVEL  DISPOSITION ERRORS

     1.  AABAB  64 SYST64   3 PR BC 83/07/07.         1            ACTIVE
     2.  AABBB  64 SYST64   2 LS BC 83/07/07.        12            ACTIVE
     3.  AABDB  64 SYST64   3 LT BC 83/07/07.        13            ACTIVE
     4.  AABGT  64 SYST64   2 LT BC 83/07/07.        14            ACTIVE
     5.  AABJS  64 SYST64   3 PR BC 83/07/07.        15            ACTIVE
     6.  AABOB  64 SYST64   2 PR BC 83/07/07.        17            ACTIVE
     7.  AABCB  64 SYST64   3 PR RB 83/07/07.        13            ACTIVE
     8.  AABE2  64 SYST64   2 PR RB 83/07/07.        13            ACTIVE
     9.  AABFT  64 SYST64   3 PR RB 83/07/07.         5            ACTIVE
    10.  AABHR  64 SYST64   2 LT RB 83/07/07.        15            ACTIVE
    11.  AABIS  64 SYST64   3 LT BC 83/07/07.         1            ACTIVE
    12.  AABK2  64 SYST64   2 LT BC 83/07/07.         1            ACTIVE
    13.  AABLB  64 SYST64   3 PR BC 83/07/07.         1            ACTIVE
    14.  AABPB  64 SYST64   2 PR BC 83/07/07.        20            ACTIVE
```

Figure 2-13. QLOAD Output File

Example:

The analyst can use the QDUMP and QLOAD utilities to dump queued files from one machine and load them onto another. The following commands dump all punch files from machine AA. The QREC utility is used to dequeue the files and then purge them, because QDUMP does not purge files.

```
QREC,PO=N,I=DIRCTVS,OP=DI.
REWIND,DIRCTVS.
LABEL,QFILES,VSN=QUEUE,MT.
QDUMP,PO=N,I=DIRCTVS,TP=I.
REWIND,DIRCTVS.
QREC,PO=N,OP=PI,I=DIRCTVS.
```

File DIRCTVS is the input directive file which contains the following directives.

```
BC=NONE,BC=PH.
RB=NONE,RB=PH.
```

The following commands load the files dumped by the previous QDUMP onto another machine.

```
LABEL,QFILES,VSN=QUEUE,MT.
QLOAD,PO=N,MI=AA,OP=A,DF=ALL.
```

QMOVE

QMOVE moves queued files from one mass storage device to another. It also produces a listing of all files moved with information about each file processed.

For secured systems, the destination device for each file selected to be moved must have access level limits that are appropriate to accept the file. If the file is being reactivated as well as moved, its access level must be within the file's origin type limits. If a selected file cannot be moved, QMOVE issues a diagnostic message and skips that file.

When QMOVE is selected at the system console, the initial QMOVE K display appears on the left screen. This display contains a list of all applicable options associated with QMOVE, their default values, and a short description of each (refer to figure 2-14).

If the FM option is specified, indicating the loading of queued files to a specified family of devices, the initial QMOVE left screen K display is replaced by the secondary QMOVE K display (refer to figure 2-15). This display closely resembles the initial QMOVE display but restricts QMOVE processing to the family of devices specified. Each device in the specified family containing inactive queued files is indicated. In addition, any option entered for the QMOVE utility is reflected in this display. Options not entered remain at default values.

```
         *** QUEUE FILE MOVE ***  PAGE 1 OF 2
INACTIVE QUEUES RESIDE ON FOLLOWING FAMILIES.
     SYST64    SYS964    PACKV2

OPTIONS            DESCRIPTION      (ERRORED FILE MOVING NOT SET)
 MI = 64            MACHINE ID (1-2 CHARACTERS,ALL).
 FM = ALL           FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL           DEVICE NUMBER (1-77B, ALL).
 DF =               DESTINATION FAMILY (1-7 CHARACTERS).
 DD =               DESTINATION DEVICE (1-77B).
 FU = ALL           FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B            USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.     DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B            FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=               JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                      JOB SEQUENCE NUMBER WILL BE CLEARED IF
                      PREVIOUSLY ENTERED.


 LD =               DESTINATION LID (3 CHARACTERS).
 ID = 0B            ID OF FILE TO MOVE (0-67B).
      67B
 LA =               LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =               UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B            DESTINATION USER INDEX (0-377777B).
      377777B
 TF = ALL           FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL           FORMS CODE.
 L  = OUTPUT        FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 TP = ALL           TYPE (A-ACTIVE,I-INACTIVE,ALL).
 OP = A             OPTION (A-LEAVE ACTIVE,I-LEAVE INACTIVE).
```

Figure 2-14. Initial QMOVE Display (Sheet 1 of 2)

```
          *** QUEUE FILE MOVE ***   PAGE 2 OF 2
 (DS=DT)         MOVE BY FILE DESTINATION AND
                           DISPOSITION TYPE.
                              OPTION WILL BE CLEARED
      S I P P P P L L L W     IF PREVIOUSLY SELECTED.
      F N U L R 2 R S T T     * = OPTION SELECTED.
   BC * * * * * * * * * *
   RB * * * * * * * * * *
```

Figure 2-14. Initial QMOVE Display (Sheet 2 of 2)

```
          *** QUEUE FILE MOVE ***   PAGE 1 OF 2
INACTIVE QUEUES RESIDE ON FOLLOWING DEVICES IN FAMILY - SYST64
      01 02 03


OPTIONS           DESCRIPTION      (ERRORED FILE MOVING NOT SET)
 MI = 64           MACHINE ID (1-2 CHARACTERS,ALL).
 FM = SYST64       FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL          DEVICE NUMBER (1-77B, ALL).
 DF =              DESTINATION FAMILY (1-7 CHARACTERS).
 DD =              DESTINATION DEVICE (1-77B).
 FU = ALL          FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B           USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.    DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B           FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=              JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                     JOB SEQUENCE NUMBER WILL BE CLEARED IF
                     PREVIOUSLY ENTERED.


 LD =              DESTINATION LID (3 CHARACTERS).
 ID = 0B           ID OF FILE TO MOVE (0-67B).
      67B
 LA =              LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =              UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B           DESTINATION USER INDEX (0-377777B).
      377777B
 TF = ALL          FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL          FORMS CODE.
 L  = OUTPUT       FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 TP = ALL          TYPE (A-ACTIVE,I-INACTIVE,ALL).
 OP = A            OPTION (A-LEAVE ACTIVE, I-LEAVE INACTIVE).
```

Figure 2-15. Secondary QMOVE Display (Sheet 1 of 2)

```
              *** QUEUE FILE MOVE ***  PAGE 2 OF 2

 (DS=DT)          MOVE BY FILE DESTINATION AND
                             DISPOSITION TYPE.
                               OPTION WILL BE CLEARED
       S I P P P P L L L W     IF PREVIOUSLY SELECTED.
       F N U L R 2 R S T T     * = OPTION SELECTED.
    BC * * * * * * * * * *
    RB * * * * * * * * * *
```

Figure 2-15. Secondary QMOVE Display (Sheet 2 of 2)

After QMOVE processing has been completed and K display interaction has been terminated by

K.STOP.

an output file is generated, indicating all files moved. Figure 2-16 contains an example of this output.

```
QMOVE PROCESSOR.               83/07/07. 13.34.15.  PAGE    1
                    *** MOVED QUEUE FILE DISPOSITION ***
   ACTIVE FILES MOVED TO FAMILY SYST64  DEVICE  2 AND LEFT ACTIVE
                                              LENGTH ACCESS
  NO.  JSNS MID FAMILY  DN DT DS   DATE       (PRUS) LEVEL  DISPOSITION ERRORS

   1.  AABCB  64 SYST64   3 PR RB 83/07/07.      13
   2.  AABE2  64 SYST64   3 PR RB 83/07/07.      13
   3.  AABFT  64 SYST64   3 PR RB 83/07/07.       5
   4.  AABHR  64 SYST64   3 LT RB 83/07/07.      15
   5.  AABIS  64 SYST64   3 LT BC 83/07/07.       1
   6.  AABK2  64 SYST64   3 LT BC 83/07/07.       1
   7.  AABLB  64 SYST64   3 PR BC 83/07/07.       1
   8.  AABPB  64 SYST64   3 PR BC 83/07/07.      20
   9.  AABQB  64 SYST64   3 PR BC 83/07/07.       2
  10.  AABSB  64 SYST64   3 LT BC 83/07/07.      13
  11.  AABUS  64 SYST64   3 PR BC 83/07/07.      15
  12.  AABWB  64 SYST64   3 PR RB 83/07/07.      13
  13.  AABYT  64 SYST64   3 PR RB 83/07/07.       5
  14.  AACAS  64 SYST64   3 LT BC 83/07/07.       2
  15.  AACCB  64 SYST64   3 PR BC 83/07/07.       2
```

Figure 2-16. QMOVE Output File

Example 1:

If there are inactive queued files residing on a removable device, the analyst can activate these files but must first move them to a nonremovable device. This example shows how to use the QMOVE utility to move queued files from the removable device with family name SYSTEM and device number 45 to the nonremovable device with family name FAM1 and device number 5. The following entries are made from DSD.

```
X.QFSP.
K,jsn.                    (jsn is the job sequence name of QFSP)
K.QMOVE.
K.FM=SYSTEM,DN=45.
K.DF=FAM1,DD=5.
K.OP=A.                   (the moved files are active)
K.GO,STOP.
```

Example 2:

This example exhibits the relationships among the ID, TF/TUI, and FC parameter options. (Refer to the descriptions of these options for the types of files affected by them.) The following command moves all local batch destined output files with ID=6 and all remote batch destined output files to device 3 in family SYS. The BC and RB options explicitly disable input file processing.

```
QMOVE,PO=N,DF=SYS,DD=3,ID=6,BC=IN,RB=IN.
```

The following command performs the same function as the previous command does except that no remote batch files are moved.

```
QMOVE,PO=N,DF=SYS,DD=3,ID=6,BC=IN,RB=NONE.
```

QREC

QREC deactivates or activates selected queued files and purges selected inactive queued files.

For secured systems, the access level for any file selected to be reactivated must be within the file's origin type limits. If a selected file cannot be processed, QREC issues a diagnostic message and skips that file.

When QREC is selected at the system console, the initial QREC K display appears on the left screen. This display contains a list of all applicable options associated with QREC, their default values, and a short description of each (refer to figure 2-17).

A complete list of current inactive queued files is displayed on the right screen when the following command is entered:

```
K.LIST.
```

When this command is processed, the right screen K display is automatically replaced with the inactive queues K display (refer to figure 2-18). The information presented in this display is the same as that generated by the QLIST utility. The list of files displayed is also written to the output file specified by the QREC L option.

```
             *** QUEUED FILE REQUEUING ***    PAGE 1 OF 2

INACTIVE QUEUES RESIDE ON FOLLOWING FAMILIES.
      SYST64    SYS964    PACKV2

OPTIONS            DESCRIPTION
 MI = 64            MACHINE ID (1-2 CHARACTERS,ALL).
 FM = ALL           FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL           DEVICE NUMBER (1-77B, ALL).
 FU = ALL           FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B            USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.     QUEUED DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B            FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=               JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                      JOB SEQUENCE NUMBER WILL BE CLEARED IF
                      PREVIOUSLY ENTERED.


 LD =               DESTINATION LID (3 CHARACTERS).
 ID = 0B            ID OF FILES TO PROCESS (0-67B).
      67B
 LA =               LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =               UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B            DESTINATION TUI (0-377777B).
      377777B
 TF = ALL           FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL           FORMS CODE.
 L  = OUTPUT        FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 OP = RI            PROCESS OPTION (2 CHARACTERS).
                    PROCESS OPTION (RP/RI/PI/DI).
```

Figure 2-17. Initial QREC Display (Sheet 1 of 2)

```
             *** QUEUED FILE REQUEUING ***    PAGE 2 OF 2

 (DS=DT)          REQUEUE BY FILE DESTINATION AND
                               DISPOSITION TYPE.
                               OPTION WILL BE CLEARED
      S I P P P P L L L W      IF PREVIOUSLY SELECTED.
      F N U L R 2 R S T T      * = OPTION SELECTED.
   BC * * * * * * * * * *
   RB * * * * * * * * * *
```

Figure 2-17. Initial QREC Display (Sheet 2 of 2)

```
                    *** INACTIVE QUEUES LIST ***

                                                   LENGTH  ACCESS
NO.   JSNS MID FAMILY  DN DT DS    DATE            (PRUS)  LEVEL

  1.  AABEB  64 SYST64   2 LS BC  83/08/08.            5
  2.  AABFR  64 SYST64   2 PR RB  83/08/08.           41
  3.  AABG1  64 SYST64   2 PR RB  83/08/08.           41
  4.  AABH2  64 SYST64   2 LS BC  83/08/08.            5
  5.  AABIR  64 SYST64   2 PR RB  83/08/08.           41
  6.  AABJ2  64 SYST64   2 PR BC  83/08/08.            7
  7.  AABKR  64 SYST64   2 PR RB  83/08/08.           41
  8.  AABLR  64 SYST64   2 PR RB  83/08/08.           41
  9.  AABM2  64 SYST64   2 LS BC  83/08/08.            4
 10.  AABN2  64 SYST64   2 LS BC  83/08/08.            5
 11.  AAB01  64 SYST64   2 PR RB  83/08/08.           41
 12.  AABPB  64 SYST64   2 LS BC  83/08/08.            6
 13.  AABDB  64 SYST64   2 LS BC  83/08/08.            2

END OF DISPLAY.
```

Figure 2-18. Inactive Queues List

If the FM option is specified, indicating processing of queued files for a specified family of devices, the initial QREC left screen K display is replaced by the secondary QREC K display (refer to figure 2-19). This display closely resembles the initial QREC display but restricts QREC processing to the family of devices specified. Each device in the specified family containing inactive queued files is indicated. In addition, any option entered for the QREC utility is reflected in this display. Options not entered remain at default values.

After QREC processing has been completed and K display interaction has been terminated by

```
K.STOP.
```

an output file is generated, indicating the disposition of all queued files processed. Figure 2-20 contains an example of this output.

Example 1:

If the QFT is becoming full, the analyst can enter QREC from DSD to dequeue active queued files and free up QFT space. The following QREC entry dequeues all queued files.

```
X.QREC(OP=DI,PO=N)
```

If RBF is not active, the analyst is still able to dequeue remote batch files by using QREC. The following QREC entry dequeues all remote batch files.

```
X.QREC(OP=DI,BC=NONE,PO=N)
```

If these are queued files that previously had been dequeued, the analyst can activate these files with QREC. The following QREC entry requeues all inactive queued files.

```
X.QREC(OP=RI,PO=N)
```

```
             *** QUEUED FILE REQUEUING ***  PAGE 1 OF 2

INACTIVE QUEUES RESIDE ON FOLLOWING DEVICES IN FAMILY - SYS964
     40

OPTIONS          DESCRIPTION
 MI = 64          MACHINE ID (1-2 CHARACTERS,ALL).
 FM = SYS964      FAMILY FOR DEVICES (1-7 CHARACTERS).
 DN = ALL         DEVICE NUMBER (1-77B, ALL).
 FU = ALL         FAMILY FOR USER INDEX (1-7 CHARACTERS).
 UI = 0B          USER INDEX RANGE (0-377777B).
      377777B
 DA = 83/08/03.   QUEUED DATE RANGE (YYMMDD,ALL).
      83/08/08.
 FS = 0B          FILE SIZE RANGE IN PRUS (0-777777B).
      777777B
 JSN=             JOB SEQUENCE NUMBER (1-4 CHARACTERS).
                    JOB SEQUENCE NUMBER WILL BE CLEARED IF
                    PREVIOUSLY ENTERED.


 LD =             DESTINATION LID (3 CHARACTERS).
 ID = 0B          ID OF FILES TO PROCESS (0-67B).
      67B
 LA =             LOWER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 UA =             UPPER SECURITY ACCESS LEVEL (1-7 CHARACTERS).
 TUI= 0B          DESTINATION TUI (0-377777B).
      377777B
 TF = ALL         FAMILY FOR TERMINAL (1-7 CHARACTERS).
 FC = ALL         FORMS CODE.
 L  = OUTPUT      FILE TO RECEIVE OUTPUT (1-7 CHARACTERS).
 OP = RI          PROCESS OPTION (2 CHARACTERS).
                  PROCESS OPTION (RP/RI/PI/DI).
```

Figure 2-19. Secondary QREC Display (Sheet 1 of 2)

```
             *** QUEUED FILE REQUEUING ***  PAGE 2 OF 2

(DS= DT)          REQUEUE BY FILE DESTINATION AND
                                DISPOSITION TYPE.
                                OPTION WILL BE CLEARED
        S I P P P P L L L W     IF PREVIOUSLY SELECTED.
        F N U L R 2 R S T T     * = OPTION SELECTED.
    BC  * * * * * * * * * *
    RB  * * * * * * * * * *
```

Figure 2-19. Secondary QREC Display (Sheet 2 of 2)

```
        QREC/QLIST PROCESSOR.        83/07/07. 13.34.54.  PAGE   1
                                   *** QUEUE DISPOSITION ***
                                                      LENGTH ACCESS
           NO.  JSNS MID FAMILY  DN DT DS   DATE      (PRUS) LEVEL   DISPOSITION

            1. AABAB  64 SYST64   2 PR BC 83/07/07.        1           ACTIVATE
            2. AABBB  64 SYST64   2 LS BC 83/07/07.       12           ACTIVATE
            3. AABE2  64 SYST64   2 PR RB 83/07/07.       13           ACTIVATE
            4. AABDB  64 SYST64   2 LT BC 83/07/07.       13           ACTIVATE
            5. AABFT  64 SYST64   2 PR RB 83/07/07.        5           ACTIVATE
            6. AABHR  64 SYST64   2 LT RB 83/07/07.       15           ACTIVATE
            7. AABGT  64 SYST64   2 LT BC 83/07/07.       14           ACTIVATE
            8. AABIS  64 SYST64   2 LT BC 83/07/07.        1           ACTIVATE
            9. AABK2  64 SYST64   2 LT BC 83/07/07.        1           ACTIVATE
           10. AABJS  64 SYST64   2 PR BC 83/07/07.       15           ACTIVATE
           11. AABLB  64 SYST64   2 PR BC 83/07/07.        1           ACTIVATE
           12. AABPB  64 SYST64   2 PR BC 83/07/07.       20           ACTIVATE
           13. AABOB  64 SYST64   2 PR BC 83/07/07.       17           ACTIVATE
           14. AABQB  64 SYST64   2 PR BC 83/07/07.        2           ACTIVATE
           15. AABSB  64 SYST64   2 LT BC 83/07/07.       13           ACTIVATE
           16. AABRB  64 SYST64   2 LS BC 83/07/07.       12           ACTIVATE
           17. AABUS  64 SYST64   2 PR BC 83/07/07.       15           ACTIVATE
           18. AABTT  64 SYST64   2 LT BC 83/07/07.       14           ACTIVATE
           19. AABWB  64 SYST64   2 PR RB 83/07/07.       13           ACTIVATE
           20. AABVB  64 SYST64   2 PR BC 83/07/07.       17           ACTIVATE
           21. AABYT  64 SYST64   2 PR RB 83/07/07.        5           ACTIVATE
           22. AABX2  64 SYST64   2 PR RB 83/07/07.       13           ACTIVATE
           23. AACAS  64 SYST64   2 LT BC 83/07/07.        2           ACTIVATE
           24. AABZR  64 SYST64   2 LT RB 83/07/07.       15           ACTIVATE
           25. AACCB  64 SYST64   2 PR BC 83/07/07.        2           ACTIVATE
           26. AACB2  64 SYST64   2 LT BC 83/07/07.        2           ACTIVATE
           27. AACDB  64 SYST64   2 PR BC 83/07/07.       20           ACTIVATE
           28. AABCB  64 SYST64   2 PR RB 83/07/07.       13           ACTIVATE
```

Figure 2-20. QREC Output File

Example 2:

The analyst can purge all queued files (active and inactive) on a particular device by using QREC either with or without an input directive file. The first method involves two calls to QREC. The first QREC call dequeues (makes inactive) all active files on the device with family name SYSTEM and device number 1, and the second QREC call purges all inactive (and hence all) queued files on that same device.

```
QREC,PO=N,OP=DI,FM=SYSTEM,DN=1.
QREC,PO=N,OP=PI,FM=SYSTEM,DN=1.
```

The second method involves only one command call to QREC to perform the same function as the first method does.

```
QREC,I=DIR.
```

File DIR is the input directive file which contains the following directives.

```
OP=DI,FM=SYSTEM,DN=1.
GO.
OP=PI,FM=SYSTEM,DN=1.
GO,STOP.
```

Example 3:

This example exhibits the relationships among the ID, TF/TUI, and FC parameter options. It is important to observe the following restrictions regarding these parameters and QREC.

- ID pertains only to local batch destined output files.
- TF/TUI pertain only to remote batch destined output files.
- FC pertains to all output files.
- When the OP option is specified, all queued files are processed unless the ID, TF/TUI, and FC parameters restrict output file selection or the BC or RB option restricts input or output file selection.

The following command activates all local batch destined output files with ID=6 and FC=AD, all remote batch destined files with TF=SYSTAA,TUI=3751 and FC=AD, and all input files.

```
QREC,PO=N,OP=RI,ID=6,TF=SYSTAA,TUI=3751,FC=AD.
```

The following command performs the same functions as the previous command does except that no input files are processed.

```
QREC,PO=N,OP=RI,ID=6,TF=SYSTAA,TUI=3751,FC=AD,BC=IN,RB=IN.
```

DAYFILE DUMPING UTILITIES

The dayfile dumping utilities (AFD, DFD, ELD, GETLOG, MAINLOG) write all or selected parts of the account, system, error log, or binary maintenance log dayfiles to a file. AFD, DFD, and ELD produce a listing (output) file. GETLOG writes the error log dayfile, binary maintenance log dayfile, and an image of the equipment status table to files. GETLOG is used to provide input to the Hardware Performance Analyzer (HPA). MAINLOG produces its output in a binary format. A job using any of these utilities must be a system origin job, or the user must have system origin privileges and the system must be in debug mode. The following format is used to call the dayfile dumping utilities.

```
utility,L=listfile,FR=string,OP=op,PD=pd,PL=pl,I=infile,B=binfile,E=estfile.

        or

utility,listfile,string,op,pd,pl,infile,binfile,estfile.
```

Option	Description
utility	Utility called to perform the dayfile dump.

Utility	Description
AFD	Dump account dayfile.
DFD	Dump system dayfile.
ELD	Dump error log dayfile.
GETLOG	Dump error log dayfile, binary maintenance log dayfile, and EST image.
MAINLOG	Dump binary maintenance log dayfile.

Option	Description
L=listfile	Output file containing the dayfile dump produced by AFD, DFD, or ELD. For GETLOG, listfile is the file containing the error log dayfile. The utility also places diagnostic messages in this file when various error conditions occur. These messages begin with NOTICE*** to distinguish them from the lines of the dayfile being processed, and are described in appendix A. The default name of listfile is OUTPUT for AFD, DFD, and ELD. The default name is ERR for GETLOG. If L=0 is specified, no file is written. L=listfile is not used with MAINLOG. The utility paginates listfile if it is OUTPUT or if print density and page length are specified.
FR=string	Search string for selective dayfile dumping. The utility searches the dayfile for this string in the starting position of the field specified by the OP=op parameter.
OP=op	Dump option. If neither FR=string nor the OP dump option is specified, default is OP=F for nonterminal output files. For terminal output files, the default is OP=I. If FR is specified but OP is not, default is OP=M.

op	Description
F	Full dayfile dump is taken.
I	Incremental dump is taken. The dayfile is dumped starting from the point of the last dayfile dump. AFD does not process the I option when executed within a job with system origin privileges that is not system origin.
J	The job sequence name field in the dayfile is searched for the string specified by FR=string. The dump begins from that point.
M	The message field in the dayfile is searched for the string specified by FR=string. The dump begins from that point. OP=M cannot be used with MAINLOG.
P	Incremental dump is taken. The dayfile is dumped starting from the point of the last dayfile dump with this job name.
T	The time field in the dayfile is searched for the string specified by FR=string. The dump begins from that point.

Option	Description
PD=pd	Print density in pd lines per inch (3, 4, 6, or 8). Default is PD=6. PD cannot be used with MAINLOG.
PL=pl	Page length in pl lines per page. Default is based on the following print densities. PL cannot be used with MAINLOG.

pd	Default pl
3	30
4	40
6	60
8	80

Option	Description
I=infile	An attached, terminated dayfile to be used for input. For GETLOG, infile is an attached terminated binary maintenance log. If omitted, the utility uses the active dayfile for input.
B=binfile	File on which GETLOG and MAINLOG write the binary maintenance log. These utilities write binfile with W-type records having C-type blocking (refer to the CYBER Record Manager Basic Access Methods Reference Manual for further information on record types and record blocking). GETLOG and MAINLOG assume B=BML if this option is omitted. If B=0 is specified, no file is written.
E=estfile	File on which GETLOG writes an image of the equipment status table. GETLOG assumes E=EST if this option is omitted. If E=0 is specified, no file is written.

MASS STORAGE SUBSYSTEM 3

The MSF hardware product is a large capacity on-line mass storage device, which is a cost effective extension to the disk file storage system and an alternative to conventional magnetic tape storage. Storing files on MSF retains the security, data integrity, and on-line access capabilities provided by disk and reduces the operational and data integrity problems caused by storing, retrieving, and mounting tape volumes. Capabilities are provided for use of both MSF and magnetic tapes to protect files from hardware and system failures.

MSF is comprised of the following components.

Component	Description
Cartridge	A plastic housing that encloses 2540 mm (100 in) of magnetic tape on which data is stored under program control.
Coupler	The interface between the peripheral processor (PP) and the mass storage adapter (MSA), which includes a buffer that contains data going to or coming from the mass storage transport.
CSU	Cartridge storage unit (CSU), which includes storage cells (cubicles) for 2052 cartridges† and a selector that moves cartridges among the mass storage transport, the cubicles, and the input-output (I/O) drawers of the CSU. Each CSU has two I/O drawers; the top one is the input drawer and the bottom one is the output drawer. Each drawer has eight vertically aligned drawer slots, numbered from 0 (top slot) to 7 (bottom slot). There can be up to 13 CSUs in an MSS configuration. Each CSU in a configuration is associated with a letter from A through M, which is the CSU identifier.
MSA	Mass storage adapter, which interfaces between the coupler and the mass storage transport or the CSU.
MST	Mass storage transport, which includes storage positions for five cartridges: one being read or written, two queued for reading or writing, and two queued for storage by the selector into the CSU.

The MSS is the product consisting of the MSF hardware, the CYBER coupler, the diagnostics, and the operational software. The basic function of MSS is to store data on MSF and move it to disk upon request for access by an authorized user. Control of file movement between disk and MSF is largely transparent to the applications programmer; however, there are operational changes and additions that are of importance to site personnel. These include modifications to operational procedures in the areas of permanent file backup, permanent file recovery, and disk space management. In addition, new MSS utilities are introduced.

† 2000 cartridges are available for file data storage and the rest are reserved for customer engineer and system use.

Detailed information about the call and operation of each MSS utility is contained in the following sections.

Utility	Description
ASDEF	Creates the system files (CSU maps and MSF catalogs) necessary for MSS processing.
ASLABEL	Manages the allocation of cubicles and assignment of cartridges in the CSU.
ASMOVE	Controls the destaging of files (creating MSF images) and the releasing of disk space.
ASVAL	Controls the releasing of MSF space and analyzes the CSU maps, MSF catalogs, and PFC entries to identify and flag discrepancies within these three components.
ASUSE	Provides reports on the assignment and availability of cartridges and cubicles within a CSU.
ASDEBUG	Corrects error conditions detected by ASVAL and recovers data from MSF cartridges.

DEFINITIONS

The descriptions of the MSS utilities require some familiarity with the terms whose definitions follow.

CARTRIDGE

A cartridge is the MSS data storage component consisting of 16 streams, called allocation units (AUs). Streams that have data written on them (allocated streams) are chained together in the MSF catalog (definition following) to identify the sequence of streams that must be accessed in order to read a file on MSF. A head of chain (HOC) flag identifies the first AU in the chain, a link field identifies the next AU in the chain, and an end of chain (EOC) flag identifies the last AU in the chain.

The cartridge label contains information that characterizes one of the three types of cartridges that can be used in an MSS environment. Cartridges having label types other than the following cannot be processed by MSS except by the ASLABEL utility, which can rewrite the cartridge label, or by the ASDEBUG utility, which can write the data on the cartridge to a permanent file.

- A manufacturer's label contains the volume serial number (vsn) of the cartridge in a machine-readable format. A cartridge with a manufacturer's label can be added to a CSU and assigned to a subfamily or pool (refer to the ASLABEL utility).
- A scratch label contains the vsn of the cartridge and additional system information indicating that the cartridge is available for assignment by the ASLABEL utility. A scratch label also contains the usage record of the cartridge. A cartridge with a scratch label is called a scratch cartridge.
- A family label contains the vsn of the cartridge and additional system information indicating that the cartridge is assigned to a particular subfamily. It also indicates the CSU identifier and the X, Y coordinates of the cubicle where the cartridge resides when it is not in use.

The addition, removal, and reassignment of cartridges are managed by the MSS utilities. The cartridge labels, and also the MSF catalogs and CSU maps (definitions following), contain information concerning the location and content of the cartridges. When a cartridge is labeled and assigned to a subfamily, a label is written on each stream of the cartridge, which contains the cartridge vsn, the CSU id, X, Y coordinates, family, and subfamily to which it was assigned, and the stream number of the particular stream. If such a cartridge is accessed for relabeling or for reading or writing an MSF file, the stream label verification procedure is used to verify this stream label information against the data in the MSF catalogs and CSU maps. If a discrepancy is detected, an error message is issued and corrective action must be taken to update the cartridge labels and/or system files as described in a later section. Whenever the cartridge location or content is changed, the cartridge label, MSF catalogs, and CSU maps are updated to reflect the current status of the cartridge. The descriptions of the MSS utilities contain further information on cartridge management.

CSU MAP

A CSU map is a direct access permanent file that contains information indicating how cubicles in a CSU are assigned to a family and identifying the cartridges that reside in the CSU. There is one CSU map for each CSU in the configuration. The permanent file name of the CSU map is CSMAPi, where i is the CSU identifier (a letter from A through M); its user index is 377760_8; and its family is the default family on the mainframe on which MSSEXEC executes (refer to the definition of MSSEXEC).

A CSU map contains an entry for each possible X, Y coordinate pair that identifies a cubicle in the CSU, from X=0, Y=0 (bottom right) to X=57, Y=36 (upper left). There are no cubicles at the positions where X=30 or Y=18, but there are entries in the CSU map for such coordinate pairs and these entries indicate that no cubicle exists there. Thirty-one cubicles are reserved for customer engineer use; they have the following X, Y coordinates: X=57, Y=36; X=0, Y=36; X=57, Y=0; X=26 through X=0, Y=0. Twenty-one cubicles are reserved for system use; they have the following X, Y coordinates: X=48 through X=31, Y=0; X=29 through X=27, Y=0. In all, there are 2146 entries in a CSU map and they are ordered (assigned a map entry ordinal) according to the positions in the CSU of the corresponding cubicles. That is, the following scheme is used to relate the X, Y coordinate pairs and the map entry ordinals.

- Given the X and Y coordinates, the ordinal is 2146 - X - (Y*58).

- Given the ordinal, Y is the whole number quotient of (2146 - ordinal)/58 and X is the remainder.

- Ordinal 0 does not represent a coordinate pair; it is used as a map header entry.

Thus, in a CSU map the zero entry is the map header entry; the first entry describes the cubicle at X=57, Y=36; the second entry describes the cubicle at X=56, Y=36; and so forth.

Each entry in a CSU map has the following format:

59	58 53	42 41	36 0	
code	ord	familyname		
ℓ		sub-family	vsn	

Field	Description
code	Number from 1 to 7 indicating how the cubicle is assigned.

code	Description
1	Reserved for customer engineer.
2	Reserved for system use.
3	Reserved for a different CSU map.
4	Assigned to the cartridge scratch pool.†
5	Assigned to a subfamily.
6	Unassigned.
7	No cubicle exists at these coordinates (X=30 or Y=18).

Field	Description
ord	Ordinal for this cubicle in the MSF catalog of the subfamily to which the cubicle is assigned. This ordinal is referred to as the FCT ordinal (refer to the definition of MSF catalog). This field is meaningful only if code = 5.
familyname	Seven-character name in 6-bit display code of the family to which the cubicle is assigned. This field is meaningful only if code = 5.
ℓ	Linkage error flag that is set by the ASVAL utility when a CSU map entry of a cubicle assigned to a family has no corresponding entry in the MSF catalog.
subfamily	Number from 0 through 7 identifying the subfamily to which the cubicle is assigned. This field is meaningful only if code = 5.
vsn	Six-character volume serial number of the cartridge assigned to the cubicle. If no cartridge is assigned, this field contains spaces.

The zero entry in the CSU map is the map header entry. In this entry the code field is 7, the leftmost 6 bits of the second word contain the CSU identifier, and the remaining bits are unused.

The CSU map is updated whenever the ASLABEL, ASVAL, or ASDEBUG utility causes a change in cubicle or cartridge assignment. It is recommended that the CSU map be backed up after every update to avoid problems such as the following:

- Mismatches between CSU map and MSF catalog entries.
- Lost CSU maps because of a disk failure or other problem.
- Attempts to access cartridges that are no longer available.
- Attempts to store cartridges in cubicles that are no longer empty.

† The pool is an area of the CSU that stores scratch cartridges that are managed by the ASLABEL utility.

Thus, the analyst should make a copy of the CSU map on tape or another device or family to always retain the latest version of the CSU map. If a device containing CSU maps is reloaded, the latest version of the CSU maps should be recovered from the backup copy after the reload is completed. After recovering the CSU maps, the analyst should run the ASVAL utility to check that the entries in the CSU maps and MSF catalogs match. If there are inconsistencies, corrective action should be taken as described in Error Conditions and Corrective Actions later in this section.

MSF CATALOG

An MSF catalog is a disk-resident direct access permanent file that contains information describing which streams of each cartridge assigned to a particular subfamily are allocated to MSF files and which streams are available for allocation. There is one MSF catalog for each subfamily of a family that can have MSF-resident files, and it resides on the master device for the subfamily. The permanent file name of the MSF catalog file is MSFCATi and its user index is $37776i_8$, where i is the subfamily identifier (a number from 0 through 7). For example, file MSFCAT3 and user index 377763_8 identify the MSF catalog for subfamily 3.

An MSF catalog is partitioned into subcatalogs, one subcatalog for each CSU used by the subfamily. The maximum number of subcatalogs in an MSF catalog is 13 (the maximum number of CSUs in a configuration). Each subcatalog consists of two parts: the file and cartridge table (FCT) and the available stream table (AST). The FCT has an entry for each cubicle assigned to the subfamily from the given CSU. The maximum number of FCT entries in a subcatalog is 2000 (the maximum number of user cartridges in a CSU). The AST contains information used by the allocation algorithm to select the cartridges on which a file will reside.

The preamble of the MSF catalog contains a header and at most 13 subcatalog entries. The header identifies the family and subfamily of the MSF catalog and each subcatalog entry contains the length and location of its FCT and AST, the CSU identifier, unallocated stream count, and date of the last ASVAL run that resulted in the releasing of MSF space assigned to the particular CSU or the setting of flags in entries for cubicles in the CSU. The format of the header is as follows:

59	17	11 0
familyname	sub-family	unused
unused		

Field	Description
familyname	Seven-character name in 6-bit display code of the family for this MSF catalog.
subfamily	Number from 0 to 7, identifying the subfamily for this MSF catalog.

The format of the subcatalog entry is as follows:

59	53	41 35	29 17	0
id	length	FCT loc	AST loc	streams
unused		date time		

Field	Description
id	CSU identifier for the subcatalog (a letter from A to M).
length	Number of FCT (and AST) entries in the subcatalog.
FCT loc	Location (beginning PRU number) of the FCT.
AST loc	Location (beginning PRU number) of the AST.
streams	Number of unallocated streams for this subcatalog.
date time	Date and time of the last releasing of orphan files on the CSU identified by id or the last time flags were set for cartridges or cubicles in the CSU (whichever is later).

The header and subcatalog information is arranged in the following order:

1. First word of the header.
2. First word of each of the subcatalog entries.
3. Second word of the header.
4. Second word of each of the subcatalog entries.

Each cubicle from the given CSU assigned to the subfamily has an entry in the FCT of the subcatalog. This entry contains the X,Y coordinates of the assigned cubicle. If a cartridge has been assigned to the cubicle, the FCT entry also contains the vsn of the cartridge, usage information, status flags, and information about each of the 16 streams of the assigned cartridge. The format of each FCT entry is as follows:

59 57	53	47	41	35 33 29 27 20 0		
bps	$flags_1$	x	y	vsn		
unused	$link_1$		load threshold	load count		
unused	$link_2$		pass threshold	pass count		
unused	$link_3$		error threshold	error count		
x_1	x_2	x_3	unused			
y_1	y_2	y_3	unused			
reserved for site (2 words)						
u	pru	$flags_2$	chain	u	$stream_1$ detail	
⋮						
reserved for CDC (8 words)						

Field	Description
bps	Number of blocks per stream on the cartridge assigned to this cubicle.
$flags_1$	One of the following flags.

Bit	Description
53	Inhibit allocation flag, indicating that space from the cartridge assigned to this cubicle is not to be allocated to a file. This flag is set by a directive to the ASLABEL utility.
52	Lost cartridge flag, indicating that the cartridge assigned to this cubicle was not there the last time MSSEXEC tried to pick it. This flag can be cleared by a directive to the ASLABEL utility.
51	Excessive write parity error flag. Space from such a cartridge will not be allocated. This flag can be cleared by a directive to the ASDEBUG utility.
50	Reserved.
49	Linkage error flag, indicating that the CSU map entry for this X,Y location is inconsistent with this FCT entry.
48	Reserved.

Field	Description
x	X coordinate of this cubicle.
y	Y coordinate of this cubicle.
vsn	Six-character volume serial number of the cartridge assigned to this cubicle. If no cartridge is assigned, this field contains spaces.
$link_i$	Ordinal of the FCT entry for the cubicle containing the next cartridge on which the file on the cartridge assigned to this cubicle resides. If a file does reside on multiple cartridges, the entire file must be contained in one CSU. Also, since there are only three link fields, if a cartridge contains several files, only three can be contained on other cartridges.
load threshold	If the number of loads of the cartridge exceeds this threshold value, streams from this cartridge will not be allocated to new files.
load count	Number of times the cartridge assigned to this cubicle has been loaded to a mass storage transport read/write station.
pass threshold	If the number of passes across the read/write heads exceeds this threshold value, streams from this cartridge will not be allocated to new files.
pass count	Number of times the cartridge assigned to this cubicle has been passed across a read/write head.
error threshold	If the number of errors recorded exceeds this threshold value, streams from this cartridge will not be allocated to new files.

Field	Description
error count	Number of recovered read errors for the cartridge assigned to this cubicle.
x_i	X coordinate of the cubicle in which the cartridge referred to by the $link_i$ field resides.
y_i	Y coordinate of the cubicle in which the cartridge referred to by the $link_i$ field resides.
u	Unused.
pru	Number of PRUs on the stream.
$flags_2$	One of the following flags.

Bit	Description
47	Start of fragment flag; set by the ASVAL utility.
46	Frozen chain flag, indicating a problem with this allocation chain. Streams in this chain are not reused until a directive to the ASDEBUG utility clears the flag.
45	Stream conflict flag, indicating an allocation conflict involving this stream. This flag is set by the ASVAL utility or by MSSEXEC.
44	Stream selected flag indicating that the allocation routine has selected this stream but the file data has not yet been written on the stream. This field is meaningful only if the free/busy flag indicates that the stream is free.
43	Free/busy flag, indicating whether or not this stream is currently allocated to a file.
42	Reserved.
41-40	Off-cartridge link flag indicating that the next stream of the file is on another cartridge. The next cartridge is identified by one of the $link_i$ fields. The value of the off-cartridge link flag (1, 2, or 3) specifies which $link_i$ to use. The chain field specifies the stream number on the next cartridge. Only 3 of the 16 streams of a cartridge can have this flag set at any one time. This field is meaningful only if the chain control field indicates that this stream is the first or middle stream of the file.
39-38	Unused.
37-36	Chain control, indicating whether the stream is a first (1), last (2), only (3), or middle (0) stream of the file. This field is meaningful only if the stream is allocated to a file.
35-34	Unused.

Field	Description
chain	Next stream number, if any, containing file data for the file. This field is meaningful only if the stream is allocated to a file.
$stream_1$ detail	PRU, flag, and chain control information about stream 1. The upper 30 bits of this word contain information about stream 0. The lower 30 bits are divided into the same fields, and contain information about stream 1. The next seven words are divided similarly: the upper 30 bits contain information about stream 2, 4, 6, 8, 10, 12, or 14 and the lower 30 bits contain information about stream 3, 5, 7, 9, 11, 13, or 15.

The MSF catalog is updated whenever the ASLABEL, ASMOVE, ASVAL, or ASDEBUG utility causes a change in cartridge or cubicle assignment that affects the subfamily. Because the MSF catalog for a subfamily resides on its master device, it will be backed up by PFDUMP whenever the master device for the subfamily is dumped. Consequently, when PFLOAD reloads all files, the MSF catalogs are automatically recovered and all MSF-resident files as indicated in a recovered PFC will also have entries in the recovered MSF catalog. Thus, no special operational procedures are needed to back up an MSF catalog. It is possible, however, that the MSF catalog will be inconsistent with the CSU maps or cartridge labels. If such inconsistencies do exist, corrective action will have to be taken as described in Error Conditions and Corrective Actions later in this section.

MSF FILES

In an MSS environment, permanent files can be categorized according to whether or not they reside on MSF. A disk file is a permanent file that resides on disk but not on MSF. An MSF file is a permanent file that resides on MSF and may or may not also reside on disk, depending on how the disk space is managed (refer to Disk Space Management in a later section). Depending on backup requirements (BR parameters), both disk and MSF files can also have backup images on tape (refer to the NOS 2 Reference Set, Volume 3).

When a user defines a direct access file, initially it is a disk file. A disk file becomes an MSF file when it is destaged to MSF; that is, an image of the file is created on MSF. Destaging files is accomplished through the ASMOVE utility, which is run periodically to manage disk space. When ASMOVE is run, files are destaged to MSF and/or their disk space released depending on certain file characteristics (refer to ASMOVE in a later section). Thus, after an ASMOVE run a file can reside on disk, on MSF, or on both. If the file does have an MSF image, the asa field in the PFC entry for the file indicates the location of the MSF copy. The obsolete (AFOBS) flag in the PFC entry indicates whether or not the MSF image is a current version of the file.

When a user attaches an MSF file, it is staged to disk from MSF (that is, a disk image is created) if the current version of the file is not on disk. If the file is attached in write mode, the MSF image is marked obsolete; that is, the AFOBS flag in the PFC entry for the file is set. This is because the disk image is immediately updated when the user makes changes to the file, but the MSF image is not updated until the ASMOVE utility is run again. Hence, the current version of the file resides on disk only. Setting the AFOBS flag ensures that the current version of the file will be copied to MSF and will replace the obsolete MSF file the next time ASMOVE is run. When a user attaches a file, however, it is always the current version of the file that he accesses; an obsolete file cannot be accessed.

If the file is purged, its disk space, but not its MSF space, is immediately released. The ASVAL utility must be run to release MSF space allocated to purged files. Thus, because a purged file has no PFC entry linking to its MSF catalog entry, the MSF image that still exists before ASVAL is run is called an orphan file. However, a user can never access an orphan file.

When a file is destaged to MSF, information is written on each stream to which the file data is written. This information includes the file's creation date and time and user index from the PFC entry, the identity of the first stream to which the file is written, the identity of the stream immediately preceding this one, and the number of disk PRUs of data recorded on previous streams (for all but the first stream of multistream files).

When a file is staged back to disk, the file label verification procedure is used to verify this file label information against the stream label information (refer to the definition of cartridge) for each stream of the file. If a discrepancy is detected, an error message is issued, the file stage is aborted, an error flag is set in the PFC entry to indicate that the MSF file could not be accessed, and the stream conflict error flag is set in the MSF catalog entry for the particular cartridge(s) and stream(s).

MSSEXEC

MSSEXEC is the main processing program that is responsible for controlling MSS activities. The MSS utilities issue requests to MSSEXEC to destage files from disk to MSF, purge unneeded MSF files, label or relabel cartridges, update CSU maps and MSF catalogs, and so forth. In a multimainframe environment, two versions of this program exist: the mainframe to which the MSF device is physically connected (the master mainframe) has a program called MSSEXEC, and all other mainframes (the slave mainframes) have a program called MSSSLV. Refer to Multimainframe Operation for more information.

SUBFAMILY

Each permanent file family consists of eight subfamilies, subfamily 0 through subfamily 7. The lower 3 bits of the user index identify the subfamily to which a user belongs. For example, a user whose index ends in 3 (or 011 in bit notation) belongs to subfamily 3. When the ASDEF utility is run to create MSS system files, the CSU maps are created under user index 377760_8 (subfamily 0) and one MSF catalog is created under each user index $37776i_8$ (subfamily i), i=0,1,2,...,7. When the ASLABEL utility is used to assign a CSU, cubicle, or cartridge to a family, it is possible for the analyst to specify assignment only to particular subfamilies of the family.

UTILITIES

The following sections describe the MSS utilities. All of these utilities must be run from system origin jobs. In a multimainframe environment, the ASDEF and ASUSE utilities can be run on any mainframe that has access to the family being processed. However, the remaining utilities must be run on the mainframe on which MSSEXEC executes.

ASDEF

ASDEF creates the system files (CSU maps and MSF catalogs) that are necessary for MSS processing. If a CSU is added to the MSF hardware configuration, ASDEF is used to create the CSU map for that CSU. If a family is to be permitted to have MSF-resident files, ASDEF is used to create the eight MSF catalogs for that family (one catalog for each subfamily).

NOTE

If the CS parameter is specified, ASDEF will create a CSU map for the specified CSU (refer to the definition of CSU map). It is recommended that the CSU map is copied on tape or on another device or family immediately after it is created.

The format of the ASDEF command is as follows:

ASDEF,p_1,p_2.

p_i	Description
CS=id	CSU identifier of the CSU for which a CSU map is to be created; id is a letter from A to M.
CS	Same as CS=A.
CS omitted	No CSU map is to be created. FM=familyname or FM must be specified.
FM=familyname	Family for which MSF catalogs are to be created, one catalog for each subfamily.
FM	Same as FM=system default family.
FM omitted	No MSF catalogs are to be created. CS=id or CS must be specified.

Example:

ASDEF,CS=B.

CSMAPB, the CSU map for CSU B, is created, and its entries are as described in the previous definition of CSU map. However, since ASDEF does not assign cubicles, the entries for cubicles available for use initially have zeros or spaces in all but the code field, which indicates the cubicles are unassigned.

ASLABEL

ASLABEL manages cartridge assignment and cubicle allocation in a CSU. The following functions are performed through the use of directives to ASLABEL.

- Add a CSU to a subfamily (AC directive).
- Remove a CSU from a subfamily (RC directive).
- Add cubicles to a subfamily, the pool, or the reserved area (AB directive).
- Remove cubicles from a subfamily, the pool, or the reserved area (RB directive).
- Add cartridges to a subfamily or the pool (AM directive).
- Remove cartridges from a subfamily or the pool (RM directive).
- Restore an abnormally removed cartridge (RS directive).
- Repair a cartridge label or overwrite a family label (FX directive).
- Inhibit or allow further allocation of files to a cartridge (IB directive).

Input to ASLABEL is via a directive file. ASLABEL reads the appropriate CSU maps and MSF catalogs to determine how to process each directive and then issues requests to MSSEXEC to read and/or write cartridge labels and to update the CSU maps and MSF catalogs. ASLABEL generates a report detailing the action taken for each input directive. If the assignment information or cartridge label is not appropriate or conflicts with data in the CSU map or MSF catalog, the cartridge label information is included on this report and the cartridge is put into the output drawer. It may be possible to restore such a cartridge as described in Cartridge Restoration and Reuse later in this section.

NOTE

ASLABEL updates the CSU map for the specified CSU (refer to the definition of CSU map). It is recommended that the CSU map is copied on tape or on another device or family immediately after each update.

The format of the ASLABEL command is as follows:

ASLABEL,p_1,p_2.

p_i	Description
I=filename	File containing the directives to ASLABEL.
I	Same as I=COMPILE.
I omitted	Same as I=INPUT.

P_i	Description
L=filename	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
Z	Directives are contained on the ASLABEL command. The I parameter is ignored.
Z omitted	Directives are contained on the file specified by the I parameter.

ASLABEL Directives

The directives to ASLABEL can be specified on a separate file (specified by the I parameter) or after the ASLABEL command (Z specified). If on the input file, each directive must be specified on a separate line via the OP=directive option. Parameters for a directive are on the same line, are separated by commas, and end with a period:

OP=directive,p_1,p_2,...,p_n.

Example:

```
ASLABEL,I=DIRFILE.
```

DIRFILE is the directive file and contains the following directives.

```
OP=AM,N=4,PK=D.
OP=RM,V=VSN444,FM,SB=1.
```

Two directives to ASLABEL are specified. OP=AM adds four cartridges to the pool of CSU A (CS parameter not specified). OP=RM removes the cartridge whose vsn is VSN444 from subfamily 1 of the default family. (Refer to the following descriptions of directives and parameters.)

If the directives are contained on the command, they follow the command terminator. The first character following the terminator is the separator. Any character that does not appear in any of the directives can be used as the separator character. Each directive must be preceded by the separator and terminated by a period.

Example:

```
ASLABEL,Z./OP=AM,N=4,PK=D./OP=RM,V=VSN444,FM,SB=1.
```

The slant is used as the separator. This command performs the same functions as those in the preceding example.

The following directives are available with ASLABEL. Some of these directives cause cartridges to be physically moved to and from cubicles and the input or output drawer (refer to OP=AM, OP=RM, OP=RS, and OP=FX). The remaining directives cause only logical operations to occur, updating the MSS system files. The descriptions of the parameters for these directives follow this section.

Add CSUs

OP=AC adds a CSU to a subfamily. The MSF catalog for the specified subfamily is updated to reflect that cartridges and permanent files for the subfamily can reside on the specified CSU. This directive, however, does not manipulate cartridges or cubicles.

Remove CSUs

OP=RC removes a CSU from a subfamily. The MSF catalog for the specified subfamily is updated to reflect that cartridges and permanent files for the subfamily cannot reside on the specified CSU. Before OP=RC can be specified, all cubicles in the specified CSU must have been removed previously from the family (refer to the OP=RB directive). This directive, however, does not manipulate cartridges or cubicles.

Add Cubicles

OP=AB adds an unassigned cubicle within a CSU to a subfamily (PT=F), the pool (PT=P), or the reserved area of the CSU (PT=R). More than one cubicle (N=n) can be added at a time. Specific cubicles (XI and YI options) can be added, but they must be currently unassigned. For PT=R, XI and YI must be used to add multiple cubicles; N=n is not valid. If cubicles are to be assigned to a subfamily, ASLABEL selects available cubicles closest to the top of the CSU. If cubicles are to be assigned to the pool, ASLABEL selects available cubicles closest to the bottom of the CSU. The CSU map is updated to reflect the new assignment of cubicles.

Remove Cubicles

OP=RB removes an assigned empty cubicle from a subfamily (PK=F), the pool (PK=P), or the reserved area of the CSU (PK=R). More than one cubicle (N=n) can be removed at a time. ASLABEL reads the CSU map and selects the first empty cubicle assigned to the subfamily, pool, or reserved area to be removed. Specific cubicles (XI and YI options) can be removed, but they must be empty. The CSU map is updated to reflect that the cubicles are unassigned.

Add Cartridges

OP=AM adds a cartridge with a manufacturer's label or a scratch label to either a specific subfamily (PT=F) or the pool (PT=P). ASLABEL selects the first empty cubicle assigned to the subfamily or pool as the new location for the cartridge. More than one cartridge (N=n) can be added at a time or a specific cartridge (V=vsn) from the pool can be added to a subfamily. The CSU map, MSF catalog, and cartridge label are updated to reflect the new assignment of the cartridge.

Remove Cartridges

OP=RM removes either an empty cartridge from a subfamily to the pool or the output drawer (PK=F and PT=P or PT=D) or any cartridge from the pool to the output drawer (PK=P and PT=D). Any cartridge currently assigned to a subfamily cannot be removed unless it is empty; that is, all 16 streams must be unallocated. More than one cartridge (N=n) can be removed or a specific cartridge (V=vsn) from the pool can be removed to the output drawer. The CSU map, MSF catalog, and cartridge label are updated to reflect the change in location of the cartridge. The removed cartridge then has a scratch label, which allows it to be reassigned via the OP=AM directive.

If the cartridge specified by the V parameter is lost (does not reside in its assigned cubicle), the LT option should be specified. This allows the appropriate entries in the CSU map and MSF catalog to be deleted even though the cartridge is not available to have its label updated. If LT is not specified, an error message is issued and ASLABEL aborts.

Restore Lost Cartridges

OP=RS restores to its proper cubicle a cartridge that was inadvertently removed from a CSU. If restoration is successful, the lost flag in the MSF catalog is cleared. If data recorded on the cartridge label does not agree with the information in the MSF catalog and the CSU map entry for the cubicle to which the cartridge is to be restored, the cartridge label information is reported and the cartridge is put into the output drawer for use in further processing of the cartridge.

Fix Cartridge Labels

OP=FX writes a scratch label on a cartridge and adds the cartridge to the pool. This directive is intended for use when a cartridge label has been destroyed, but the cartridge itself is not physically damaged and can be reused. It can also be used when a cartridge with a family label is to be assigned to a different subfamily via the OP=AM directive, but it is not feasible to first remove the cartridge normally via the OP=RM directive. For example, if ASLABEL is run to add a cartridge to a subfamily, and a system failure occurs before the MSF catalog and CSU map are updated but after the cartridge is relabeled, then the cartridge label does not match the corresponding entries in the MSF catalog and CSU map. Hence, OP=RM cannot be used to remove the cartridge from the subfamily, but OP=FX can be used to rewrite the cartridge label and then OP=AM can be used to add the cartridge to a subfamily. However, if a family label is to be overwritten, the FM and SB parameters must identify the family and subfamily to which the cartridge was assigned. The CSU map and MSF catalog are updated to reflect the new cartridge label.

Control Cartridge Allocation

OP=IB sets or clears the inhibit allocation flag in the MSF catalog entry for the specific cartridge (V=vsn must be specified). If the flag is set (ON), MSSEXEC does not allocate new MSF files to this cartridge. If the flag is cleared (OF), allocation of files to this cartridge is enabled.

Parameters for ASLABEL Directives

The descriptions of the parameters to the ASLABEL directives follow. Not all options are valid with all directives, as indicated.

p_i	Description
CS=id	CSU identifier of the CSU to be used by ASLABEL; id is a letter from A to M.
CS	Same as CS=A.
CS omitted	Same as CS=A.
D=d	Input drawer slot from which ASLABEL picks the cartridge; valid only with OP=AM, OP=RS, or OP=FX.
D	First nonempty input drawer slot is to be used; valid only with OP=AM, OP=RS, or OP=FX.
D omitted	Same as D.
FM=familyname	Family to which ASLABEL adds or from which it removes a cartridge or CSU. With OP=FX, this parameter specifies the family to which the cartridge was assigned.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.
LT	CSU map and MSF catalog entries are to be updated, even though the cartridge is lost and its label cannot be updated; valid only with OP=RM.
LT omitted	If the cartridge is lost and OP=RM is specified, an error message is issued and ASLABEL aborts.
N=n	Number of cartridges or cubicles to be added, removed, or repaired; $1 \leq n \leq 2000$; not valid if PT=R is specified. If V=vsn is specified, n must be 1.
N	Same as N=1.
N omitted	Same as N=1.
OF	Inhibit allocation flag in the MSF catalog is to be cleared; valid only with OP=IB.
ON	Inhibit allocation flag in the MSF catalog is to be set; valid only with OP=IB.

Pi	Description
PK=pkloc	Location from which the cartridge or cubicle is to be picked; not valid if V=vsn is specified.

pkloc	Description
D	Cartridge is to be picked from the specified input drawer slot (D=d). PK=D is valid only with OP=AM, OP=RS, or OP=FX.
F	Cartridge or cubicle is to be picked from the specified family (FM=familyname) and subfamily (SB=subfamily). PK=F is valid only with OP=RM or OP=RB.
P	Cartridge or cubicle is to be picked from the pool. PK=P is valid only with OP=AM, OP=RM, or OP=RB. PK=P is not valid if PT=P is specified.
R	Cubicle is to be picked from the reserved area of the CSU. PK=R is valid only with OP=RB.

Pi	Description
PK	Same as PK=P.
PK omitted	Same as PK=P.
PT=ptloc	Location into which the cartridge or cubicle is to be put.

ptloc	Description
D	Cartridge is to be put into the first available output drawer slot. PT=D is valid only with OP=RM.
F	Cartridge or cubicle is to be put into the specified family (FM=familyname) and subfamily (SB=subfamily). PT=F is valid only with OP=AM or OP=AB.
P	Cartridge or cubicle is to be put into the pool. PT=P is valid only with OP=AM, OP=RM, or OP=AB. PT=P is not valid if PK=P is specified.
R	Cubicle is to be put into the reserved area of the CSU. PT=R is valid only with OP=AB.

Pi	Description
PT	Same as PT=P.
PT omitted	Same as PT=P.
SB=subfamily	Subfamily to which ASLABEL adds or from which it removes a cartridge or CSU; $0 \le sub \le 7$. With OP=FX, this parameter specifies the subfamily to which the cartridge was assigned.
SB	Same as SB=0.
SB omitted	Same as SB=0.

P_i	Description
V=vsn	Volume serial number of the cartridge to be added, removed, or repaired; not valid if PK=pkloc is specified. If V=vsn is specified, n must be 1 if N=n is specified.
V	Volume serial number of the cartridge is not specified.
V omitted	Same as V.
XI=x_1	Column of the CSU to be added or removed; $0 \le x_1 \le 57$, $x_1 \ne 30$; valid only with OP=AB or OP=RB.
YI=y_1	Row of the CSU to be added or removed; $0 \le y_1 \le 36$, $y_1 \ne 18$; valid only with OP=AB or OP=RB.
XI=x_1,YI=y_1	X and Y coordinates of the cubicle to be added or removed; $0 \le x_1 \le 57$, $0 \le y_1 \le 36$, $x_1 \ne 30$, $y_1 \ne 18$; valid only with OP=AB or OP=RB.
XI=x_1,YI=y_1, XF=x_2,YF=y_2	Rectangle of cubicles to be added or removed; cubicles with X coordinates between x_1 and x_2 and Y coordinates between y_1 and y_2 are included; valid only with OP=AB or OP=RB. At most, 100 cubicles can be included in the rectangle. $x_1,x_2 \le 57$, $x_1,x_2 \ne 30$; $y_1,y_2 \le 36$, $y_1,y_2 \ne 18$; $x_1 < x_2$; $y_1 < y_2$. XF and YF must both be specified, if either is specified. XF and YF cannot be specified unless both XI and YI are specified.
XI and YI omitted	With OP=AB, the next available cubicle closest to the top (for assignment to a family) or the bottom (for assignment to the pool) is to be selected. With OP=RB, the first empty assigned cubicle is to be selected.

ASLABEL Update Sequence

The general result of each directive to ASLABEL is the updating of the CSU maps, MSF catalogs, and cartridge labels, whichever are appropriate, to reflect the changes in cartridge, cubicle, or CSU assignment. Because the MSF catalog is a disk-resident permanent file, it will be backed up on a dump tape whenever PFDUMP dumps the master device for its particular subfamily. Thus, it is not necessary for the analyst to back up the MSF catalogs immediately after an ASLABEL run. However, the backup and recovery of CSU maps do require special operational procedures, which should be performed immediately after an ASLABEL run (refer to the definition of CSU map).

When ASLABEL is run to change the assignment of a cartridge, the update sequence consists of a series of steps to delete the old assignment information from the MSS system files, relabel the cartridge, and add the new assignment information to the MSS system files. If an interruption such as a system failure, ASLABEL abort, or MSSEXEC abort prevents ASLABEL from completing the update sequence, the location of the affected cartridge and the status of the CSU maps and MSF catalogs depend on the point of interruption as follows:

- If the cartridge label, MSF catalog, and CSU map do not all match, then the cartridge is put into the output drawer. The OP=RS directive cannot be used to restore the cartridge because of the inconsistency. However, OP=FX can be used to overwrite the cartridge label and add the cartridge to the pool, if the FM and SB parameters specify the family and the subfamily on the cartridge label.

- If the cartridge label, MSF catalog, and CSU map do match, then the cartridge may be returned to its original location, the new location, or the output drawer depending on the exact point of interruption. If the cartridge is in the output drawer, OP=RS can be used to restore the cartridge to the location indicated on the cartridge label.

Cartridge Restoration and Reuse in a later section describes the procedure for restoring cartridges found in the output drawer.

Restrictions to ASLABEL

The following restrictions apply to the ASLABEL utility.

- MSSEXEC must be running when ASLABEL is run.

- Only one copy of ASLABEL can be run at a time.

- ASLABEL, ASVAL, and ASDEBUG cannot be run at the same time.

Example

The following output shows the format of an ASLABEL report. The cartridge label information is included on the report because of a mismatch with the CSU map. An error message is issued for the first directive on the command (in this case, the only directive).

```
ASLABEL REPORT FILE

ASLABEL,Z./OP=RS,PK=D,CS=B.

    1  OP=RS,PK=D,CS=B.

    1  OP=RS,PK=D,CS=B.

       VSN = P66157
       FAMILY = SYSTST
       SUBFAMILY = 0
       CSU = B
       X = 2
       Y = 6
*** ERROR   8    DIRECTIVE   1
                 UNEXPECTED CSU, X, Y, FAMILY OR SUBFAM.***
```

ASMOVE

ASMOVE manages disk and MSF residence. That is, ASMOVE determines which files should be left on disk, which files should be released from disk and moved to MSF, and which files should be resident both on disk and on MSF. The ASVAL utility, not ASMOVE, controls the releasing of MSF space.

The selection process includes two algorithms that weigh certain file characteristics as follows:

- Files are selected for destaging to MSF based on file length, time since the last update, and the preferred residence specified by the user.

- Files are selected for release from disk based on time since the last access and the backup requirement specified by the user.

ASMOVE reads the PFC entries for a particular family and calculates release and destage values (refer to Selection Algorithms later in this section) for each file to determine its residence. If a file has both disk and MSF images but is to reside only on MSF, ASMOVE releases the disk space for the file. For files that do not have an MSF image, ASMOVE creates entries on the ASMOVE/MSSEXEC communication file, MOVCOM, to identify the files to be destaged and to specify whether or not the file's disk space is to be released upon completion of the destage. MSSEXEC then processes each destage and destage/release request on MOVCOM.

ASMOVE generates an output report that lists the files released by ASMOVE and the files contained on MOVCOM. A report on the use of disk space before and after the ASMOVE run is included in the output file and the dayfile.

The format of the ASMOVE command is as follows:

ASMOVE,p_1,p_2,...,p_n.

p_i	Description
FM=familyname	Family to be used by ASMOVE.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.
L=filename	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
NW	No wait. ASMOVE will not wait for completion of destage and release processing by MSSEXEC.
NW omitted	ASMOVE will wait for completion of destage and release processing by MSSEXEC.
RD=yymmdd	Last access date. All files not accessed after yymmdd are to be released from disk.

P_i	Description
RD omitted	No files are to be released.
RO	Report only. ASMOVE does not release files from disk and does not send requests to MSSEXEC to destage or destage/release files.
RO omitted	Disk space is to be released and requests are to be sent to MSSEXEC, if appropriate.
RT=hhmmss	Last access time. All files not accessed after hhmmss of the day specified by the RD parameter are to be released.
RT	Same as RT=000000 (midnight).
RT omitted	Same as RT=000000 (midnight).
TM=mode	Selects or deselects test mode (refer to Pseudo Release in a later section).

mode	Description
Y	Select test mode. Pseudo release of all files selected for release from disk by this ASMOVE run is performed.
N	Deselect test mode. The pseudo release flag is cleared and disk images for all files from the selected family which were previously pseudo released are really released from disk. Normal release processing is performed for all files selected for release from disk by this ASMOVE run.

P_i	Description
TM omitted	Normal release processing is to be performed for files that do not have the pseudo release flag set. Files with the pseudo release flag set are treated as if they have already been released.
UI=userindex	Destage and release processing is restricted to files having user index userindex.
UI=0	All user indexes are processed.
UI omitted	All user indexes are processed.

The following options for ASMOVE redefine the values of the weight factors or thresholds (installation parameters) used in the algorithms that select files to be destaged or released. The site analyst uses these options to increase or decrease the importance of certain file characteristics used to determine which files are to be destaged and/or released. For example, specifying a large MN parameter prohibits ASMOVE from selecting small files for destaging to MSF. Unless otherwise stated, each of these options causes the installation-defined value to be multiplied by the integer value n, $n \leq 0$. Refer to the NOS 2 Installation Handbook for the initial definitions of these values.

Option	Description
DB=n	n times the installation-defined DB weight factor is to be used as the preferred residence value for destage decisions involving files with a PR=M attribute.†
DB	Same as DB=1.
DB omitted	Same as DB=1.
DC=n	n times the installation-defined weight factor is to be used as the preferred residence value for destage decisions involving files with a PR=N attribute.†
DC	Same as DC=1.
DC omitted	Same as DC=1.
DL=n	n times the installation-defined length weight factor is to be used as the length weight factor for destage decisions.
DL	Same as DL=1.
DL omitted	Same as DL=1.
DT=n	n times the installation-defined time weight factor is to be used as the time weight factor for destage decisions.
DT	Same as DT=1.
DT omitted	Same as DT=1.
DV=n	n times the installation-defined destage control value is to be used as the destage control value.
DV	Same as DV=1.
DV omitted	Same as DV=1.
MN=n	n times the installation-defined minimum length threshold is to be used as the minimum allowable size in disk PRUs (64 words) for MSF files.

† The file owner specifies the preferred residence attribute via the PR parameter on the DEFINE or CHANGE command (refer to of the NOS 2 Reference Set, Volume 3).

Option	Description
MN	Same as MN=1.
MN omitted	Same as MN=1.
MX=n	n times the installation-defined maximum length threshold is to be used as the maximum allowable size in disk PRUs for MSF files.
MX	Same as MX=1.
MX omitted	Same as MX=1.

Selection Algorithms

ASMOVE determines which files to destage and/or release according to the following algorithms. Files that reside only on MSF are not considered because they have been destaged and released previously. Also, indirect access files are excluded from consideration because they cannot reside on MSF. For all other files, ASMOVE checks the file length and excludes from further consideration any file whose length in PRUs is less than the minimum length threshold (refer to the MN parameter) or greater than the maximum length threshold (refer to the MX parameter).

If the current image of the file resides on both disk and MSF, ASMOVE uses the release algorithm to determine whether or not to release disk space; the destage algorithm is not used. If the current file resides on disk only, ASMOVE uses the destage algorithm to determine whether or not to destage the file. If the file is to be destaged to MSF, ASMOVE also determines via the release algorithm whether or not to release the file's disk space.

Destage Algorithm

The destage algorithm is used to select for destaging certain files that do not have current MSF images. ASMOVE calculates the destage value for each eligible file according to the following equation. If the destage value exceeds the destage control value (refer to the DV parameter), ASMOVE selects the file for destaging. Otherwise, the file remains on disk only.

$$\text{destage value} = (1 + t * \text{time}) * (1 + \ell * \text{length}) * (\text{res})$$

t	Installation-defined time weight factor.
time	Number of days since the file was last modified.
ℓ	Installation-defined length weight factor.
length	Length of the file in PRUs.
res	Installation-defined preferred residence value. This value depends on whether the file owner specified no preferred residence or MSF residence preferred for the file. Refer to the DB and DC parameters.

Release Algorithm

The release algorithm is used to select files whose disk space is to be released. Any file with a backup required (BR=Y)† attribute and whose master device has not been dumped since the file was last modified is not considered for disk space release. The date and time the master device was last dumped was set by the SD parameter on PFDUMP. For all other files, ASMOVE checks the last access date and time in the PFC entry for each file. If the file was last accessed before the date and time specified by the RD and RT parameters, its disk space is to be released. If the file to be released has a current MSF image, ASMOVE releases the disk space. If the file to be released does not have a current MSF image, MSSEXEC creates one before releasing the disk space.

Disk Space/Dump Tape Management

As more disk-resident files are created and more MSF-resident files are staged to disk, it will be necessary to monitor the availability of disk space. It is recommended that ASMOVE be used as a periodic disk space management procedure to avoid frequent disk full conditions (refer to Disk Space Management later in this section). ASMOVE can also be used to reduce the amount of data written on dump tapes and thereby avoid maintaining large numbers of dump tapes. This is accomplished by destaging to MSF and/or releasing disk space of files that need not be on the dump tape (refer to Dump Tape Management later in this section).

Restriction to ASMOVE

Only one copy of ASMOVE per family can be run at a time. A second ASMOVE aborts if the first one has not completed.

Example

The following output shows the format of an ASMOVE report. The files that are to be destaged and destaged/released are listed. An account of the disk space and the destage for backup, release date, and release time values is given.

† The file owner specifies the backup requirement via the BR parameter on the DEFINE or CHANGE command (refer to the NOS 2 Reference Set, Volume 3).

ASMOVE REPORT.

```
ASMOVE,FM=SYSTST,L=MOV,RD=791109,RT=085547,MN=1,MX=9999,TM=Y

FILE              UI      LENGTH

AAAAAAI           172         22      RELEASE AND DESTAGE
AAAAAAJ           172         22      RELEASE AND DESTAGE
AAAAAAK           172          7      RELEASE AND DESTAGE
AAAAAAL           172         29      RELEASE AND DESTAGE
AAAAAAM           172         41      RELEASE AND DESTAGE
AAAAAAN           172         50      RELEASE AND DESTAGE
AAAAAAO           172         43      RELEASE AND DESTAGE
AAAAAAP           172         31      RELEASE AND DESTAGE
AAAAAAQ           172         27      RELEASE AND DESTAGE
AAAAAAR           172         34      RELEASE AND DESTAGE
AAAAAAS           172         16      RELEASE AND DESTAGE
DEF0002           170         78      RELEASE AND DESTAGE
AAAOAAA           172         19      RELEASE AND DESTAGE
AAAEAAA           172         17      RELEASE AND DESTAGE
AAAPAAA           172         20      RELEASE AND DESTAGE
MOV0040           170          6      RELEASE AND DESTAGE
MOV0005           170          6      RELEASE AND DESTAGE
DLF0006           170          4      RELEASE AND DESTAGE
DLF0012           170         70      RELEASE AND DESTAGE
DMP0012           170        160      RELEASE AND DESTAGE
RDF0012           170         59      RELEASE AND DESTAGE
CLF0012           170          5      RELEASE AND DESTAGE
DWK0013           170       1065      RELEASE AND DESTAGE
WLF0013           170         29      RELEASE AND DESTAGE
MOV0014           170          7      RELEASE AND DESTAGE
DEF0015           170        692      RELEASE AND DESTAGE
DLF0017           170         78      RELEASE AND DESTAGE
CLF0017           170          5      RELEASE AND DESTAGE
STIMABS           170        103      DESTAGE
GLOSARY           172         66      DESTAGE
AAAVAAA           172         14      DESTAGE
DMP0017           170        287      DESTAGE
RDF0017           170         59      DESTAGE
DWK0018           170       1089      DESTAGE
WLF0018           170         31      DESTAGE
RPT0019           170        119      DESTAGE
MOV0020           170          8      DESTAGE
DLF0021           170        107      DESTAGE
DMP0021           170        481      DESTAGE
RDF0021           170         60      DESTAGE
RPT0022           170        150      DESTAGE
DEF0023           170        687      DESTAGE
AAAXAAA           172         12      DESTAGE
AAAYAAB           172         13      DESTAGE
AAAYAAC           172         14      DESTAGE

ACTPFSPACE BEFORE PROCESSING =        6488
ACTPFSPACE AFTER PROCESSING  =        3846
PF SPACE RELEASED            =        2642
RELEASE DATE USED            =   82/02/10.
RELEASE TIME USED            =   08.55.47.
```

ASVAL

ASVAL either performs release processing or reports on problems with the current MSS system files. That is, it either makes available MSF space presently allocated to files that are no longer needed, or reports on irregularities or discrepancies found in the current MSF catalogs and PFC entries for the specified family and, optionally, in certain CSU maps. The function to be performed is determined by whether or not the RF option is specified, as described in the following paragraphs.

NOTE

ASVAL updates the CSU map for the specified CSU. (Refer to the definition of CSU map.) It is recommended that the CSU map is copied on tape or on another device or family immediately after every update of the CSU map.

Release Processing

If RF=filename or RF is specified, ASVAL determines which MSF files are no longer needed and issues a request to MSSEXEC to purge these files so their MSF space can be reused. The procedure is for ASVAL to analyze copies of the MSF catalogs and PFC entries for the specified family that are contained on the release data file (RDF) specified by the RF parameter. Those MSF files described in an MSF catalog but not having a PFC entry (that is, orphans) can be purged. During the analysis (refer to MSF Catalog Analysis and PFC Analysis later in this section), ASVAL keeps track of the error conditions it discovers, and if the error count is less than or equal to the threshold specified by the FX parameter, release processing is performed if RL is specified and the last purge date in the MSF catalog is prior to the RDF file dump date. That is, trouble-free orphans are purged and their MSF space is made available for reuse. The current MSF catalog is updated to reflect that these files no longer exist. A validation report is issued which lists the errors encountered, the number of trouble-free orphans, and the amount of released MSF space. If RL is not specified or the last purge date in the MSF catalog follows the RDF file dump date, no release processing is performed but the validation report is issued, which lists the errors encountered, the number of trouble-free orphans, and the amount of releasable MSF space.

The RDF used for this analysis is a file produced during a previous PFDUMP run and it contains versions of the MSF catalogs and PFC entries that were current at the time of the dump. The site analyst chooses which RDF to use depending on how long after a file was purged he wants to wait before releasing MSF space. For example, he might run ASVAL every week for release processing purposes and use the RDF from the previous week's full dump. There are some restrictions as to which RDFs can be used (refer to MSF Space Management later in this section). The capability to release trouble-free orphans by analyzing the current MSF catalogs and PFC entries is not provided in order to ensure that an MSF file is released from MSF only after it is no longer needed.

Problem Reporting

If RF=filename or RF is not specified, ASVAL reports on problems with the current MSF catalogs and PFC entries for the specified family. If AM is specified, problems with CSU maps are also included in the report. ASVAL examines the MSS system files and PFC entries and searches for problem chains and fragments, problem asa values, and CSU map/MSF catalog mismatches. The procedures ASVAL uses to detect and classify inconsistencies and discrepancies are described later in this section (refer to Error Detection and Classification). ASVAL keeps track of the error conditions, if any, it discovers, and if the error count is less than or equal to the threshold specified by the FX parameter, problem fixing is performed. That is, ASVAL sets flags in the appropriate entries of the CSU map, MSF catalog, and/or PFC entries to prevent propagation of errors due to the inconsistencies or discrepancies found and to permit error recovery by the ASDEBUG utility. A count of the errors is recorded in the dayfile. A validation report is issued which lists the errors encountered, the number of trouble-free orphans, and the amount of releasable MSF space.

The format of the ASVAL command is as follows:

ASVAL,p_1,p_2,...,p_n.

p_i	Description
AM	The CSU map for the CSU specified by the CS parameter is to be analyzed in addition to the MSF catalogs; not valid if RF=filename or RF is specified.
AM=	Same as AM.
AM omitted	CSU maps are not to be analyzed.
CS=id	CSU identifier of the CSU to be used. Up to 13 CSUs can be selected by the letters A through M. For example, CS=ACJG selects CSU A, C, G, and J.
CS	Same as CS=ABCDEFGHIJKLM.
CS omitted	Same as CS=ABCDEFGHIJKLM.
FM=familyname	Family to be analyzed; not valid if the RF option is specified.
FM	Same as FM=system default family; not valid if the RF option is specified.
FM omitted	Same as FM=system default family, if the RF option is not specified. The family on the release data file is used, if the RF option is specified.
FX=n	Error threshold. If the total error count is greater than n, neither release processing nor problem fixing is performed.
FX	Same as FX=0.
FX omitted	Same as FX=0.

P_i	Description
L=filename	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
RF=filename	File which contains the release data file.
RF	Same as RF=ZZZZRDF.
RF omitted	Current versions of the MSF catalogs are to be analyzed.
RL	Release processing is to be performed; valid only if the RF option is specified.
RL omitted	No release processing is to be performed.
SB=subfamily	Subfamily to be processed. Up to eight subfamilies can be selected by the numbers 0 through 7. For example, SB=723 selects subfamilies 2, 3, and 7.
SB	Same as SB=01234567.
SB omitted	Same as SB=01234567.
ST=n	Scattered file criterion. Files are indicated as scattered if they are contained on at least n more cartridges than the minimum number needed to contain them. The minimum number of cartridges is the quotient of (number of streams + 15)/16; the remainder is ignored. For example, if the file is contained on 100 streams and 10 cartridges, it is scattered if n=1 but is not scattered if n=5.
ST	Same as ST=0. That is, files are scattered if they are contained on more than the minimum number of cartridges needed to contain them.
ST omitted	Same as ST=0.

Error Detection and Classification

ASVAL detects and classifies errors according to the following procedures. During the CSU map analysis, ASVAL detects and classifies errors in the CSU map. During the MSF catalog analysis, ASVAL detects errors with chains of AUs and during the PFC analysis, ASVAL classifies these errors. Whenever an error is encountered, the total error count is increased by one. The action taken for each type of error is discussed in Release Processing and Problem Fixing later in this section.

CSU Map Analysis

If the AM option is specified, ASVAL attempts to locate problems with CSU map entries by comparing the MSF catalogs and the CSU map. For each X,Y coordinate pair in an MSF catalog entry, ASVAL locates the corresponding CSU map entry. A type 1 error exists if the code field in the CSU map entry is not 5 (assigned to a subfamily), or if the family, subfamily, or vsn fields in the CSU map entry do not match those in the corresponding MSF catalog entry. ASVAL also scans the CSU map for all other entries assigned to the subfamily and reports as a type 2 error any of these entries that does not have a corresponding MSF catalog entry.

MSF Catalog Analysis

The MSF catalog analysis locates problems with chains of AUs (refer to the definition of cartridge) and identifies on each HOC whether any of the following problems exist or whether any part of the MSF files resides on a cartridge which is lost or has excessive write parity errors.

ASVAL scans the MSF catalog for HOC entries that are allocated and follows each chain until it terminates. Normal termination occurs with an EOC entry. Abnormal termination occurs when no EOC is found, but rather an illegal link value exists, an AU links to an unallocated stream, or an AU links to an AU previously found in the chain being followed (looping chain).

During the chain scans, the following types of chains can be encountered; they are linkage problems that are identified on the HOC entry.

Chain	Description
Intersecting	More than one chain links to the same AU.
Scattered file	The number of cartridges used for the file exceeds the value specified by the ST parameter plus the minimum number of cartridges needed for the file.

ASVAL also locates any AUs that are allocated but were not on any chain being followed. Such AUs are linked together to form partial chains without an HOC. These partial chains are called fragments and the first AU in a fragment is designated as the start of fragment. Each fragment chain is followed until it terminates. The abnormal termination conditions previously listed can also occur with fragments. Intersections can occur, but a fragment chain that intersects the start of another fragment chain is not an intersection; rather, one is the tail end of the other.

PFC Analysis

The PFC analysis is performed to classify the errors encountered on chains during the MSF catalog analysis. For each PFC entry with asa≠0 (the file has an MSF image and the asa value identifies the first AU in the chain containing the file), ASVAL classifies the following errors. Error type 3 exists if the asa value is illegal. Error type 4 exists for any of the following reasons.

- The AU specified by the asa value is not allocated or is not an HOC entry.
- The chain does not terminate normally.

- The chain intersects with another chain or fragment.

- More than one PFC entry points to the chain.

- The chain includes a cartridge for which the lost or excessive parity error flag is set.

ASVAL also classifies the following error conditions.

- Error type 5 exists if an orphan chain terminates abnormally or intersects with other chains or fragments. Trouble-free orphans (chains without a PFC entry pointing to them and without linkage problems) are not classified as errors.

- Error type 6 exists if an orphan is a fragment.

- Error type 7 exists if a chain or fragment points to an unallocated AU.

ASVAL generates informational report messages if either of the following conditions is true.

- The system error flag is set in the PFC.

- The read error flag is set in the PFC.

Release Processing and Problem Fixing

If the total error count calculated during the analyses described previously exceeds the value specified by the FX parameter, then neither release processing nor action to flag or fix the detected error conditions is performed. The validation report, however, is produced. Otherwise, action taken depends on the parameter specified and the type of errors found, as follows.

If ASVAL was run for release processing purposes (RF=filename or RF specified), ASVAL issues a request to MSSEXEC to release trouble-free orphans if RL was specified. If RL was not specified, no release processing is performed. If ASVAL was run for problem reporting purposes (RF omitted), the following action is taken.

- For error type 1, the linkage error flag is set in the MSF catalog entry.

- For error type 2, the linkage error flag is set in the CSU map entry.

- For error type 3, there are two alternatives. If the file also has a disk image, the asa field in the PFC entry is cleared. Thus, the good disk image will not be released and the file is accessible even if the MSF image cannot be retrieved. If the file does not have a disk image, no action is taken. However, if the disk image can be reloaded from tape, it is recommended that the file be reloaded and that ASVAL then be rerun to clear the asa field in preparation for other corrective action.

- For error type 4, the action taken is both that taken for error type 3 and that taken for error type 5, 6, or 7.

- For error type 5, 6, or 7, the frozen flag is set in the MSF catalog entry for the initial AU on the problem chain or fragment. This enables the problem chain/fragment/AU to be made available to the ASDEBUG utility, but prevents these AUs from being overwritten until then. Thus, the ASDEBUG utility can be used to inspect or save data from the corresponding streams or cartridges.

Validation Report

The validation report consists of a report heading and a series of report groups for each subfamily and CSU being reported on. The heading identifies the subfamily, the CSU, whether or not there are any problems, and the last purge date and time for the CSU (the last time orphans on this CSU were released). There is one report group for each error detected, and the actual information recorded in a report group depends on the type of error as described in the following paragraphs. Each report group, however, contains the following items.

- Error type (a number from 1 to 7).
- Identification (refer to the particular error type described in the following paragraphs).
- Chain information (MSF catalog ordinal, stream number, A or U designation for allocated or unallocated, H or E designation for HOC or EOC).
- Error description.

After the last report group, the validation report lists the number of trouble-free orphans, the amount of released or releasable MSF space, the total number of errors detected, and whether or not the MSS system files were updated.

Error Types 1 and 2

Error types 1 and 2 identify mismatches between the CSU map and the MSF catalog. In the validation report, the identification field lists the MSF catalog ordinal, the X and Y coordinates, and the vsn of the cartridge in error. The chain field is blank because problem chains are not identified as either error type 1 or 2. The analyst should run the ASUSE utility to produce a detailed report of the appropriate CSU map and MSF catalog entries to determine the exact problem.

Error Types 3 and 4

Error types 3 and 4 identify problem chains and problem asa values. In the validation report, the identification field lists the permanent file name and user index of the affected file; the dump control date and time (from the PFC entry for the file) to identify the backup file, if any; and the letter N (no) or Y (yes) to indicate whether or not the file has a disk image. The chain field lists the MSF catalog ordinal and stream number for all AUs in the affected chain. An A or U indicates whether each AU is allocated or unallocated, and an H or E identifies the HOC or EOC. An error description is printed for each error detected; one chain can have several errors.

Error Types 5, 6, and 7

Error types 5, 6, and 7 identify problem orphans, fragments, and problem unallocated AUs. In the validation report, the information reported is the same as for error types 3 and 4, except for the identification field. Instead of the permanent file identification, the word ORPHAN (error type 5), FRAGMENT (error type 6), or UNALLOCATED (error type 7) is printed. Error type 7 is an unallocated AU that is pointed to by a chain or fragment. Each such AU is also reported with the chain for the corresponding orphan or fragment.

Intersections

Intersections occur when more than one chain links to the same AU; they are classified as either error type 4 or 5. Thus, they are reported as explained previously. Intersections are also reported in a separate entry consisting of a heading and additional information identifying the MSF catalog ordinals and stream numbers of the intersecting chains. Therefore, when intersections are reported, there are two entries for the affected subfamily and CSU: one lists only the intersections and the other lists all the errors encountered.

The following output shows the format of a validation report. ASVAL was run for problem reporting purposes (RF not specified), and no errors were detected.

```
ASVAL - VALIDATION REPORT                               ASVAL - VER 1.0

        FAMILY = SYSTST


        ASVAL,FM=SYSTST,SB=0,CS=J.

                     L  = OUTPUT
                     RF = 0
                     AM = 0
                     CS = J
                     FM = SYSTST
                     FX = 0
                     RL = 0
                     SB = 0
                     ST = 0

SUBFAMILY = 0  CSU = J    -- GOOD --    LPDT = ********  ********

RELEASABLE MSS FILES    =   12

RELEASABLE MSS STREAMS  =   16

TOTAL VALIDATION ERRORS =    0

CATALOGS NOT MODIFIED


**REPORT COMPLETE**
```

Typical ASVAL Runs

As described previously, ASVAL is run either to make MSF space available for reuse or to report on problems with the current MSS system files and/or PFC entries. The following examples show typical ASVAL runs that may be used periodically for these purposes.

Example:

The following ASVAL command causes MSF space to be made available for reuse.

```
ASVAL,RF=DUMP1,RL.
```

DUMP1 is the release data file produced by a previous PFDUMP run from which ASVAL can identify all the MSF files that were orphans at the time of the dump. If no error conditions are detected in the MSF catalog and PFC entries contained on file DUMP1 (FX=0 by default), the orphans are purged and the MSF space assigned to them is released. The last purge date and time field in the subcatalog (in the MSF catalog) for each CSU for each subfamily is updated to the time of the ASVAL run if any file from that CSU is purged. This is to ensure that a subsequent ASVAL run does not release the same space a second time, as the MSF space may be reallocated to a new file.

If errors were detected, they are listed on the validation report and release processing is not performed. This is indicated by the CATALOGS NOT MODIFIED message at the end of the validation report. The analyst can rerun ASVAL with the following command to ensure that release processing is performed (n is the number of errors detected during the previous ASVAL run).

```
ASVAL,RF=DUMP1,RL,FX=n.
```

After this ASVAL run has completed, an analysis of the current version of the CSU map, MSF catalog, and PFC entries should be made to determine whether or not the errors detected in the first ASVAL run exist in the current MSS system files and PFC entries. This is accomplished through the following command.

```
ASVAL,FM=familyname,AM.
```

where familyname is that on the release data file, DUMP1.

Example:

Upon completion of any device reload which includes recovery of an MSF catalog and/or CSU map, ASVAL should be run to determine whether any CSU map/MSF catalog mismatches exist. The following call accomplishes this.

ASVAL,FM=familyname,SB=n_1,n_2,...,n_h,AM.

where familyname is that for which recovery was done and n_1,n_2,...,n_h are the affected subfamilies if just some of the devices of the family were reloaded.

ASVAL analyzes the CSU map, MSF catalog, and PFC entries for the subfamilies specified by the SB parameter and reports any discrepancies or inconsistencies. For example, if the recovery was not scheduled and ASLABEL was run to add or remove cartridges or cubicles from one of the affected subfamilies after the last incremental or full dump for these subfamilies, then the CSU map will reflect the results of the ASLABEL run but the MSF catalog will not. Such mismatches will be reported on the validation report.

If the following ASVAL command is then made, the errors detected during the previous run will be flagged as described previously in Release Processing and Problem Fixing.

ASVAL,FM=familyname,SB=$n_1,n_2,\ldots,n_h$,AM,FX=n.

where familyname and $n_1,n_2,\ldots,n_h$ are the same as in the previous ASVAL run and n is the number of errors detected during the previous run. After investigating the cause of these errors, the analyst can run the ASDEBUG utility to correct the error conditions (refer to ASDEBUG).

If a device reload includes recovery of all CSU maps (default family, user index = 377760_8), the latest CSU maps should be recovered from backup copies. Then each family that has MSF-resident files should be analyzed via the following command to detect CSU map/MSF catalog mismatches.

ASVAL,FM=familyname,AM.

It is recommended that the previous ASVAL run be made periodically to check whether any unexpected error conditions exist. As the site analyst becomes more familiar with MSS processing, the frequency of these periodic ASVAL runs can be decreased.

Restrictions to ASVAL

- Only one copy of ASVAL can be run at a time.
- ASVAL, ASLABEL, and ASDEBUG cannot be run at the same time.

ASUSE

ASUSE reads data in the MSF catalogs and CSU maps and produces reports on the availability of space on MSF cartridges and the allocation of cubicle space within a CSU. The reports may not be completely up to date because the MSF catalogs and CSU maps can be updated while the reports are being generated.

The types of reports that ASUSE generates are as follows:

Report	Description
Basic usage report	Lists general information about the use of each CSU in a subfamily.
Optional report A	Identifies cartridges with a specified number of streams available for assignment.†
Optional report B	Identifies cartridges with flags set in the MSF catalog.
Optional report C	Lists the contents of a CSU as described in the CSU map.

†A cartridge that has the lost cartridge flag, inhibit allocation flag, or excessive write parity errors flag set is considered as having zero streams available for allocation regardless of the number of unallocated streams on the cartridge.

Report	Description
Optional report D	Lists detailed cartridge status information on each entry in the MSF catalog.
Optional report E	Lists detailed cartridge and stream status information on each entry in the MSF catalog.

The format of the ASUSE command is as follows:

ASUSE,p_1,p_2,...,p_n.

p_i	Description
CS=id	CSU identifier of the CSU to be used. Up to 13 CSUs can be selected by the letters A through M. For example, CS=ACJG selects CSU A, C, G, and J.
CS	Same as CS=ABCDEFGHIJKLM.
CS omitted	Same as CS=ABCDEFGHIJKLM.
FM=familyname	Family to be reported on.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.
L=filename	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
OP=op†	Type of report to be generated.

op	Description
A	Optional report A and basic usage report.
B	Optional report B and basic usage report.
C	Optional report C and basic usage report.
D	Optional report D and basic usage report.
E	Optional report E and basic usage report.

OP	Basic usage report only is to be generated.
OP omitted	Same as OP.

† Multiple options can be specified (for example, OP=AB).

Pi	Description
SB=subfamily	Subfamily to be reported on. Up to eight subfamilies can be selected by the numbers 0 through 7. For example, SB=0273 selects subfamilies 0, 2, 3, and 7.
SB	Same as SB=01234567.
SB omitted	Same as SB=01234567.
SL=n	Minimum number of streams available for assignment; valid only with optional report A. Cartridges with n or more streams available are reported. $0 \leq n \leq 16$, $n \leq m$ (refer to SU=m).
SL	Same as SL=0.
SL omitted	Same as SL=0.
SU=m	Maximum number of streams available for assignment; valid only with optional report A. Cartridges with m or less streams available are reported. $0 \leq m \leq 16$, $n \leq m$ (refer to SL=n).
SU	Same as SU=16.
SU omitted	Same as SU=16.

Basic Usage Report

The basic usage report contains a title line, which identifies the subfamily, family, and CSU being reported on. The statistics in this report contain separate totals for CSUs and subfamilies. The following items are listed.

- Number of CSU locations reserved for the subfamily.
- Number of cartridges in the subfamily.
- Number of cartridges with 0 streams available for assignment.
- Number of cartridges with 1 stream available for assignment.

.
.
.

- Number of cartridges with 16 streams available for assignment.
- Number of unassigned and unflagged streams.
- Number of assigned and unflagged streams.
- Number of flagged streams.
- Number of cartridges with the inhibit allocation flag set.
- Number of available off-cartridge links.
- Number of cartridges with available streams and no off-cartridge links.

The following output shows the format of a basic usage report.

```
ASUSE REPORT FILE

SUBFAMILY = 3 CSU = J FM = SYSTST

BASIC REPORT

COUNT OF CSU LOCATIONS RESERVED FOR SUB-FAMILY =       10
NUMBER OF CARTRIDGES IN THE SUB-FAMILY =                4

NUMBER OF CARTRIDGES WITH  0 STREAMS AVAILABLE =        4
NUMBER OF CARTRIDGES WITH  1 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  2 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  3 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  4 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  5 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  6 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  7 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  8 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH  9 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 10 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 11 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 12 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 13 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 14 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 15 STREAMS AVAILABLE =        0
NUMBER OF CARTRIDGES WITH 16 STREAMS AVAILABLE =        0

NUMBER OF FREE AND UNFLAGGED STREAMS =                  0
NUMBER OF ASSIGNED AND UNFLAGGED STREAMS =             64
NUMBER OF FLAGGED STREAMS =                             0
NUMBER OF CARTRIDGES WITH INHIBIT FLAG SET =            0
NUMBER OF AVAILABLE OFF-MSC LINKS =                     3
NUMBER OF CARTRIDGES WITH AVAILABLE STREAMS AND
NO OFF CARTRIDGE LINKS =                                0
```

Optional Reports A and B

Optional reports A and B both contain a title line, which identifies the subfamily, family, and CSU being reported on, and list the following information about cartridges. Optional report A includes a cartridge only if the number of streams available for assignment is within the range specified by the SL and SU parameters. Optional report B includes only those cartridges for which flags are set in the MSF catalog.

- Volume serial number of the cartridge.
- X,Y coordinate pair of the cartridge location.
- Number of streams available on the cartridge.
- Number of off-cartridge links available on the cartridge.

In addition to the preceding items, optional report B lists one or more of the following messages depending on the flags set in the MSF catalog. Refer to the definition of MSF catalog for more information about these flags.

- EXCESSIVE PARITY ERRORS.
- LOST.
- INHIBIT SET.
- STREAM n START OF FRAGMENT.
- STREAM n FROZEN CHAIN.
- STREAM n STREAM CONFLICT.

The following output shows the format of optional report A.

```
ASUSE REPORT FILE

SUBFAMILY = 3 CSU =J FM = SYSTST

OPTIONAL REPORT(S) AB

VSN = V99004
X =          45
Y =          36
AVAILABLE STREAMS =      0
OFF CARTRIDGE LINKS =    0

VSN =V99005
X =          44
Y =          36
AVAILABLE STREAMS =      0
OFF CARTRIDGE LINKS =    0

VSN = V99006
X =          43
Y =          36
AVAILABLE STREAMS =      0
OFF CARTRIDGE LINKS =    0

VSN = V99007
X =          42
Y =          36
AVAILABLE STREAMS =      0
OFF CARTRIDGE LINKS =    3

END OF REPORT(S) AB
```

Optional Report C

Optional report C contains a title line, which identifies the CSU being reported on. The CSU number and Y coordinate are printed at the top of the page. There is a new Y coordinate on each page, from Y=36 through Y=0. X coordinates are written two to a line, from X=57 through X=0. The information listed in this report includes the following items.

- X coordinate.
- Code.
- Vsn.
- Family.
- Subfamily.
- FCT link.
- Flags.

Optional Reports D and E

Optional reports D and E both contain a title line, which identifies the subfamily, family, and CSU being reported on. Both reports list the following cartridge information about entries in the MSF catalog.

- FCT ordinal of the MSF catalog entry.
- X and Y coordinates of the location of the cartridge in the cubicle described by this entry.
- Volume serial number of the cartridge in the cubicle described by this entry.

In addition to the preceding information, optional report E lists the following information about the streams on the cartridges previously described.

- Off-cartridge links. Also referred to as Off-MSC (Mass Storage Cartridge) links.
- Two words reserved for site use.
- Stream detail in octal.

Refer to the definition of MSF catalog for more information about the catalog entries.

The following output shows the format of optional report E.

```
ASUSE REPORT FILE

OPTIONAL REPORT E  MSFCATALOG FOR SUBFAMILY 3, CSU J  FM = SYSTST

 ORD   X   Y  VSN

   1  45  36  V99004  LINK1=     2  LINK2=     2  LINK3=     2
                      SITE=00000000000000000000/00000000000000000000
             STREAM
              00-03      20106       20300       22100       24101
              04-07      26102       20300       20007       20010
              10-13      20011       20012       20013       20014
              14-17      20015       20200       20300       20300

   2  44  36  V99005  LINK1=     3  LINK2=     3  LINK3=     3
                      SITE=00000000000000000000/00000000000000000000
             STREAM
              00-03      20006       20014       20200       22101
              04-07      24102       26103       20007       20010
              10-13      20011       20012       20200       20300
              14-17      20015       20016       20200       20300

   3  43  36  V99006  LINK1=     4  LINK2=     4  LINK3=     4
                      SITE=00000000000000000000/00000000000000000000
             STREAM
              00-03      20106       20011       20013       22001
              04-07      24102       26103       20007       20200
              10-13      20300       20200       20300       20014
              14-17      20015       20016       20017       20200

   4  42  36  V99007  LINK1=     0  LINK2=     0  LINK3=     0
                      SITE=00000000000000000000/00000000000000000000
             STREAM
              00-03      20106       20014       20016       20200
              04-07      20300       20300       20007       20010
              10-13      20011       20012       20200       20300
              14-17      20200       20300       20017       20200
```

ASDEBUG

ASDEBUG allows the analyst to update appropriate entries in the CSU maps and/or MSF catalogs and thereby resolve inconsistencies reported by the ASVAL utility. ASDEBUG can also copy data from selected MSF files or cartridges to disk. This function of ASDEBUG is intended for use when errors such as unrecoverable read errors do not allow successful staging of an MSF file.

NOTE

> ASDEBUG updates the CSU map for the specified CSU. (Refer to the definition of CSU map.) It is recommended that the CSU map is copied on tape or on another device or family immediately after every update of the CSU map.

Input to ASDEBUG is via a directive file. Refer to the ASLABEL utility for a description of the directive file format.

The format of the ASDEBUG command is as follows:

ASDEBUG,p_1,p_2,p_3.

p_i	Description
I=filename	File on which directives are written.
I	Same as I=COMPILE.
I omitted	Same as I=INPUT.
L=filename	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
Z	Directives are contained on the ASDEBUG command. The I parameter is ignored.
Z omitted	Directives are contained on the file specified by the I parameter.

ASDEBUG Directives

The following directives are available with ASDEBUG. The descriptions of the parameters for these directives follow this section.

Read Streams

OP=RS reads selected streams of a cartridge in a specified drawer (D=d) or identified by its vsn (V=vsn) or X,Y coordinates (XI, YI options). The CS parameter specifies the CSU where the cartridge resides. The range of streams to be read is specified by the SL and SU parameters. The streams are written to the file specified by the PF parameter.

Read File

OP=RF reads the file whose alternate storage address is specified by the CS, FO, and ST parameters. The file is written to the file specified by the PF parameter.

Release Frozen Chain Space

OP=RP clears flags in the MSF catalog and releases MSF space for the chain whose alternate storage address is specified by the CS, FO, and ST parameters.

Remove Cartridge Entry from MSF Catalog

OP=RL removes an MSF catalog entry that is not linked properly to the CSU map. The CS and FO parameters identify the MSF catalog entry to be removed.

Remove Cartridge Entry from CSU Map

OP=RC removes a CSU map entry that does not have a corresponding FCT entry in the MSF catalog. The CS, XI, and YI parameters identify the CSU map entry to be removed. The cartridge at the particular X,Y location is put into the outut drawer and the CSU map entry is changed to unassigned. The CSU map should be backed up immediately after the ASDEBUG run to ensure consistency with cartridge labels and MSF catalogs (refer to the definition of CSU map).

Change Flag in CSU Map or MSF Catalog

OP=CF sets or clears flags in the CSU map or MSF catalog. The FL and ON or OF parameters indicate the flag type and the action to be taken. The appropriate FCT or CSU map entry is determined from the FO, V, or XI and YI parameters. For FCT stream detail flags (FL=SF, FC, or SC), the user can specify either a single stream via the ST parameter, or a range of streams via the SL and SU parameters.

Parameters for the ASDEBUG Directives

The descriptions of the parameters to the ASDEBUG directives follow. Not all options are valid with all directives, as indicated.

p_i	Description
CS=id	CSU identifier of the CSU to be used by ASDEBUG; id is a letter from A to M.
CS	Same as CS=A.
CS omitted	Same as CS=A.
D=d	Input drawer slot to be used; $0 \leq d \leq 7$. Not valid for OP=RS if V=vsn or XI=x is specified.
D	First available input drawer slot is to be used.
D omitted	V=vsn or XI=x and YI=y must be specified for OP=RS.

Pi	Description
FL=flag	Name of flag in CSU map or MSF catalog to be set or cleared. Valid only for OP=CF.

flag	Description
EW	Excessive write parity error flag.
FC	Frozen chain flag.
FE	Linkage error flag (in MSF catalog FCT).
IB	Inhibit allocation flag.
LC	Lost cartridge flag.
ME	Linkage error flag (in CSU map).
SC	Stream conflict flag.
SF	Start of fragment flag.

Pi	Description
FL omitted	FL=flag must be specified for OP=CF.
FM=familyname	Family to be processed.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.
FO=ord	MSF catalog ordinal indicating the file to be read or the chain whose space is to be released. Not valid for OP=CF if V=vsn or XI=x is specified.
FO omitted	FO=ord must be specified for OP=RF, OP=RP, and OP=RL. V=vsn or XI=x and YI=y must be specified for OP=CF.
OF	Flag specified by FL=flag is to be cleared. Valid only with OP=CF.
ON	Flag specified by FL=flag is to be set. Valid only with OP=CF.
PF=filename	File to which the MSF image (streams or file) is to be copied. Each stream copied is separated by an end of record. This file is defined under the user's current family and user index.
PF	Same as PF=ZZZZBUG.
PF omitted	Same as PF=ZZZZBUG.
SB=subfamily	Subfamily to be used; $0 \leq$ subfamily ≤ 7.
SB	Same as SB=0.
SB omitted	Same as SB=0.
SL=i	Stream where OP=RS begins copying or OP=CF begins changing flags; $0 \leq i \leq 15$; $i \leq j$ (refer to SU=j).

P_i	Description
SL	Same as SL=0.
SL omitted	Same as SL=0.
ST=s	Stream where OP=RF begins reading or OP=RP begins releasing. If specified with OP=CF, ST=s indicates a single stream detail to be changed and takes precedence over the SL and SU parameters.
ST omitted	ST=s must be specified for OP=RF and OP=RP.
SU=j	Stream where OP=RS ends copying or OP=CF ends changing flags; $0 \leq j \leq 15$; $i \leq j$ (refer to SL=i).
SU	Same as SU=15.
SU omitted	Same as SU=15.
V=vsn	Volume serial number of the cartridge to be used; not valid for OP=RS if D=d, D, XI=x, or YI=y is specified; and not valid for OP=CF if FO=ord, XI=x, or YI=y is specified.
V omitted	D=d or D, or XI=x and YI=y must be specified for OP=RS. FO=ord or XI=x and YI=y must be specified for OP=CF.
XI=x	X coordinate of the cubicle where the cartridge to be read resides; $0 \leq x \leq 57$ and $x \neq 30$. YI=y must also be specified. D=d, D, or V=vsn must not be specified with OP=RS. FO=ord or V=vsn must not be specified with OP=CF.
XI omitted	D=d, D, or V=vsn must be specified for OP=RS. FO=ord or V=vsn must be specified for OP=CF. XI=x and YI=y must be specified for OP=RC.
YI=y	Y coordinate of the cubicle where the cartidge to be read resides; $0 \leq y \leq 36$ and $y \neq 18$. XI=x must also be specified. D=d, D, or V=vsn must not be specified with OP=RS. FO=ord or V=vsn must not be specified with OP=CF.
YI omitted	D=d, D, or V=vsn must be specified for OP=RS. FO=ord or V=vsn must be specified for OP=CF. XI=x and YI=y must be specified for OP=RC.

Restrictions to ASDEBUG

The following restrictions apply to the ASDEBUG utility.

- MSSEXEC must be running when ASDEBUG is run.
- Only one copy of ASDEBUG can be run at one time.
- ASDEBUG, ASVAL, and ASLABEL cannot be run at the same time.

MSS OPERATIONAL PROCEDURES

This section summarizes operational procedures used in an MSS environment. These include modifications to existing procedures and also new MSS procedures, especially in the areas of permanent file backup and reloading and disk space management. Refer to the descriptions of the appropriate utilities for details about these operational procedures.

INITIALIZATION

MSS processing is initiated when the ASDEF utility is run to create the system files necessary to allow storage of files on MSF. ASDEF creates both a CSU map for each CSU that is to store file data on cartridges and eight MSF catalogs (one for each subfamily) for each family that is to have MSF-resident files. Once these system files have been created, the ASLABEL utility can then be run to allocate portions of the CSU to each subfamily and to initialize cartridges for use by files belonging to these subfamilies. When permanent files are defined, they reside on disk until the ASMOVE utility is run. Depending on the parameters specified, ASMOVE can destage files to MSF and release the disk space assigned to files so that it is available for general use.

DISK SPACE MANAGEMENT

The availability of disk space must be managed more frequently in an MSS environment than in a non-MSS environment. This is necessary because MSF-resident files must be staged to disk before a user can access them, and their disk space is not immediately released upon completion of the jobs that attached the files. Consequently, disks are apt to approach a disk full condition unless the ASMOVE utility is used periodically to release disk space.

The ASMOVE utility destages selected files to MSF and optionally releases their disk space. It is recommended that the site analyst use ASMOVE as part of a periodic disk space management procedure and also just prior to a full dump to reduce the amount of data dumped to tape. (Refer to Dump Tape Management.)

The E display (refer to the E,M command in the NOS 2 Operator/Analyst Handbook) can be used to monitor the tracks on a device or set of devices as indicated by the TKS=nnn value for each disk. When too few tracks (as defined by the installation) are available on the direct access devices for a family or subfamily, the ASMOVE utility with the RD and RT parameters specified should be run. ASMOVE reads the PFC entries for the specified family, selects certain files to reside on MSF, and decides which files should be released from disk.

Files can be destaged to MSF without their disk space being released. This destage-only feature can be used prior to a routine backup dump to create MSF images for files with the BR=MD attribute and thereby eliminate the need to include them on a backup dump tape. (Refer to Dump Tape Management.) Having an MSF image also provides backup for the file in special cases where the permanent file is being updated at the same time PFDUMP is being run.

The destage-only feature can also be used to allow disk space to become available immediately when ASMOVE is run again. That is, ASMOVE can directly release disk space of files that have both disk and MSF images but are to reside on MSF only. However, for files that have no MSF image, there is a delay before the disk space can be released because these files must first be destaged to MSF.

MSF SPACE MANAGEMENT

The availability of MSF space must be managed because MSF space is not automatically released when a permanent file is purged. This allows an analyst to perform a permanent file recovery to a time prior to the purging of the file. On a typical dump tape, the entry for an MSF-resident file includes the PFC and permit entries, but not the file data. A subsequent reload operation recovers only what was dumped; the PFC and permit information, but not the file data. Thus, MSF space for a purged permanent file cannot be released until the site analyst no longer needs to recover the file data, because the file data resides on MSF only and typically not on any dump tape.

An MSF-resident file is stored only on the cartridges within the cubicles of CSUs assigned to a subfamily. When destaging a file to MSF, MSSEXEC selects the CSU with the most space available. If no CSU has enough free space to store the file being destaged, MSSEXEC abandons that destage request, issues a message to the dayfile, and continues to destage other files that fit on the available MSF space. To avoid this problem, use the ASVAL utility periodically to release MSF space for purged files, thereby making it available for reuse.

When an analyst decides that it is time to reuse MSF space currently allocated to files that have been purged, he runs ASVAL with the RF and RL parameters specified. The RF parameter specifies an RDF, which is an auxiliary file produced by the permanent file utility PFDUMP and which contains versions of the MSF catalogs and PFC entries that were current at the time of the dump. ASVAL examines the RDF to identify unneeded MSF files (those without PFC entries) and their MSF space is released. The site analyst chooses which RDF to use based on the date and time of the dump that produced it. That is, a particular RDF is used only if there is no need for a permanent file recovery to a time prior to the dump that produced the RDF.

Once an RDF is used by ASVAL to release MSF space, the site analyst should discard it and any other RDFs for the same set of devices. These RDFs cannot be used as input to ASVAL in any future run. The MSS software does not permit an RDF to be specified by the RF parameter on an ASVAL call, unless it was produced by PFDUMP after the last ASVAL run that released MSF space was completed. This prevents the inadvertent release of MSF space that was previously released and reassigned to a file.

Example:

Suppose two PFDUMPs were run a week apart producing two release data files, RDF1 and RDF2. Suppose, also, that according to both RDF1 and RDF2, file AFILE is an orphan (it has been purged but still resides on MSF). If the following call to ASVAL is made, the MSF space assigned to AFILE is released and made available for reuse, if no errors were encountered.

```
ASVAL,RF=RDF1,RL.
```

Now, suppose that a new file, BFILE, which did not exist when RDF1 and RDF2 were produced, is assigned to the MSF space on which AFILE has resided. If ASVAL were to accept either RDF1 or RDF2 on a subsequent ASVAL call, the MSF space allocated to file AFILE (which is now the space where BFILE resides) is released. However, any RDF created after the ASVAL run that purged AFILE would not have an entry for AFILE and, hence, ASVAL would not inadvertently release the MSF space presently allocated to BFILE.

After ASVAL uses a release data file to release MSF space, the corresponding backup tape from PFDUMP is the oldest tape that should be used for the first reel of a future incremental load. The first reel determines which files are to be reloaded according to the CIR on the tape (refer to PFLOAD in section 1). Use of an older tape as the first reel can allow the PFC entry for a purged file to be restored even though its MSF space may have been reassigned. The MSS software does not prevent loading from the wrong dump tape, but does detect as an error an attempt to stage a file whose data was overwritten.

Example:

Suppose that RDF1 and RDF2 are as in the previous example, and that file CFILE is an orphan according to RDF2, but not according to RDF1. The following ASVAL call releases MSF space allocated to CFILE.

```
ASVAL,RF=RDF2,RL.
```

Now suppose that the dump tape created by the PFDUMP run that produced RDF1 is used as the first reel of an incremental PFLOAD. Then the PFC and permit entries for file CFILE are reloaded, but, in fact, file CFILE does not exist on MSF. This will be detected as an error when a user attempts to attach CFILE.

BACKUP AND RECOVERY

Permanent file backup and recovery methods in an MSS environment are similar to those in a non-MSS environment. It is assumed that most sites with disk-resident permanent files have a file backup procedure consisting of a full dump followed by a series of incremental dumps. The assumed reload procedure is to load from tapes starting with the most recent incremental dump tape and continuing through older incremental dump tapes until the most recent full dump tape is processed. These procedures can be modified as follows to accommodate MSF-resident files.

File Dumping

The normal backup dump procedure is to dump files based on the modification date field in the PFC entries for the files. New parameters to PFDUMP provide the capability to dump files that have been modified during a certain interval, which is useful in recycling old dump tapes (refer to Dump Tape Management later in this section). For files that reside only on MSF, the option to stage the file to disk and thereby include it in the dump or to suppress staging and include only the file's PFC and permit information on the dump tape is provided. If the device or family being dumped has MSF-resident files, the following procedures should be included with the normal dumping procedures.

Full Dumps

Full dumps should be performed as usual, but OP=S should be specified on the call to PFDUMP to suppress staging. Thus, all files on disk are dumped but only the PFC and permit entries for MSF files without disk images are included in the dump. It is unnecessary and not feasible to dump the files that reside only on MSF. OP=S and SD should be specified on the call to PFDUMP; RD=filename should be used at the discretion of the site analyst.

Parameter	Description
OP=S	Selects no staging. If the SD option was inadvertently used on any previous nonincremental dump, an incremental dump should be taken prior to the full dump.
SD	Updates the dump date/time field on each master device dumped to permit files created or modified prior to this dump to be released when ASMOVE is run again. Refer to Release Algorithm in ASMOVE description.
RD=filename	Specifies that PFDUMP is to write a release data file to be used later by ASVAL. RD=filename is included or excluded on a call to PFDUMP depending on how often the analyst wants to purge unneeded MSF files.

Incremental Dumps

Incremental dumps should be performed as usual. No staging should occur because any files that were created or modified since the last dump will still be on disk if a tape backup is required. The following parameters should be specified on the call to PFDUMP.

Parameter	Description
OP=M	Selects incremental dumps.
SD	Updates the date/time field on each master device dumped, as previously described for full dumps.
AD=yymmdd and AT=hhmmss	Selects the date and time just prior to the previous incremental or full dump of the device. Hence, all files not included in the last dump are dumped.

The following parameters should be used at the discretion of the site analyst.

Parameter	Description
OP=S	Selects no staging. If the SD option was inadvertently used on any recent partial dump, OP=S should not be specified so any file with a BR=Y attribute which had its disk space inadvertently released will be included in the dump.
RD=filename	Specifies that PFDUMP is to write a release data file to be used later by ASVAL, as previously described for full dumps.

Dump Tape Management

In a non-MSS environment, it is possible to make all previous dump tapes available for use after a full dump is completed. However, in an MSS environment, such dump tape recycling cannot occur because files that have resided only on MSF for some time are probably not included on any recent dump tape. When a low percentage of files on a tape are active files, it is possible to redump any remaining files in order to recycle the tape by running PFDUMP with OP=M, BD, and BT parameters, but not OP=S, specified.† This performs a dump of all files that were last dumped before the date and time specified on the PFDUMP call. If necessary, files will be staged in from MSF; after the dump is completed, the disk space for these staged files is released. Thus, files that might not be on any dump tape made after the date specified by the BD parameter are dumped and tapes created before this date can be recycled.

The number of dump tapes created can be reduced by using ASMOVE to reduce the amount of data written on these dump tapes. If ASMOVE is run prior to an incremental dump, files with the BR=MD attribute can be destaged to MSF and excluded from the dump. That is, the incremental dump will exclude the files with a BR=MD attribute that are on both MSF and disk. If ASMOVE is run prior to a full dump, disk space for files that do not have to be on disk can be released and these files are not written on the dump tape. The following procedures involving dumps and ASMOVE runs can be used for efficiency.

1. Run ASMOVE to destage files with the BR=MD attribute.

2. Take an incremental dump to back up files with the BR=Y attribute.

3. Run ASMOVE to release the disk images of files backed up in step 2.

4. Take a full dump to reduce the number of dump tapes involved if a reload is required.

CSU Map/MSF Catalog Backup

A CSU map is created for each CSU in an MSS environment and is updated by the ASLABEL, ASVAL, and ASDEBUG utilities. (Refer to the definition of CSU map.) It is recommended that the CSU map is copied on tape or on another device or family immediately after every update of the CSU map. If the device containing subfamily 0 of the default family is reloaded, the latest CSU maps should be recovered from the backup copies. After recovering the CSU maps, run the ASVAL utility with the AM and FM parameters specified to ensure that the CSU map and MSF catalog entries match. If they do not, corrective action should be taken as described in Error Conditions and Corrective Actions. Failure to retain or recover the latest CSU maps can cause problems with future ASLABEL runs (refer to the definition of CSU map).

An MSF catalog is created for each subfamily of a family that can have MSF-resident files and is updated by the ASLABEL, ASMOVE, ASVAL, and ASDEBUG utilities. When PFDUMP copies permanent files to tape for a master device or all devices in a family, it ensures that corresponding MSF catalogs are also dumped. (If MSSEXEC has an MSF catalog attached in modify mode, PFDUMP interfaces with MSSEXEC so that the MSF catalog is included on the dump tape. While PFDUMP is accessing the MSF catalog, any file destage requests for that subfamily are delayed.) Consequently, if PFLOAD is used to reload all files, the MSF catalogs are automatically recovered and entries for all MSF-resident files reflected in recovered PFC entries will exist in the recovered MSF catalog.

†It is possible to specify the AD and AT parameters also, thereby dumping files that were dumped during an interval - after the date and time specified by AD and AT and before the date and time specified by BD and BT (refer to parameters for PFDUMP). This performs a dump of all files last dumped during the interval specified (including MSF-resident files) and allows the site analyst to recycle all dump tapes created during this interval.

If PFLOAD is run after the ASLABEL utility has updated the MSF catalog and CSU map but before the MSF catalog has been backed up, the recovered MSF catalog will not match exactly the corresponding CSU map. In this case, recovery procedures (as described in MSF Catalog/CSU Map Mismatch later in this section) must be taken to bring the CSU map, MSF catalog, and cartridge label information into agreement.

File Reloading

PFLOAD runs should be made as usual. PFLOAD reads the CIR records from the most recent incremental dump tape to control loading of file data and PFC and permit information. For MSF-resident only files, PFLOAD reloads only the PFC and permit information (if PFDUMP dumped only this information). The following situations involve PFLOAD in an MSS environment.

- If one device needs to be reloaded, the DN or TD parameter specifies the device. The OP=Z and UD options should not be specified.

- If PFLOAD is used for other than a device recovery, both OP=Z and UD should be specified. The OP=Z option ensures that the PFC entry does not link to an MSF file that may no longer exist, and UD ensures that the file is included in the next incremental or full dump.

- If a file has a nonzero asa value in its PFC entry (indicating that the file has an MSF image), the ASCVER flag in the PFC entry will be set when the PFC and permit information are reloaded. If the file is successfully staged to disk when it is attached, this flag is cleared. Otherwise, the flag remains set. This can be used to indicate the possibility of an operational error, such as omitting OP=Z when a file or set of files is reloaded from an obsolete dump tape.

- If any unscheduled device reload that includes recovery of an MSF catalog and/or CSU map is made, ASVAL should be run with the AM and FM parameters specified. ASVAL examines the PFC entries for MSF-resident files, the MSF catalog, and the CSU map to detect any error conditions that exist.

ERROR CONDITIONS AND CORRECTIVE ACTIONS

It is possible for operational, hardware, or software malfunctions to cause a variety of error conditions to exist or appear to exist in the MSF catalogs, CSU maps, PFC entries, or cartridge labels. The ASVAL utility can analyze the MSF catalogs, CSU maps, and PFC entries to detect these errors, and the ASLABEL utility can identify problems with cartridge labels. The following sections describe some specific error conditions and the actions that should be taken to correct them. Most of the errors are caused either by incorrect operational procedures that result in the recovery of the wrong version of an MSS system file, or by abnormal termination of MSSEXEC or MSS utility processing, which can interrupt the updating of an MSS system file.

Clearing Permanent File Error Flags

The permanent file error flags that have been set by MSSEXEC in the PFC can be cleared by the CE parameter of the CHANGE command. The job must be system origin.

Permanent File Recovery

If a permanent file cannot be accessed or is included by ASVAL on the validation report, the following methods can be tried to recover a copy of the file.

1. Attach the file. If the file has a disk image or can be staged in from MSF, the file data will be available on disk and can be copied to another file. ASVAL should then be run as described in step 2.

2. If the file cannot be attached, reload the file from a dump tape. To identify the PFDUMP run which saved a backup copy of the file, check the output from ASVAL or PFCAT, which includes date and time fields from the PFC entry for the file. Depending on the BR attribute (backup requirement) of the file, a backup copy on a dump tape may not exist.

   If the file can be reloaded to disk, ASVAL should be run as follows:

   ```
   ASVAL,FM=familyname,SB=subfamily,FX=n,AM.
   ```

   where familyname and subfamily identify the family and subfamily of the recovered file and n is sufficiently large that the fixing/flagging will be done. ASVAL sets the obsolete flag in the PFC entry because the file now has a disk image; thus the file is disassociated from the error condition. The error condition may still exist in the MSF catalog or CSU map, but it can be investigated and corrected by the site analyst via the ASDEBUG utility. Before using ASDEBUG to correct the error, the site analyst should take an incremental dump so the old PFC entry with an asa value pointing to a problem MSF-resident file will not be reloaded if a device reload occurs before the next scheduled backup dump.

3. If steps 1 and 2 fail, try to regenerate the file. Depending on the particular problem and status of the cartridges to which the file was destaged, the OP=RF or OP=RS directive to ASDEBUG might recover the file data.

4. If the file cannot be recovered, purge it so there is no PFC entry pointing to a problem MSF-resident file.

Cartridge Restoration and Reuse

If a cartridge is unexpectedly found anywhere outside its assigned cubicle, the following steps can be taken to restore the cartridge so it can be used again.

1. Put the cartridge in the input drawer of the CSU to which it is assumed to belong and run ASLABEL with the OP=RS directive. If the cartridge label information agrees with the CSU map entry for the cubicle with the X,Y coordinates written on the cartridge label, the cartridge will be restored to that cubicle and the MSF catalog entry for the cartridge is updated to clear the lost flag. Otherwise, the cartridge is put in the output drawer and the cartridge label information is included in the output from ASLABEL.

2. If the cartridge was not restored to its CSU cubicle, examine the label information reported by ASLABEL. If the cartridge is assigned to a different CSU, repeat step 1 using the correct CSU. If the family name is blank, the cartridge has a scratch label and can be assigned normally with the OP=AM directive to ASLABEL.

3. If steps 1 and 2 fail, examine the CSU map entry for the cubicle with the X,Y coordinates written on the cartridge label to see how the cubicle is assigned. Examine the cartridge, if any, in this cubicle. Also, it might be useful to run ASVAL to ensure the CSU map and MSF catalog entries for the cartridge match or to identify affected permanent files, if any, if they do not match.

4. If step 3 does not produce any useful information and the cartridge cannot be restored, use the OP=FX directive to ASLABEL to rewrite the cartridge label and thereby make a scratch cartridge. It might be useful to first run ASDEBUG with the OP=RS directive to preserve the data on the cartridge.

Removal of Faulty or Missing Cartridges

The following steps should be taken to remove a cartridge which has unrecoverable errors, or to release the CSU map entry for a cartridge which is missing.

For unallocated cartridges:

1. Attempt to remove the cartridge with the ASLABEL OP=RM directive.

2. If CARTRIDGE NOT FOUND is reported, repeat step 1 specifying the LT parameter.

3. If CARTRIDGE NOT EMPTY is reported, at least one AU on the cartridge is still allocated.

For allocated cartridges:

1. Use the ASLABEL OP=IB directive to inhibit further allocation of the cartridge.

2. Run ASVAL specifying the AM parameter. Examine the report for possible discrepancies between the CSU map, MSF catalog, and PFC entries related to this cartridge.

3. If no MSF catalog entry corresponds to the CSU map entry, use the OP=RC directive to ASDEBUG to remove the map entry.

4. If no discrepancy is reported by ASVAL, the affected files should be attached in write mode (if possible), reloaded using PFLOAD with the OP=Z option, or purged. Then ASVAL release processing should be done to release the MSF space on the cartridge, and the cartridge can be removed as in step 1.

MSF Catalog/CSU Map/PFC Problems

If error conditions exist in the MSF catalogs or CSU maps, the recovery procedure is to correct the appropriate entry rather than reload the entire file. Reloading other than the latest copy of the CSU map is not feasible because it can contain entries for several families and these entries would not be up to date. Reloading an old copy of the MSF catalog is not desirable because any permanent file that was destaged and released from disk since the last incremental dump will be lost. The following sections describe corrective action for specific problems with MSF catalogs, CSU maps, or PFC entries.

MSF Catalog/CSU Map Mismatch

The following examples of MSF catalog/CSU map mismatches can appear as error type 1 or 2 on the ASVAL output report, which identifies the mismatch and the permanent files or orphans affected. Before taking any corrective action, the analyst should ensure that operational errors did not result in loading the wrong version of the CSU map or MSF catalog.

- If a cartridge has an MSF catalog entry indicating that all AUs on the cartridge are available for allocation but is not identified in any CSU map entry (type 1 mismatch), use the OP=RL directive to ASDEBUG to remove the MSF catalog entry for the cartridge.
- If a cartridge is identified in a CSU map entry but has no MSF catalog entry (type 2 mismatch), use the OP=RC directive to ASDEBUG to update the CSU map entry to unassigned and empty status. This directive will write a scratch label for the cartridge, if any, and place the cartridge in the output drawer.
- If a cartridge has an MSF catalog entry indicating that at least one AU on the cartridge is allocated, recover the disk space for the affected permanent file, if any, or purge the file. Run ASVAL to purge unneeded MSF files and thereby make the cartridge unallocated. Use the OP=RL directive to ASDEBUG to remove the MSF catalog entry for the cartridge.

NOTE

It sometimes takes two ASVAL/ASDEBUG runs to clear up completely type 1 or type 2 errors. Therefore, it is recommended that ASVAL be rerun with the AM parameter after an ASDEBUG run using OP=RC or OP=RL.

MSF Catalog Chain Problems

AUs that are allocated to an MSF-resident file are chained together in the MSF catalog to identify the sequence of AUs that contain the file. (Refer to the definition of cartridge.) For most files, the AUs in the chain reside on the same cartridge. Hence, one disk access is sufficient to update information for the entire chain at one time. However, an MSF-resident file can reside on several cartridges and several disk accesses may be necessary to update its chain. If MSSEXEC is interrupted during such an update, the resultant chain will be incomplete. ASVAL identifies incomplete chains as error type 4, 5, or 6 on the validation report. The following are types of incomplete chains.

- If an incomplete chain is produced while an MSF-resident file is being purged, it is a chain fragment (one without an HOC entry).
- If an incomplete chain is produced while a file is being destaged to MSF, it is an ill-formed chain (one without an EOC entry).
- If an ill-formed chain is not corrected, the AU that should have been linked to it may be reused and become part of a good chain. Although the ill-formed chain may appear to be complete, the ill-formed chain and the good chain are intersecting.

The corrective action for any of these bad chain conditions is as follows:

1. Run ASVAL with the FM parameter specified and use a sufficiently large FX=n value so that ASVAL updates the MSF catalog entries affected by the problem chains.

2. Recover the permanent files, if any, that have MSF images potentially affected by these error conditions. (The ASVAL report identifies these files.) The procedure described in Permanent File Recovery should be used.

3. Take an incremental or full backup dump. This prevents PFC entries with inaccurate asa values or problem MSF chains from being recovered if a device reload is necessary.

4. Run ASDEBUG with the OP=RP directive to make each AU on the problem chain available for allocation. Thus, the AUs can be included in a new chain without any problems. In the case of intersecting chains, all chains that have an AU in common with another chain should be released before any further destage attempts; otherwise, errors will occur when a user tries to attach a file that is contained on an intersecting chain.

PFC/MSF Catalog Mismatch

It is possible that an old version of an MSF catalog can be reloaded because of incorrect operational procedures. If so, the asa value in the PFC entry for a file can be invalid according to the obsolete MSF catalog or can point to a problem chain. If the correct version of the MSF catalog is available on tape, it should be reloaded. If it is not available, the following action is appropriate. If the file also has a disk image, ASVAL should be run to clear the asa field in the PFC entry. If there is no disk image, the analyst should reload the file from tape, if possible, and then run ASVAL to clear the asa value.

PSEUDO RELEASE

The pseudo release capability allows the site analyst to experiment with MSS operational procedures in order to determine which procedures should be used normally and to become adept at recognizing error conditions and performing appropriate recovery procedures. While employing the pseudo release feature, the analyst runs no risk of losing any permanent files used in this checkout phase, as explained in the following paragraphs.

Pseudo release mode is initiated by an ASMOVE run with TM=Y specified. ASMOVE selects files to be destaged and/or released from disk by using the destage and release algorithms as usual. The destage to MSF process is the same whether or not pseudo release mode is in effect (refer to the description of ASMOVE for details on destaging). However, the procedures for disk space release vary depending on whether or not pseudo release mode is enabled. Disk space is not actually released in pseudo release mode. Rather, the AFPDR flag (refer to the definition of catalog entry in section 1) is set in the PFC entry for a file that has been selected for disk space release. This flag indicates that PFM should ignore the disk image for this file. Therefore, if the user attaches such a file, the disk image is ignored and the file is staged to disk from MSF. The normal staging process is followed except that the disk image is created on a scratch device instead of a permanent file device. Thus, in actuality, two disk images of the file exist. However, once the file is staged to disk, whether or not staging errors are detected and reported by MSSEXEC, the AFPDR flag is cleared so that the user accesses the original disk image. Also, the file staged to the scratch disk is released so the scratch space is available for reuse. If MSS processing becomes disabled, the original disk image can still be accessed via an ATTACH request.

There are two methods for terminating pseudo release mode. One is to perform a full dump followed by a reload with OP=Z specified on the PFLOAD call. This clears the asa field in the PFC entry for each file, thereby indicating that no MSF images exist and that the files reside on disk only. The other method is to run ASMOVE with TM=N specified. This causes the disk images for pseudo-released files to be really released from disk, thereby leaving the file with only the MSF image.

The following examples can be used after pseudo release mode is enabled to force different error conditions to occur. The analyst can implement these incorrect operational procedures and then perform error recovery action without endangering any of the permanent files involved. These examples assume that ASDEF has been run to create a CSU map and the MSF catalogs for the CSU and family being tested.

Example 1:

1. Run ASLABEL to add cartridges (for example, A, B, C) to a subfamily.
2. Dump the CSU map file to tape.
3. Run ASLABEL to remove cartridge A and add another cartridge (for example, D).
4. Reload the CSU map file dumped in step 2. This creates a mismatch between the CSU map and MSF catalog, because the MSF catalog indicates that cartridge D resides in the CSU but cartridge A does not.
5. Run ASVAL to detect the mismatch.
6. Run ASDEBUG to correct the mismatch. The resultant CSU map and MSF catalog should contain entries for cartridges B and C, but not A or D.

Example 2:

1. Run ASLABEL to add several cartridges to a subfamily.
2. Create some permanent files with different backup requirements and preferred residence requirements.
3. Run ASMOVE to destage and/or release the files created in step 2.
4. Physically remove one of the cartridges from the CSU; do not use ASLABEL to remove it.
5. Attach the files whose disk space was released in step 3.
6. Run ASVAL to verify that only files resident on the removed cartridge are affected.
7. Run ASLABEL to restore the cartridge removed in step 4.
8. Attach the files reported in step 6. There should be no problems reported.

Example 3:

1. Run ASLABEL to add several cartridges to a subfamily. Make a backup copy of the CSU map and MSF catalog files.

2. Create several files with the BR=Y or BR=MD attribute. Run ASMOVE to destage all of them and release those with the BR=MD requirement.

3. Take a backup dump of the family.

4. Reload the CSU map and MSF catalog backed up in step 1.

5. Create several new files with the BR=MD attribute. Run ASMOVE to destage them and to release the disk space of the files with the BR=Y attribute in step 2.

6. Attach the files created in step 2. They should have been overwritten by the files destaged in step 5.

7. Recover the files with the BR=Y attribute from the dump tape made in step 3.

Example 4:

Try to interrupt MSSEXEC while it is destaging new files or releasing unused MSF files to create incomplete chains. ASVAL reports such errors and ASDEBUG fixes them.

NETWORK UTILITIES 4

This section describes the following utilities and files involved in the operation of the network and interactive subsystems of NOS.

- NAM Initialization (NAMI). This utility controls the network software startup process.
- Network Dump Collector (COLLECT). This utility produces permanent files from the various NPU and host dump, trace, statistics, and list files resulting from any abnormal termination of the network.
- Load File Generator (LFG). This utility produces a direct access file used by the Network Access Method (NAM) to perform the downline load of network processing units (NPUs).
- NPU Dump Analyzer (NDA). This utility produces readable listings from dump files produced when NAM dumps NPUs.
- PIP Dump Analyzer (LISTPPM). This utility program converts binary records from the peripheral interface package (PIP) memory dump file into a report listed in byte format.
- Application Interface Program (AIP) Trace. This utility produces a trace file of the messages transferred between an application program and NAM. The information contained in this trace can be useful in tracking network problems and in debugging application programs.
- Network description files. Network description files are used by the Transaction Facility (TAF) to describe user access characteristics via terminal definition directives prepared by the site analyst.
- Stimulator. A stimulator is a collection of programs that artificially loads the system to analyze the effects of such a load on system performance and reliability.

NAM INITIALIZATION (NAMI)

The NAMI utility controls the network software startup process. The network software consists of the NAM subsystem and several rollable jobs (NS, CS, NVF, TVF, COLLECT) and network applications (IAF, TAF, RBF, ITF). The NAMI utility starts NAM and the programs NS, CS, NVF, TVF, COLLECT, and other applications desired at the site such as RBF and ITF by submitting jobs to the input queue. The skeletons of these jobs are contained on a master startup file along with parameter records containing directives telling the NAMI utility what parameters to substitute in the job skeletons and what jobs to start. Refer to the NOS 2 Installation Handbook for descriptions of the master startup file, parameter records, and job skeletons.

The advantage of having the NAMI utility startup the network software is that parameters that are common to more than one job or that change from one network startup to the next can be changed easily.

The console operator enters the procedure call NAM. or NAMNOGO. to call procedure file NAM or NAMNOGO respectively (refer to the NOS 2 Operator/Analyst Handbook). These procedure files (saved under the SYSTEMX user name) contain the NAMI command which calls the NAMI utility. The format of the NAMI command is:

NAMI,p_1,p_2,...,p_n.

where p_i is a parameter consisting of a keyword or a keyword equated to a value. All parameters are order-independent.

p_i	Description
GO	This parameter initiates the network startup process without operator intervention.
MFN=filename†	The permanent file name of the master file to be used. Once this parameter is specified subsequent network startups use this master file until a new master file is specified. If this parameter is omitted, the previously selected master file is used. The master file must reside on the system default family.
OIN=nnn	The previous network invocation number (nnn) for which the dumps/traces will be collected during this run. If this parameter is omitted, the current network invocation number minus one is used.
PW=password†	The password assigned to the user name where the master file is stored. If this parameter is omitted, the previously selected password is used. This parameter is not required if UN=NETOPS is specified.
RN=recordname†	The name of the parameter record on the master file that is used for this network initiation. Once this parameter is specified, subsequent network startups use this same parameter record until a new parameter record is specified. The following recordnames can be specified.

recordname	Description
INIT	Purge existing dumps/traces, stop but do not dump local NPUs at network startup, take host dumps when an NPU fails, and stop local NPUs at host termination.
MINIT	Purge existing dumps/traces, stop local NPUs at network startup, do not take NPU dumps before initial loading of NPUs, do not stop local NPUs at host termination, and do not take host dumps when an NPU fails.
MRECOV	Purge existing dumps/traces, do not take NPU dumps before initial loading of NPUs, do not stop local NPUs at network startup or host termination, and do not take host dumps when an NPU fails.
MULTI	Collects dumps/traces on tape before network startup, take NPU dumps before initial loading of NPUs, do not stop local NPUs at network startup or host termination, and do not take host dumps when an NPU fails.

†This parameter must be specified for the initial network software startup. It can be specified either on a NAMI command or by an operator entry using the NAMNOGO procedure.

Pi	Description

recordname	Description
RECOVR	Purge existing dumps/traces, take host dumps when an NPU fails, do not stop NPUs at network startup or termination, and do not dump NPUs before initial load.
RESTRT	Collect dumps/traces on tape before network startup, take NPU dumps before initial loading of NPUs, take host dumps when an NPU fails, stop local NPUs at host termination, and do not stop local NPUs before network startup.

RS=applname	The name of the application to startup. This parameter allows a specified application to be started when the network is already operational. It is not valid at network initiation. The application's startup job skeleton must reside on the parameter record/master file specified for this network initiation.
UN=username†	The user name where the master file is stored. If this parameter is omitted, the previously selected user name is used.

The first time the network startup process is executed, a permanent file is created using a network invocation number of 1 and parameters from the NAMI command. The initial call to NAMI must specify the filename, password, and username of the master file and parameter record to be used or the console operator must enter them using NAMNOGO.

On subsequent network startup operations, a permanent file exists and contains the names of the last used master file, parameter record, and network invocation number. Parameters from this permanent file will be used to startup the network unless overridden by parameters from the NAMI command or parameters entered by the console operator using NAMNOGO. The NAMI command parameters take precedence over the permanent file parameters and operator entries take precedence over parameters from either the NAMI command or the permanent file.

NETWORK DUMP COLLECTOR (COLLECT)

The COLLECT utility is a program that produces two permanent files; one of the various host dump, trace, statistics, and list files which result from any abnormal termination of the network and one of any NPU dump files. The collected local files may be copied to the two permanent files and then purged or copied and not purged. The permanent files can then be copied to tapes. There is also an option to purge the local files without copying them to the permanent files. The format of the COLLECT command is:

```
COLLECT,NIN=nnn,NOPURGE,NOSAVE.
```

Parameter	Description
NIN=nnn	One- to three-character network invocation number which indicates the upper limit of the invocation numbers to be collected. All files with an NIN value from 1 through nnn are copied to the permanent file. If NIN=nnn is omitted, the default value is 1.

†This parameter must be specified for the initial network software startup. It can be specified either on a NAMI command or by an operator entry using the NAMNOGO procedure.

Parameter	Description

NOTE

> NPUs that stop when the host network software terminates are dumped during the subsequent network invocation. Therefore, the network invocation number of these dumps is one greater than the dumps of the host programs taken at the time of the termination.

NOPURGE	Specifies that no purging activity will take place after the collected files are copied to the permanent files. If NOPURGE is omitted, the collected files are purged after they are copied to the permanent files. NOPURGE should not be specified if NOSAVE is specified.
NOSAVE	Specifies that the collection process is not performed and the files indicated by NIN=nnn are purged. NOSAVE should not be specified if NOPURGE is specified.

The COLLECT utility is automatically initiated by the network startup job (NAMI) upon each invocation of the network. (COLLECT may not be automatically initiated if the master file has been modified.) The utility receives an NIN value of the last network invocation number. The current network will be initiated with an incremented value of NIN. For example, on the fifth initiation of the network the COLLECT utility has a command call of

```
COLLECT,NIN=004.
```

and the network is initiated with an NIN of 005.

The COLLECT utility processes all dump, trace, statistics, and list files whose file name is of the form

pptsnnn

where: pp is a two-character product prefix.

pp	Description
CS	Communication Supervisor
IA	Interactive Facility
NI	Network Interface Package
NP	Network Processing Unit
NS	Network Supervisor
NV	Network Validation Facility
RB	Remote Batch Facility
TV	Terminal Verification Facility

t is the type of file.

t	Description
D	Dump file
L	List file
S	Statistics file
T	Trace file

s is the subtype 0, 1, 2, or 3 for the file.

nnn is the network invocation number in the range 000 through 999.

In the case of NPU dumps (pp=NP), ts is a unique hexadecimal number identifying the dump.

The permanent files produced by the COLLECT utility each have one file with many records. Each dump, trace, statistics, or list file is copied to a permanent file as one or more records where the first record copied is preceded by a two-word record containing the original file name. This format enables an ITEMIZE or CATALOG of a COLLECT utility permanent file to show which collected files were copied to the permanent file.

The COLLECT utility assigns each permanent file a file name of the form

DUMPnnn for host dump, trace, statistics, or list files.

DUNPnnn for NPU dump files.

where: nnn is the network invocation number from the COLLECT command.

The permanent files DUMPnnn and DUNPnnn are attached and copied to magnetic tape (or other operator assigned equipment) if the RESTRT or MULTI startup procedure is selected. Once the files are successfully copied, they are purged.

The COLLECT utility purges all dump and trace files without collecting them on a permanent file if the INIT, MINIT, MRECOV, or RECOVR startup procedure is selected.

LOAD FILE GENERATOR (LFG)

LFG is a utility program that reformats Communications Control Program (CCP) files for subsequent use by the Network Supervisor of NAM to load NPUs. LFG accepts one or more input files in single or multifile format and produces a single network load file (NLF) for use by the Network Supervisor.

LFG is invoked with the following command:

$LFG,p_1,p_2,\ldots,p_n.$

where p_i is a parameter consisting of a keyword or a keyword equated to a value. All parameters are optional and order-independent.

Pi	Description
BC=nn	This parameter specifies the maximum number of load service messages in a network load file record. It is used to optimize NPU loads. $1 \leq nn \leq 64$.
BC omitted	Same as BC=64.
I=infile	One- to seven-character name of the file on which the input directives are written.
I omitted	Same as I=INPUT.
L=outfile	One- to seven-character name of the file on which the summary listing is to be written.
L=0	Suppress the summary listing. If an error is detected an error message is written to file OUTPUT.
L omitted	Same as L=OUTPUT.
NLF=loadfile	One- to seven-character name of the network load file.
NLF omitted	Same as NLF=NLF.
Z	An input directive is contained on the command after the terminator. The I parameter is ignored. This eliminates the need to use a separate input directive file when the input directive contains only a few input files. When the input directive appears on the LFG command, the first character following the command terminator is the separator character. Any character which is not used in the input directive can be used as the separator character. The input directive must be preceded by a separator and terminated by a blank, period, or the end of the input line (column 72). For example, (slant used for separator): **LFG,Z./*FILE,PFILE1,PFILE2.**
Z omitted	Input directives are not contained on the command. The system uses the I parameter.

INPUT DIRECTIVES

Input directives have the following format.

$*FILE,filename_1,filename_2,...,filename_n.$

An input directive begins with an asterisk followed by the directive identifier FILE and a string of file names. The directive identifier and file names are separated by commas. If a specified file is empty, LFG ignores it. LFG scans a directive until it detects a terminator or the end of the directive line (column 72). A directive is terminated by a blank, period, or the end of the line. If an asterisk is not specified, LFG assumes *FILE and proceeds to read file names. LFG continues to read input directives until the end of the record.

Each file specified by filename contains a load partition or a program initiation control block (PICB) for LFG to reformat. These files are created by the CCP installation process (refer to the NOS 2 Installation Handbook). A load partition is any loadable software module that can be loaded into an NPU during one operation. For example, all of the software for CCP can be loaded into an NPU as one load partition. A PICB consists of a sequence of commands that controls the load or dump operations. For each step in a PICB that specifies a load operation there is a corresponding load partition.

The names of the input files can be specified on the LFG command (Z parameter) or in a separate file (I=infile parameter). In either case, these files must be local to the job that runs LFG. LFG does not rewind the input files.

If the input directives are written on a separate record in a batch job (I=INPUT), the job has the following format.

```
ujn.
USER,username,password,familyname.
CHARGE,*.
LFG,I=INPUT.
--EOR--
*FILE,AFILE1,...,AFILEn.  )
*FILE,BFILE1,...,BFILEn.  } file INPUT
*FILE,CFILE1,...,CFILEn.  )
--EOI--
```

NETWORK LOAD FILE

The network load file produced by LFG is a random access file with the local file name specified by the NLF parameter of the LFG command. The default network load file name is NLF.

SUMMARY LISTING

The summary listing produced by LFG is a summary of the network load file contents. The summary is written on the file specified by the L parameter of the LFG command. The default summary file name is OUTPUT. Error messages produced by LFG are also written on this file. The summary listing has the following format.

NO.	PARTITION NAME	INPUT FILE	RECORDS
1	PN1	AFILE1	3
2	PN2	AFILE2	7
3	PN3	AFILE3	2

Field	Description
NO.	Line number of the summary listing.
PARTITION NAME	Name of the load partition or PICB for LFG to reformat.
INPUT FILE	Name of the input file on which the load partition or PICB resides.
RECORDS	Number of records in the load partition or PICB.

NPU DUMP ANALYZER (NDA)

NDA is a utility program that produces a readable printout from the NPU dump file. The NPU dump file may contain one or more dump records which are created by the Network Supervisor during the initiation or reloading of a failed NPU. NDA reports depict the state of an NPU at the time a dump is generated.

NDA is accessed by a command that allows selection of the following.

- Dumps from/to specific NPU macromemory addresses.
- Listing options.
- Input directive file.
- Output file.

The format of the command for the NPU Dump Analyzer is:

$NDA,p_1,p_2,\ldots,p_n.$

where each parameter is a keyword or a keyword equated to a value. All parameters are optional and order-independent. If a parameter is not specified, a default value is assumed. If the same keyword is specified more than once, the last (rightmost) occurrence of the keyword overrides all previous ones. Invalid or undefined parameters cause termination of the run.

p_i	Description
BA=addr	One- to six-digit hexadecimal address within the NPU macromemory at which the dump report begins. Default is BA=addr of the actual beginning of the dump. This parameter is valid only if parameter LO=M or input directive 9 is specified.
EA=addr	One- to six-digit hexadecimal address within the NPU macromemory at which the dump report ends. Default is EA=addr of the actual end of the dump. This parameter is valid only if parameter LO=M or input directive 9 is specified.
I=infile	One- to seven-character name of the input directive file. If there is no input directive file, I=0 must be specified. Default is I=INPUT.
L=outfile	One- to seven-character name of the output file. Default is L=OUTPUT.
LO=opt	One- to three-character listing option. Each character specifies a portion of the NPU dump to be listed; any unspecified portions are not listed. Default is LO=MR, if no input directive file is specified.

opt	Description
E	All NPU words in the NPU dump record. Redundant lines are not suppressed.
M	Macromemory.
R	File registers and page registers.

NDF=npudump	Local file name of the NPU dump file. The NPU dump file may contain multiple NPU dump records. Each record causes a separate NPU dump output to be generated. Default is NDF=NDF.

INPUT DIRECTIVES

Input directives must be contained in a single logical record on the input directive file. Each directive is in 80-column format. Column one is reserved for a one-character keyword that indicates a change in the processing rules and defines the new rules to be used for the following directives. Columns 2 through 10 and 70 through 80 are ignored on all directives. Comments are allowed in columns 11 through 70 on directives that contain a one-character keyword. Directive parameters are in fixed formats. The number of parameters and their respective columns within the directive varies with the one-character keyword specified. Each parameter is a four-digit hexadecimal value (leading zeros are required). Parameters are separated by either a comma or a blank. The remaining space between the last parameter and column 70 of a directive may contain optional comments.

0—Comments

The 0 directive specifies that comments can be entered in columns 11 through 70 of this directive and succeeding directives until a different keyword is specified.

1—File 1 Register

The 1 directive causes the contents of a specific file 1 register to be dumped. Each file 1 register is specified in columns 7 through 10 of the next directive and succeeding directives until a different keyword is specified.

2—Macromemory Word

The 2 directive causes the contents of a specific macromemory word to be dumped. Each macromemory word is specified in columns 7 through 10 of the next directive and succeeding directives until a different keyword is specified.

3—Contiguous Block Data Structure

The 3 directive causes identical data structures which are contiguously addressed in macromemory to be dumped. Each directive contains five parameters in four-digit hexadecimal format.

Columns	Description
2 - 5	Macromemory location which contains the pointer to the first identical data structure.
7 - 10	Size of the data structure in NPU words.
12 - 15	Index value of the first data structure to be dumped. The first identical data structure has an index value of one.
17 - 20	Number assigned to the first data structure to be dumped. The next data structure dumped is assigned the next highest number.
22 - 25	Number assigned to the last data structure to be dumped. Data structure dumping terminates when this number is reached.

4—Circular Buffer Data Structure

The 4 directive causes circular buffers to be dumped in chronological order. Two types of buffers can be dumped; fixed-length data structures and variable-length data structures. Each directive contains seven parameters in four-digit hexadecimal format.

Columns	Description
2 - 5	File register location which contains the first word address of the circular buffer.
7 - 10	File register location which contains the address of the oldest item in the circular buffer.
12 - 15	File register location which contains the last word address of the circular buffer.
17 - 20	File register location used as a flag to indicate whether the buffer contains meaningful data. The buffer is not dumped if this location contains zeros.
22 - 25	Bit pattern that delimits a variable-length data structure.
27 - 30	Mask for isolating the appropriate bits to identify the delimiter.
32 - 35	Data structure size. Nonzero indicates a fixed-length data structure. Zero indicates a variable-length data structure.

For variable-length data structures, the next occurrence of a data structure is determind by first masking each word to isolate the bit pattern and then comparing this pattern with the specified bit pattern until a match is found. For fixed-length data structures, the mask and bit pattern are not used.

The circular buffer format starts by dumping the oldest item in the buffer (specified in columns 7-10) and proceeds to the last word address (specified in columns 12-15) then goes to the first word address (specified in columns 2-5) and continues to the oldest item in the buffer.

7—Page Registers

The 7 directive causes the contents of the page registers to be dumped. The 7 directive does not have parameters.

8—File 1 Registers

The 8 directive causes file 1 registers to be dumped in lines of 16 consecutively addressed registers in hexadecimal format. The 8 directive does not have parameters. However, if the parameter LO=E is specified on the NDA command, the selected option will be in effect.

9—Macromemory Words

The 9 directive causes NPU macromemory words to be dumped in lines of 16 consecutively addressed words in hexadecimal format. Repetitive lines are suppressed and addressing continues with the next nonrepetitive line. This line is flagged with double asterisks to indicate the suppression. The 9 directive does not have parameters. However, if parameters BA=addr, EA=addr, or LO=E are specified on the NDA command, the selected options will be in effect.

A—LCB and TCB/CCB

The A directive causes line control blocks (LCB) to be dumped with their associated terminal control blocks (TCB) or cluster control blocks (CCB). Each directive contains seven parameters in four-digit hexadecimal format.

Columns	Description
2 - 5	Macromemory location which contains the pointer to the first LCB.
7 - 10	Size of the LCB in NPU words.
12 - 15	Index value of the LCB word which contains the pointer to the first TCB/CCB. The first word in an LCB has an index value of zero.
17 - 20	Size of the TCB/CCB in NPU words.
22 - 25	Index value of the TCB/CCB word which contains the pointer to the next TCB/CCB. The first word in a TCB/CCB has an index value of zero.
27 - 30	File register location which contains the number of LCBs to be dumped. If set to zero, only one LCB is dumped.
32 - 35	Index value of the first LCB to be dumped. The first LCB has an index value of zero.

The output format of the LCBs and their associated TCB/CCBs is to list the data structures vertically in columns such that any line of the report represents an LCB and its associated TCB/CCBs. In this format, an LCB and 15 TCB/CCBs can be listed in one line. If more than 15 TCB/CCBs are associated with the LCB, the next page lists the next 15 TCB/CCBs with the LCB column blank to indicate the association of these TCB/CCBs with the previous LCB.

B—Port Tables and MUXLCB

The B directive causes port tables to be dumped with their associated multiplex line control blocks (MUXLCBs). Only one MUXLCB can be associated with each port table. Each directive contains eight parameters in four-digit hexadecimal format.

Columns	Description
2 - 5	File register location which contains the pointer to the first port table.
7 - 10	Size of the port table in NPU words.
12 - 15	Index value of the port table word which contains the pointer to the associated MUXLCB. The first word in a port table has an index value of zero.
17 - 20	Size of the MUXLCB in NPU words.
22 - 25	Bit pattern that identifies a valid MUXLCB.
27 - 30	Mask for isolating the appropriate bits to identify a valid MUXLCB.
32 - 35	Index value of the port table word which contains the MUXLCB identifier. The first word in a port table has an index value of zero.
37 - 40	File register location which contains the number of port tables to be dumped.

The validity of the pointer to a MUXLCB is determined by first masking the appropriate port table word to isolate the validating bit pattern and then determining if the specific bit pattern is present. If the MUXLCB pointer is invalid, MUXLCB is not listed.

The output format of the port tables and their associated MUXLCBs is to list them vertically in columns such that any line of the report represents up to eight port tables; each with its associated MUXLCB.

Figure 4-1 is a sample of an NPU dump file and its corresponding input directive file.

Input directive file.

```
0         THIS IS A SAMPLE OF AN INPUT DIRECTIVE FILE SPECIFIED BY THE I PARAMETER
          ON THE NDA COMMAND.
8          DUMP FILE 1 REGISTER PER NDA COMMAND LO PARM
1          FILE 1 REGISTER INTERPRETATION
     0030  FIRST WORD ADDRESS OF CIRCULAR BUFFER
     0026  ADDRESS OF OLDEST ITEM IN CIRCULAR BUFFER
     0032  LWA OF CIRCULAR BUFFER
     0027  MEANINGFUL DATA FLAG
     0019  NUMBER OF LCBS
2          LIST CONTENT OF MACROMEMORY
     015F  FIRST LCB
     1110
     1820
3          CONTIGUOUS BLOCK
 C200 0001 0001 0001 0019
4          CIRCULAR BUFFER
 0030 0026 0032 0027 0E00 FF00 0000
A          LCB / TCB
 015F 0015 000E 0040 000E 0019 0001
B          PORT TABLES AND MUXLCBS
 000C 0008 0000 0016 0000 0000 0000 0019
```

NPU dump file header information.

```
NPU DUMP FILE = NP00475          NDA,I=IN,NDF=DUMP,LO=M.

TIME        12.49.34

DATE        82/07/15

NPU NAME    LOC7

NPU NODE    11

HALT CODE      6

P REGISTER     7
```

Figure 4-1. Sample NPU Dump File (Sheet 1 of 4)

DUMP FILE 1 REGISTER PER NDA COMMAND LO PARM

ADDRESS	0	1	2	9	A	B	C	D	E	F
000000	0000	0508	0500	1380	0023	0000	8CAF	8E8F	0000	0000
000010	0560	0F00	0C00	003C	0003	0020	F000	0004	00E0	0000
000020	007F	0000	0000	0000	0000	0000	0001	0007	000F	0000
000030	8AB0	1845	8CAF	0000	0000	1000	0000	0000	0000	0000
000040	0000	0000	0000	0184	0185	0086	0087	0085	0000	0801
000050	0000	0000	0200	0001	0001	0529	987F	0000	0000	0001
000060	0000	0000	0000	0F54	0F90	101B	0000	0000	000F	2000
000070	1380	0001	0005	0400	0000	0000	0000	401F	0000	0008
000080	0F13	0028	00C0	4A28	7FFD	0000	3657	9870	987F	0029
000090	362D	0001	9640	99CF	0001	8000	2180	A180	0000	0000
0000A0	0000	0000	0000	0000	0000	0000	0180	00F0	0000	00F8
0000B0	0000	0000	0000	0000	0000	0000	0000	0000	7D08	0000
0000C0	0000	07C0	002D	0000	0000	0000	0000	0000	007F	0000
0000D0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
0000F0**	0000	0000	0000	0000	0000	0000	0000	0001	0000	7A88
000100	--									

FILE 1 REGISTER INTERPRETATION

(LOC 0030)	8AB0	FIRST WORD ADDRESS OF CIRCULAR BUFFER
(LOC 0026)	8AB0	ADDRESS OF OLDEST ITEM IN CIRCULAR BUFFER
(LOC 0032)	8CAF	LWA OF CIRCULAR BUFFER
(LOC 0027)	0000	MEANINGFUL FLAG
(LOC 0019)	003C	NUMBER OF LCBS

LIST CONTENT OF MACROMEMORY

(LOC 015F)	8ECB	FIRST LCB
(LOC 1110)	0400	
(LOC 1820)	0000	

CONTIGUOUS BLOCK

OFFSET	1	2	3	4	5	6	7	8	9
0	0116	374E	0117	374E	0118	374E	0019	0000	001A

OFFSET	11	12	13	14	15	16	17	18	19
0	011E	32D4	001F	0000	0120	323C	0001	9539	9536

CIRCULAR BUFFER

0030 0026 0032 0027 0E00 FF00 0000
*** NO MEANINGFUL DATA IN BUFFER ***

Figure 4-1. Sample NPU Dump File (Sheet 2 of 4)

LCB / TCB

OFFSET	LCB01E	TCB000	LCB01F	TCB000	TCB001	TCB002	TCB003	LCB020	TCB000
LOC..	9141	0007	9156	0260	6400	606F	4449	916B	
0	0000	0B00	0000	02AF	5CBC	7FFF	0112	0000	
1	0000	0B00	0000	0361	60AE	00F0	1400	0000	
2	0000	0B00	0000	5400	1400	004E	446E	0000	
3	0000	0B00	0003	0B78	641E	0000	EEFB	0000	
4	0000	0B00	0000	02B0	5400	0059	0D3F	0003	
5	0000	0B00	0000	02B1	6182	0010	4400	0000	
6	0000	0B00	0000	5400	64CD	005A	4452	0000	
7	0000	5400	0000	0B78	0112	0000	5400	0000	
8	1D00	7A63	0000	02B2	1400	004F	6FA8	0000	
9	915F	0011	1E00	02A8	641E	0010	0000	0000	
A	8000	0007	918B	5400	E400	0045	0F47	0000	
B	0000	0000	0000	0385	6026	0020	E8EF	0000	
C	0000	0000	0000	02AB	0FA1	004E	0F70	0000	
D	0160	0000	0000	0A01	F000	0030	3000	0000	
E	0007	0000	0260	6400	606F	4449	0004	0000	
F	80A0	0000	0007	0360	07A1	0000	0814	0000	
10	6800	0000	80A0	1504	050C	5052	68EB	0000	
11	0000	0000	6800	8000	3301	0010	E8EA	0000	
12	0000	0000	0000	0707	0822	5054	F000	0000	
13	0000	0000	0000	0004	050C	0020	4440	0000	
14	0000	0000	0000	0A0D	F701	4B42	4400	0000	
15		0000		0707	8CD3	3500	4461		
16		0000		0002	6600	584B	5400		
17		0000		0000	60A6	3510	6FA8		
18		0000		0276	050C	5054	0000		
19		0000		0002	3301	3501	0F47		
1A		0000		0000	0822	5850	E8E1		
1B		0000		0276	050C	3511	4400		
1C		0000		0002	7301	424B	4474		
1D		0000		0000	6E9D	3502	E8D8		
1E		0000		0276	C400	0058	CEE0		
1F		0000		0002	6023	3811	ECFC		
20		0000		0000	0120	4352	6AD6		
21		0000		0276	1400	3F12	E8D4		
37		0000		0002	CCE7	0FFF	050C		
38		0000		0000	0112	0000	6208		
39		0000		0276	1400	0000	6400		
3A		0044		0002	648C	0000	4612		
3B		00FE		0000	0A00	0000	5400		
3C		0000		0276	6CAC	0000	7AED		
3D		0040		0002	0A01	0000	4612		
3E		0000		0000	6CCC	0000	4478		
3F		0001		0276	1400	0000	050C		

Figure 4-1. Sample NPU Dump File (Sheet 3 of 4)

PORT TABLES AND MUXLCBS

OFFSET	PORT010	MUX	PORT011	MUX	PORT016	MUX	PORT017	MUX
LOC..	8D2F	0040	8D37	0080	8D5F	0040	8D67	0080
0	0040	0000	0080	0010	0040	0000	0080	0010
1	0000	0044	0000	0011	0000	0044	0000	0011
2	0001	00FE	0001	0012	0001	00FE	0001	0012
3	7022	0000	7022	0013	7022	0000	7022	0013
4	0000	0040	0000	0014	0000	0040	0000	0014
5	0000	0000	0000	0015	0000	0000	0000	0015
6	0000	0001	0000	0016	0000	0001	0000	0016
7	0000	2029	0000	0017	0000	2029	0000	0017
8		1B1E		0018		1B1E		0018
9		0000		0019		0000		0019
A		3F6E		001A		3F6E		001A
B		0007		001B		0007		001B
C		0004		001C		0004		001C
D		680B		001D		680B		001D
E		480B		001E		480B		001E
F		C000		001F		C000		001F
10		0000		0001		0000		0001
11		0111		0001		0111		0001
12		0197		4101		0197		4101
13		5C68		0000		5C68		0000
14		1806		0301		1806		0301
15		0011		0000		0011		0000

OFFSET	PORT018	MUX	PORT019	MUX	PORT01E	MUX	PORT01F	MUX
LOC..	8D6F	0040	8D77	0080	8D9F	0080	8DA7	
0	0040	0000	0080	0010	0080	0010	0000	
1	0000	0044	0000	0011	0000	0011	0000	
2	0001	00FE	0001	0012	0001	0012	0000	
3	7022	0000	7022	0013	7022	0013	0000	
4	0000	0040	0000	0014	0000	0014	0000	
5	0000	0000	0000	0015	0000	0015	0000	
6	0000	0001	0000	0016	0000	0016	0000	
7	0000	2029	0000	0017	0000	0017	0000	
8		1B1E		0018		0018		
9		0000		0019		0019		
A		3F6E		001A		001A		
B		0007		001B		001B		
C		0004		001C		001C		
D		680B		001D		001D		
E		480B		001E		001E		
F		C000		001F		001F		
10		0000		0001		0001		
11		0111		0001		0001		
12		0197		4101		4101		
13		5C68		0000		0000		
14		1806		0301		0301		
15		0011		0000		0000		

Figure 4-1. Sample NPU Dump File (Sheet 4 of 4)

REPORT FORMATS

The NDA reports contain the following header information (refer to figure 4-1).

```
NPU DUMP FILE  = NPddnnn          NDA, command image

TIME             hh.mm.ss
DATE             yy/mm/dd
NPU NAME         npuname
NPU NODE         nodeid
HALT CODE        halt
P REGISTER       preg
```

Header	Description
NPddnnn	The name of the NPU dump record starting with NP, where dd is the hexadecimal dump number (00 through FF) and nnn is the network invocation number assigned at network startup.
command image	The NDA command parameters that were specified for this dump.
hh.mm.ss	Time of the dump in the form hour.minute.second.
yy/mm/dd	Date of the dump in the form year/month/day.
npuname	One- to seven-character name assigned to the NPU in the network configuration file.
nodeid	Two-digit hexadecimal number assigned to the NPU in the network configuration file.
halt	Four-digit hexadecimal number for the NPU halt code.
preg	The NPU's P-register contents at the time the NPU dump is generated in hexadecimal format.

NPU DUMP FILES

Each NPU dump file is written as a single-record direct access permanent file when an NPU dump is taken. Individual NPU dump files are named NPddnnn, where dd is a unique hexadecimal dump number consecutively assigned in the range 00 through FF and nnn is the network invocation number assigned at network startup.

HALT CODE MESSAGES

When CCP stops an NPU because of an unrecoverable condition caused by either hardware or software errors, CCP delivers a halt code message to the NPU console if the console option is selected when the variant is built. Refer to table 4-1 for halt codes. The halt code is also included in the NPU dump file header information (refer to figure 4-1 earlier in this section). The format of the halt message is:

HALT haltaddress

port PORT

buff BUFFER ADDR

Parameter	Description
halt	Four-digit hexadecimal number for the NPU halt code.
address	Address of the program in control at the time the halt condition occurred.
port	One- to four-digit hexadecimal port number that appears only on communication line adapter (CLA) hardware error conditions.
buff	Four-digit hexadecimal buffer address that appears only on buffer halt codes (000A, 000B, 000C).

When a halt occurs, the host normally executes an upline dump of the NPU main memory, micromemory, and the file 1 registers. Thereafter, the host attempts to reload the NPU main memory. This is accomplished directly through the coupler for local NPUs; it is accomplished by use of software in the local NPU connected to the remote NPU in the case of a remote NPU.

For the first two loading attempts, a dump is normally taken. Thereafter, dumps are suppressed.

The NPU can be stopped locally by master clearing it using the MASTER CLEAR switch on the maintenance control panel.

In some cases, a halt code message is not generated. In these cases consult the NPU dump file listing to find the cause of the failure. A sample format of the NPU dump file listing is shown in figure 4-1 earlier in this section.

Halt Codes

Halt Codes can be divided into three categories: those primarily resulting from incorrect switch settings; those caused by hardware malfunctions; and those that can be either hardware or software problems.

The first category includes detection of a duplicate CLA address (halt code 0012) (refer to table 4-1). This condition is usually caused by two CLA switches being set to the same address. Such a fault can normally be corrected by the operator resetting the switches.

In the second category, the halt codes are the following:

- Power failure (0001).
- Memory parity error (0002).
- Program protect error (0003).
- Bad multiplex loop interface adapter (MLIA) initialization status (0011).

Such conditions are usually caused by a hardware failure and are normally repaired by a customer engineer.

The third category of halt codes (all those not already specified) are caused either by a hardware failure or by a software error. To correct these problems, first have a customer engineer check the hardware. If the hardware is functioning properly, inform a system analyst of the problem.

Dump Interpretation

When a halt occurs, halt codes are usually sent to the network operator controlling the NPU and dump interpretation is not needed. However, if a halt occurs after loading but before completion of initialization, or the system becomes trapped in a looping condition during initialization (before the CCP header prints), dump interpretation may be necessary to determine which halt has occurred, or in which subroutine of the initiation section the program is looping.

When interpreting the NPU dump listing to determine the cause of a halt or looping condition, first examine the contents of memory location 30_{16}. If nonzero, a halt has occurred and the halt code value is contained in that location.

If memory location 30_{16} equals zero, examine the address of the NPINTAB entry in the address table which begins at fixed memory address 150_{16}. (This is the table which is displayed at the end of a successful initialization. NPINTAB has a fixed address; it is the last nonzero entry in the address table.) Entry NPINTAB gives the starting address for the NPINTAB table. The NPISFL entry in the NPINTAB table contains the flags which mark the initialization subroutines that have completed running when the looping condition occurred.

Table 4-1. Halt Codes (Sheet 1 of 2)

Code (Hexadecimal)	Significance	Action
0001	Power failure.	Reapply power, reload CCP (for momentary failure). Inform customer engineer or system analyst.
0002	Memory parity error.	Inform customer engineer or system analyst.
0003	Program protect error.	Same as code 0002.
0004	Interrupt count < 0.	Same as code 0002.
0005	MLIA failure (reported by MLIA hardware status).	Same as code 0002.
0006	Overran CIB.	Same as code 0002.
0007	Branch to zero detected.	Same as code 0002.
0008	Invalid halt code.	Same as code 0002.
0009	Ran out of buffers.	Check NOS 2 Installation Handbook to determine if sufficient memory is available to handle system configuration. Inform customer engineer or system analyst.

Table 4-1. Halt Codes (Sheet 2 of 2)

Code (Hexadecimal)	Significance	Action
000A	Duplicate release of buffer.	Same as code 0002.
000B	Buffer chain error during buffer get.	Same as code 0002.
000C	Buffer out of range.	Same as code 0002.
000D	Coupler alarm condition.	Same as code 0002.
000E	Monitor stopped.	Same as code 0002.
000F	Too many worklists from one CLA.	Same as code 0002.
0010	Force load service message received.	This is normal if a force load message was entered. Otherwise, take same action as code 0002.
0011	Bad MLIA initialization status.	Same as code 0002.
0012	Duplicate CLA address.	Reset CLA switches.
0013	Chain address = 0.	Same as code 0002.
0014	Invalid halt code.	Same as code 0002.
0015	Invalid coupler orderword.	Same as code 0002.
0016	Invalid halt code.	Same as code 0002.
0017	Invalid halt code.	Same as code 0002.

PIP DUMP ANALYZER (LISTPPM)

The peripheral interface package (PIP) Dump Analyzer (LISTPPM) is a utility program that converts all available PIP dump binary records on the PIP memory dump file into a report to be listed in byte format. The PIP PP memory dump file is created as local file ZZZZZPP by NAM when the operator drops the network or NAM detects fatal network errors.

The format of the command for the PIP Dump Analyzer is

```
LISTPPM,B=pipfile,L=outfile.
```

The parameters are order-independent. Invalid or undefined parameters cause termination of the run.

Parameter	Description
B=pipfile	Local file name of the PIP PP memory dump file. Default is B=ZZZZZPP.
L=outfile	Local file name of the output file. Default is L=OUTPUT.

AIP TRACE WITH IAF

The AIP trace utility produces a trace file of the messages transferred between IAF and NAM. This file, produced as a local file named ZZZZZDN at IAF's control point, contains information that can be useful in tracking network problems and in debugging application programs. However, the data in this file is in compressed format and hence the debug log file processor (DLFP) must be used to analyze the trace file. Refer to the NAM Version 1/ CCP Version 3 Reference Manual for details about the trace output and the use of DLFP.

The console operator selects whether or not to use the AIP trace mode of operation when entering the DSD command, IAFfff, to initialize IAF. This command selects a procedure file that contains the IAFEX command. The T parameter on the IAFEX command determines whether or not AIP trace mode is to be in effect and also the number of messages that are to be contained on the trace file. The format of the IAFEX command is

IAFEX,T=count.

Parameter	Description
T=count	$5000 \leq$ count ≤ 9999999. Message count specifying the number of messages that are to be logged on the trace file before that file is released to the system for processing. If T=* is specified, the trace file is processed only after IAF is terminated.
T	Same as T=16200.
T=0	AIP trace mode is not selected.
T omitted	Same as T=0.

Two procedure files are provided for use with the AIP trace, IAFTM and IAFTR. An analyst can create other procedure files using different T parameters on the IAFEX command.

IAFTM

IAFTM is a procedure file that contains the IAFEX,T=*. command which causes the trace file ZZZZZDN to be processed only after IAF is terminated. The IAFTM procedure file also includes the commands necessary to process the ZZZZZDN trace file. Also, all messages logged on the trace file are written to the output file and then sent to a printer. Refer to the NOS 2 Installation Handbook for more information about IAFTM.

IAFTR

IAFTR is a procedure file that contains the IAFEX,T. command which causes the trace file ZZZZZDN to be processed after every 16200 messages have been transferred between IAF and NAM. (Refer to the NOS 2 Installation Handbook for more information about IAFTR.) A local file called TRACIAF is required by the IAFEX,T. command in order to process the trace file. TRACIAF contains a command record, which is copied to the first record of the ZZZZZDN trace file by IAF. Trace information is then written to file ZZZZZDN, starting at the next record. This makes file ZZZZZDN suitable for submission as a batch job. The format of the TRACIAF file should be as follows:

```
ujn.
USER,username,password,familyname.
CHARGE,*.
    .
    .
    .
DLFP, ... .
    .
    .
    .
```

NOTE

When system activity is very high, the potential exists for the following problems to occur if the AIP trace is used.

- If the system load remains at a very high level for a long period of time, a system hang due to PP saturation could occur.

- If mass storage requirements become great, the ZZZZZDN trace file could reach track limit. If so, IAF would stop and wait for resources to become available.

Both of the preceding problems are unlikely to occur in most situations. Also, the risk of reaching track limit can be minimized by the selection of a message count on the IAFEX command that causes the trace file to be processed and released after the specified number of messages have been logged. This lowers the mass storage requirements. Because the AIP trace can be essential when certain types of problems are encountered, it is recommended that the AIP trace be used when circumstances so dictate as the risk involved is not great.

NETWORK DESCRIPTION FILES

The network description files describe the physical and logical configuration of hardware and software elements that comprise the terminal network. They must be present for the proper functioning of the TAF and NAM subsystems of NOS. Depending on which subsystems are present at a site, one to three such files may be present for a single mainframe. Each file has the following unique function and/or construction.

File Name	Description
LCF and NCF	Local configuration file and network configuration file which must be present if NAM is used. They are created by the Network Definition Language Processor (NDLP) from source text prepared according to specifications given in the Network Definition Language Reference Manual.
NCTFi†	Network description file which must be present if the Transaction Facility (TAF) is used. It is prepared directly by the site analyst according to specifications given later in this section.

Under standard operating conditions, the network subsystems expect LCF and NCF to be permanent, direct access public files stored under the NETOPS user index (377772_8). LCF and NCF are binary files created by NDLP; NCTFi is a text file composed of directives. The text file is interpreted by code in common deck COMCRTN to produce tables used by TAF during system operation (refer to COMCRTN listing). TAF expects NCTFi to be a direct access public file stored under the SYSTEMX user index (377777_8).

A directive can be up to 90 columns but only columns 1 through 72 are interpreted. Any line containing an asterisk in column 1 is a comment and is ignored.

The following format shows the terminal definition directive. No embedded blanks are allowed.

/terminalname,p_1,p_2,...,p_n.

Parameter	Description
terminalname	One- to seven-character alphanumeric name that uniquely identifies the terminal; terminalname must be specified. When NCTFi is created, terminalname must agree with any automatic login user name.

p_i	Description
TT=*ID	Terminal type identified by terminal operator entry.
	A TAF terminal is defined with the previous parameter, as well as the following, which are unique to TAF.
DB=db	Two-character data base name to be used by the terminal.
IS=stat	Initial on/off status of the terminal; stat can be either ON or OFF. Default is ON.

†i is the network file identifier as specified in the TAF configuration file (refer to the TAF Reference Manual).

Parameter	Description

P_i	Description
RS=n	Data base read security (0 through 7). Default is 0.
UA=n	24 bits defining the user argument area (0 through 77777777_8). Default is 0.
US=n	Data base update security (0 through 7). Default is 0.

STIMULATOR

A stimulator is a collection of central memory and peripheral processor programs which enters a hypothetical work load (called a session or script file) into the system to analyze the effects of such a load on response time and system reliability.

The STIMULA stimulator consists of a central memory program (STIMULA) and a peripheral processor program (1TS).

To use the stimulator:

1. Create the hypothetical load (refer to Session File Construction).
2. Process these jobs using stimulator commands at the system console (refer to Session File Processing).

Multiple stimulator sessions are described in the Multiple Sessions section; errors that can occur while the stimulator software is in use are described in appendix A.

STIMULA

STIMULA is an internal stimulator that enters a work load into the system through IAF. The stimulator software communicates directly with IAF using a channel. Only interactive terminals can be analyzed with STIMULA. The format of the command is as follows:

```
STIMULA,I=filename.
```

Parameter	Description
filename	Local file to be used as the session file. If not specified, the initial K display (refer to figure 4-5) requests the session file name.

SESSION FILE CONSTRUCTION

A session (or script) file is an indirect access permanent file containing the hypothetical job load that is to be analyzed by the stimulator. A session file consists of a group of records; each record is a session and contains a hypothetical job that is composed of various entries with the following requirements.

1. Begin each internal stimulation session with the entry ANSWERBAC. (Other first lines may be used; however, ANSWERBAC is used in most cases.)

2. Enter each session entry on a separate line or card.

3. After ANSWERBAC, enter a familyname entry, a username entry, and a password entry.

4. Specify the terminal commands and data.

5. End each session with the command BYE so that the login of the next session is performed correctly. The HELLO command must not be used unless it is followed by a blank line.

Figures 4-2, 4-3, and 4-4 contain examples of session files and figure 4-5 shows the initial K display.

```
ANSWERBAC
BMS001
NULL
↑↑↑↑
CATLIST                  Session record
↑
↑
DAYFILE
BYE
 *E-O-R*
ANSWERBAC
BMS001
NULL
↑↑↑↑
CATLIST                  Session record
↑
↑
DAYFILE
BYE
 *E-O-R*
ANSWERBAC
BMS001
NULL
↑↑↑↑
CATLIST                  Session record
↑
↑
DAYFILE
BYE
 *E-O-R*
$TASK0 50
OLD,FILE0
LIST                     Task record
LIST
↓
 *E-O-R*
$TASK1 30
OLD,FILE1
LIST                     Task record
LIST
↓
 *E-O-R*
$TASK2 20
OLD,FILE2
LIST                     Task record
LIST
↓
 *E-O-F*
```

Figure 4-2. Sample Session File with Tasks for Use by STIMULA

```
ANSWERBAC
PERFDEV
MATH,MATH
CHARGE(7159,73KDFA)
> 1
FORTRAN
NEW,MATH
10 PROGRAM MATH
20 1 CONTINUE
30 READ 10,A
40 IF(A.EQ.0) STOP
50 B=A*A
60 C=SQRT(B)
70 IF(A.LT.0) D= -C**3
80 IF(A.GT.0) D=C**3
90 PRINT 20,A                                  Source line input
100 PRINT 30,B
110 PRINT 40,D
120 GO TO 1
130 20 FORMAT (' A EQUALS ',F15.3)
140 30 FORMAT(' A SQUARED = ',F15.3)
150 40 FORMAT(' A CUBED = ',F15.3)
160 10 FORMAT(F15.3)
170 END
> >
RUN
2.0                                            Program input
0.0
25 PRINT 50
155 50 FORMAT(' ENTER VALUE ')
LIST
RUN
1.0
2.0
3.0
4.0
0.0
160 10 FORMAT(F12.1)
LIST
RUN
10.0
11.1
13.3
0.0
160 10 FORMAT(F12.3)
LIST
RUN
15.555
40.0
50.0
0.0
LIST
RUN
10.0
20.0
30.0
40.0
0.0
ENQUIRE,T
DAYFILE
BYE
```

Figure 4-3. Sample Session for Use by STIMULA

```
ANSWERBAC
USERNAM
PASSWRD
BASIC
OLD
TESTB
LIS,294
RUN
01000
REPLACE
BYE
*E-O-R*
   .
   .
   .
additional
 sessions
   .
   .
   .
*E-O-F*
```

Figure 4-4. Sample Session File for Internal Stimulation

```
ENTER STIMULATION FILE PARAMETERS IN FORM -

 P  = VALUE

 F  =                SESSION FILE NAME.
 UI = 0B             USER INDEX (OCTAL BASE ASSUMED.)

 N  = 1              NUMBER OF FILE ON SESSION FILE.
 GO                  BEGIN PROCESSING OF SESSION FILE.
```

Figure 4-5. STIMULA Left K Display

Dynamic Login

If each of the terminals to be analyzed is logged into the system with a unique user name and password, a unique session record for each terminal is stored in central memory at the stimulator control point. Thus, a large amount of central memory could be unavailable to other components of the system. To alleviate this condition, dynamic login is possible, whereby one session record is generated with a unique user name and password which are dynamically translated into unique user names and passwords for each terminal at run time. The generated user names and passwords are then validated via system validation files. The formats are as follows:

```
username$$$
    or
username$$$,password$$$
```

Parameter	Description
username	User name; one to four alphabetic characters.
password	Password; one to four alphabetic characters.
$	Special symbol 12/8/6 (6-bit display code 76_8), 1 (6-bit display code 34_8) punch; that is, 12/8/6 punch in one column and 1 punch in next column.

NOTE

The $ denotes the special symbol previously described, not the character itself. The $ character is translated into the stimulator terminal numbers at run time.

Example:

P$$$,P$$$ is translated into P000,P000 for the first terminal, into P001,P001 for the second terminal, and so forth.

Optional Think Time Specification

Think time is the number of seconds that each line is delayed before it is sent through the interactive system. A random think time can be specified with a session file command. The format of the command is as follows:

$\geq$ xxx

Parameter	Description
xxx	Think time (octal): xxx $\leq 177_8$.

To return the terminal to the initial think time (refer to figure 4-6), enter the following command.

$\geq \geq$

```
ENTER STIMULATION PARAMETERS IN FORM -

P  = VALUE        (NUMERIC VALUES ARE ASSUMED DECIMAL BASE.)
                  (SEE RIGHT SCREEN FOR SPECIAL PARAMETERS.)

NT = 310B         NUMBER OF TERMINALS TO STIMULATE.

                  (1 - 100B)
LS = 15           LINE SPEED IN CHARACTERS/SECOND. (1 - 1000)
IS = 15           INPUT SPEED IN CHARACTERS/SECOND. (1 - 1000)
TT = 10           THINK TIME DELAY IN SECONDS. (0 - 127)
TI = 8            UPPER BOUND OF RANDOM THINK TIME INCREMENT.

                  0 - 64  (MUST BE A POWER OF 2.)
                  THINK TIME WILL VARY BETWEEN TT AND TT+TI.

AC = 4            ACTIVATION COUNT. (1 - 64)
                  NUMBER OF TERMINALS TO ACTIVATE EVERY
                  AD SECONDS.

AD = 10           ACTIVATION DELAY IN SECONDS. (0 - 127)
RC = 0            NUMBER OF TIMES TO REPEAT STIMULATION.(0-31)
LD = 0            LOGOUT DELAY.(0 - 4095)
RO = ON           OUTPUT RECOVERY. (ON OR OFF)

LF = NO           LOOP ON SESSION FILE (YES OR NO)
```

Figure 4-6. STIMULA Session File Parameters

Task Definitions

A task is a predefined set of interactive commands designated by a task name and a task usage parameter. Tasks can be called throughout a session, and the task usage parameter is used to determine which task is the next most eligible task (that is, the task to be called next).

An ↑ character (6-bit display code 70_8) in the session calls the next most eligible task in the session file, which is determined by the following equation.

$$f_i = \frac{\text{Total initiations of task}_i}{(\text{Total initiations of all tasks})\ (\text{Task usage parameter for task}_i)}$$

For each $task_i$ defined in the session file, the stimulator calculates f_i, and the task with the smallest f value is the next most eligible task. Multiple ↑ characters are permitted on one line and are treated as if they occurred on separate lines. For example, ↑↑↑ calls the first three most eligible tasks, where eligibility is recalculated after each initiation of a task. If a task is called and the stimulator cannot determine the next most eligible task in the time allotted, the first task defined in the session file is used.

Tasks for the stimulator are defined in the session file as task records following the session records. Tasks are not permitted in the file before session records. The tasks should be defined in descending order according to the task usage parameter. This facilitates the use of the first task defined as the default next most eligible task in situations where the stimulator fails to calculate the next most eligible task on time.

The first line in a task record must be as follows:

```
$task   nnn
```

Parameter	Description
$	Denotes the beginning of a new task (character position 1).
task	One- to six-character task name.
nnn	Task usage percentage; $0 \leq nnn \leq 100$ (character positions 8, 9, 10). The task usage percentages of all tasks in the session file must total 100.

The last line in a task record must be a ↓ character (6-bit display code 71_8), which returns control to the calling session. An example of a session file with tasks defined is shown in figure 4-2.

SESSION FILE PROCESSING

The stimulator software is used to process the interactive session file according to the following procedures.

1. Ensure that an interactive subsystem stimulator entry is present in the EST whose status is ON (refer to the NOS 2 Installation Handbook). The stimulator entry must be on a channel that is not used by any equipment that is currently ON in the EST.

2. Use DSD to activate the stimulator.

   Type STMffff. where ffff is zero to four alphanumeric characters. This entry calls a procedure file STMffff, which must be a permanent indirect access file stored under the system user index (377777_8). The procedure file STM is called when the operator types STM. The stimulator is invoked by a STIMULA command within the STM procedure file. The stimulator requests the K display.

3. Type K,STM. Figure 4-5 appears on the left display.

4. Type the session file parameters individually as indicated in the following format column or as a group on the same line in the format.

   K.F=filename,UI=userindex,N=n,GO.

Format	Default	Description
K.F=filename	None	filename is the indirect permanent file name of the session file.
K.UI=userindex	0	userindex is the user index of file filename. The default family is assumed.
K.N=n	0	n is the number of files to be skipped on file filename before data is read from the session file; range is 0 through 377777_8.
K.GO	None	Indicates to the stimulator that all the parameters have been entered or that none are to be entered.

   Figure 4-6 appears on the left display.

5. To display the special parameters, type:

   KK.

   Figure 4-7 appears on the right screen.

```
TO ENTER MIXED MODE OF PARAMETER ASSIGNMENT -

  K.MIXED.
```

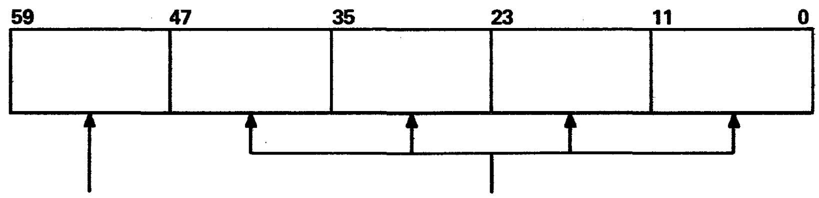
Figure 4-7. STIMULA Special Parameters

6. Type the stimulator parameters individually as indicated in the following format column or as a group on the same line in the format.

```
K.NT=n,LS=s,IS=s,TT=n,TI=i,AC=m,AD=d,RC=n,LD=d,RO=ON,GO.
```

Enter any special parameters (refer to figure 4-9) before the GO. entry.

Format	Default	Description
K.NT=n	Current EST value	n is the current maximum number of terminals on which the interactive subsystem is initialized. It must be less than or equal to the number specified in the EST entry; the range is 3 through 1000_8.
K.LS=s	15	s is the line speed in characters per second at which the operator wishes to run the terminals; the range is 1 through 1000. Any value above 60 characters per second causes a line speed of approximately 60 characters per second. If many terminals (600_8, for example) are run, the maximum realizable line speed is determined by the overhead of 1TD and 1TS. The worst case can be determined by checking the 1TD cycle time dayfile message, which is issued when the interactive subsystem is dropped.
K.IS=s	15	s is the typing speed in characters per second at which the operator wishes to run the terminals; the range is 1 through 1000.
K.TT=n	10 seconds	n is the number of seconds (think time) that each line is to be delayed before it is sent to the interactive subsystem; the range is 0 through 127 seconds.
K.TI=i	8	i is the number of seconds by which the think time will vary; the range is 0 through 64 and i must be a power of 2. If i is nonzero, the think time varies between n (the value of TT) and n+i.
K.AC=m	4	m is the number of terminals that are to be logged in every d seconds (the value of AD); the range is 1 through n (the value of NT). The AC and AD options provide a method to stagger the I/O commands and data to the interactive subsystem.
K.AD=d	10 seconds	d is the number of seconds of delay time until the login of another terminal is allowed; the range is 0 through 127 seconds.
K.RC=n	0	n is the number of sessions that will be executed for each terminal; the range is 0 through 31.
K.LD=d	0 seconds	d is the number of seconds of delay time after a logout is completed until the next login of the terminal is allowed; the range is 0 through 127 seconds.

Format	Default	Description
K.RO=o	ON	When RO=ON, the output from the interactive subsystem is recovered on file STIMOUT. The format of this file is:  Terminal number. Each byte is an ASCII character if less than 4000_8; otherwise, it is the running-second time. When RO=OFF, the output is not recovered.
K.LF=o	NO	When LF=NO, looping occurs on the session assigned to the terminal. When LF=YES, the subsequent session is the next session in the session file.
K.MIXED	No mixed mode parameters entered	Specifies that special parameter assignments are required for specific input sessions. This command displays the stimulation parameter matrix (refer to figure 4-8) whose values can be changed as described in the right screen K display (refer to figure 4-9).
K.GO	None	Indicates to the stimulator that the parameters are entered. Stimulation is initiated.
K.MX= s_1-s_2, ttys,ls, is,tt,ld, rc	Current value	Mixed mode input. s_1 is the number of the first session to be changed, and s_2 is the number of the last session to be changed. s_2 is optional; the default is s_1. (Refer to figure 4-9 for other parameter descriptions.)
K.CF= filename	None	Matrix change file. Indirect access file filename is accessed for mixed mode input directives, and must be saved under the same user index as the session file.
K.+	None	Page matrix display forward one page.
K.-	None	Page matrix display backward one page.
K.GO	None	Indicates to the stimulator that the parameters are entered. Stimulation is initiated.

STIMULATION PARAMETER MATRIX

SCRPT	TTYS	LS	IS	TT	LD	RC
1	40	15	15	10	0	0
2	40	15	15	10	0	0
3	40	15	15	10	0	0
4	40	15	15	10	0	0
5	40	15	15	10	0	0

NUMBER OF TTYS ASSIGNED = 200

MAXIMUM TTYS PERMITTED = 200

CF = MATRIX CHANGE FILE

Figure 4-8. Parameter Matrix

```
DEFINITION OF PARAMETERS

SCRIPT - SCRIPT(S) WHICH THE PARAMS WILL AFFECT
              (SCRIPT(N) OR SCRIPT(N)-SCRIPT(N+X))
  TTYS - NUMBER OF TTYS ASSIGNED TO SCRIPT(S)
    LS - LINE SPEED ASSIGNED TO SCRIPT(S)

    IS - INPUT SPEED ASSIGNED TO SCRIPT(S)
    TT - THINK TIME ASSIGNED TO SCRIPT(S)
    LD - LOGOUT DELAY ASSIGNED TO SCRIPT(S)
    RC - REPEAT COUNT ASSIGNED TO SCRIPT(S)

*NOTE - NULL PARAMETER WILL KEEP CURRENT VALUE

TO MAKE ENTRIES, FOLLOW THE FORMAT -
    K.MX=SCRIPT,TTYS,LS,IS,TT,LD,RC.



TO CHANGE MATRIX VIA PREDEFINED PARAMETERS-
    K.CF=XXX   WHERE XXX IS PF CONTAINING CHANGE
                   DIRECTIVES IN FOLLOWING FORMAT-
                   MX=SCRIPT,TTYS,LS,IS,TT,LD,RC.



TO ADVANCE DISPLAY ENTER K.+

TO BACKUP DISPLAY ENTER K.-
```

Figure 4-9. Mixed Mode Parameters

Example:

MX=2-4,3,30,30,,,1.

Three terminals will be assigned to sessions 2, 3, and 4. The line speed and input speed for these terminals will be 30 characters per second. The think time and logout delay will not be changed from the current value. The terminals will have a repeat count of one.

MULTIPLE SESSIONS

Each session on the session file is allocated to each terminal line. When each session has been allocated, the stimulator goes to the first session and reallocates the sessions to the next group of terminals. This procedure is repeated until all the terminals are allocated to a session. If a repeat count is not designated (RC parameter), the line is shut off when the session is finished. When the session completes, the repeat count is checked.

The repeat count corresponds to the number of sessions to be executed on a given terminal. The current session is completed, and the LF parameter determines the next session to be executed. If LF=OFF, the session currently assigned to the terminal is repeated. If LF=ON, the next session in the session file is executed. For example, if the repeat count is four, the session currently assigned to the terminal is repeated four times (LF=OFF), or the next four sessions on the session file (with repetition, if necessary) are executed (LF=ON).

PARAMETER OUTPUT FORMAT

The parameter information (shown in figure 4-10) is placed on the output file for printing upon completion of the stimulator run (refer to Session File Processing).

POSTPROCESSING

The postprocessing of the interactive stimulator output is accomplished by reading the file STIMOUT and sorting the data according to terminal number. This is accomplished by using the DEMUX command. As DEMUX sorts STIMOUT, it assigns an encounter number (starting at 1) to the output from each terminal session. DEMUX includes this number in the final line of each sorted terminal session output. The data for each terminal is separated by a page eject and an end of line indicator. The terminal data appears as it would on a terminal page. If the ASCII character on the STIMOUT file is 4000_8 or greater, the lower 10 bits are assumed to be time of a carriage return or the first character of output. If STIMOUT will be processed at a later time, the user should save it.

```
STIMULATOR PARAMETERS-
SESSION FILE NAME-               F=   SSCC1
USER INDEX-                     UI=   1
NUMBER OF THE FILE-              N=   1
NUMBER OF TERMINALS-            NT=   100B
LINE SPEED-                     LS=   30
INPUT SPEED-                    IS=   10
THINK TIME-                     TT=   3
RANDOM THINK TIME-              TI=   0
ACTIVATION COUNT-               AC=   1
ACTIVATION DELAY-               AD=   1
REPEAT COUNT-                   RC=   4
LOGOUT DELAY-                   LD=   0
OUTPUT RECOVERY-                RO=   ON
LOOP ON SESSION FILE-           LF=   NO
MATRIX CHANGE FILE-             CF=

       STIMULATION PARAMETER MATRIX

     SCRPT  TTYS  LS  IS  TT  LD  RC
       1     22   30  10  3   0   4
       2     21   30  10  3   0   4
       3     21   30  10  3   0   4


       NUMBER OF TTYS ASSIGNED = 64
       MAXIMUM TTYS PERMITTED  = 64


 TASK  CALLS  COMPLETE  DESIRED %  ACTUAL %

TASK0   848     818      50.000     49.970
TASK1   509     492      30.000     29.994
TASK2   340     327      20.000     20.035

TOTALS 1697    1637     100.000     99.999

DEFAULT TASK CALLS =    15
```

Figure 4-10. Output Statistics

An example of output from DEMUX is as follows:

```
ANSWERBAC
*****TTT.TTT     (Optional output)
*****TTT.TTT     (Optional output)
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1983.

yy/mm/dd.hh.mm.ss.
     .
     .
     .
     .
     .
END OF THE LINE ------------------------------------------------------------ n

(Page Eject)
ANSWERBAC
     .
     .
```

The n in the previous listing is the decimal encounter number.

The format of the DEMUX command is

DEMUX,p_1,p_2,...,p_n.

where parameter p_i is either a keyword or a keyword equated to a value.

p_i	Description
I=filename	Name of the file containing stimulator data.
I omitted	Same as I=STIMOUT.
NR	Specifies that the input and output files are not to be rewound.
NT=n	Number of terminals to be processed (0 < n < 512). This tells DEMUX how much memory to allocate to process the input file. If no post radix is specified, octal base is assumed.
O=filename	Name of the file to receive translated session output.
O omitted	Same as O=OUTPUT.
SL=terminalnumber	Selective terminal number (within the range specified by the NT=n parameter) to be processed. terminalnumber is the terminal number minus 1 in the T display. If SL is omitted, all terminals within the range specified by the NT=n parameter are processed.
T	Specifies that the time of each carriage return and first output character is written with the processed data. Subtracting the two time values gives the response time. The time values can also be used to correlate data between each terminal's input and output.

The following is an example of a procedure file called when STM. is typed at the console. It executes the stimulator (STIMULA command) and performs postprocessing of the stimulator output. The procedure file must be stored as a permanent indirect access file under the system user index (377777_8).

.PROC,STM.	Procedure file name.
STIMULA.	The stimulator is executed.
DEMUX,NT=310,O=NOS,T. GET,RESB/UN=username. RESB.	RESB is a user-created program to analyze DEMUX output.
ASSIGN,NE,TRASH. DFD,OP=I,L=TRASH.	The system dayfile is dumped to null equipment.
REQUEST(T) IDLE IAF......	Processing stops until IAF is idled. Also, ASSIGN,STM,2 should be performed. (Refer to the NOS 2 Installation Handbook.)
DFD,OP=I.	A partial dayfile dump is performed which includes IAF statistics.
ATTACH,ERRDATA/M=W. COPYEI,ERRDATA,OUTPUT. EVICT,ERRDATA. RETURN,ERRDATA. EXIT. DIS.	Output of all failing jobs is copied to output.

In the previous procedure file, output from failing jobs is copied from the file ERRDATA. In order for ERRDATA to contain this information, another procedure file is necessary to collect data on jobs that fail and place this data in ERRDATA. This procedure file (called ERRCHEK in the following example) should be called in the following manner after each stimulator session.

```
GET,ERRCHEK/UN=username.
ERRCHEK.
```

The following is an example of this procedure file.

```
.PROC,ERRCHEK*I.
IF,EF.NE.0,EXIT.                      If certain jobs normally cause compilation
                                      errors, additional procedure should be included
                                      to allow for these special cases.
DISPLAY,EF.
ASSIGN,MS,OUTPUT.
ENQUIRE,A.                            Data is gathered on which program and which
DAYFILE.                              statement caused the error.

ATTACH,ERRDATA/UN=username,M=W,NA.    This data is placed on file ERRDATA, which is
SKIPEI,ERRDATA.                       used later during postprocessing.
REWIND,OUTPUT.
COPYEI,OUTPUT,ERRDATA.
RETURN,OUTPUT,ERRDATA.
COMMENT.FAIL********************      These comments warn users that failures have been
COMMENT.FAIL********************      encountered.
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
COMMENT.FAIL********************
EXIT.
REQUEST,FAIL.    ERRCHECK FAILED...   If serious problems have been encountered, DIS
                                      could be brought up at this point.

ENDIF,EXIT.
```

Care should be taken when comparing response times between different versions of the operating system with the stimulator. Other factors may have a significant impact on response time. Awareness of the following items is necessary.

- The entire parameter set should be the same for each stimulator run. The rate of activation of terminals, for example, can significantly impact response time.

- The hardware configurations must be identical. If an attempt is made to measure small differences, all devices which cannot be restored to their original state (normally temporary devices) should be deadstarted and fully initialized.

- If the possibility exists that permanent files have been destroyed, these files should be restored before each run. This can be accomplished easily by maintaining a copy of all required files under a user name not used during the stimulation. A procedure file can then be called to restore the files before each stimulator run. This is important when stimulation loads are causing abnormal job failures. A REPLACE shortly after an unexpected abort may cause incorrect information to be written, for example.

- Job processing must be the same for each stimulator run. When many terminals are to be analyzed, random job failures may be overlooked. These failures may, however, affect the entire results of the stimulator run. To minimize this problem, it is necessary to check errors in all sessions quickly and easily. This can be done by using the procedures described earlier in this section.

By using the preceding techniques and procedures and observing the restrictions, it becomes easier to use the stimulator to check performance and reliability and to obtain meaningful data from the system.

SYSTEM ACCOUNTING 5

The user validation and user accounting capability of NOS is based on two special system files, VALIDUs and PROFILa.†

VALIDUs is used to control user validation, including

- Who can use the system.
- What resources they can use.
- Limits on job resource usage.

PROFILa is used to control user accounting, including

- Who can be accounted for.
- What accounting parameters are assigned.
- Limits on time of day access to the system.
- Limits on total resource usage.

As the structures of the user validation file and user accounting file change, concurrent file name changes can also occur to make it easier for sites to convert from one system to another. Table 5-1 lists the file names corresponding to the appropriate operating system levels.

Table 5-1. Validation and User Accounting File Names

System	User Validation File	User Indexes File	User Accounting File
NOS 2.0, 2.1	VALIDUZ	VALINDZ	PROFILB
NOS 2.2	VALIDUS	VALINDS	PROFILC

VALIDUs contains user names and PROFILa contains charge/project numbers. User names identify the user, and the user's permanent files and resource limitations. Charge/project numbers control and record billing charges. Entry of subsequent user names during a job session affects only permanent file usage and does not alter the billing procedure. Entry of subsequent charge/project numbers initiates a new sequence of billing computations. Initialization of the user validation and indexes files can be performed using the GENVAL command described in section 7. Initialization of the user accounting file is described later in this section.

†In this manual the user validation and accounting files are referred to as VALIDUs, VALINDs, and PROFILa. Refer to table 5-1 for a list of file names that correspond to the appropriate operating system levels.

The billing unit which reflects the resources used by the system during a job or a session is called the system resource unit (SRU). The calculation of this unit provides for the flexibility of weighing the usage of resources against one another. The following resources are included in the calculation of this unit.

- Central memory (CM) field length.
- Extended memory field length.
- Central processing unit (CPU) usage.
- Mass storage usage.
- Magnetic tape usage.
- Permanent file usage.

The parameters for SRU computation are related to the charge/project numbers. The PROFILa file contains indexes used to determine which SRU parameters are to be used for computation while a charge/project number is in effect for the job or session.

USER VALIDATION

The VALIDUs file is a special system file maintained as a direct access permanent file under user name SYSTEMX (user index 377777_8). The VALIDUs file is created and managed by MODVAL, and can be updated only from a system origin job. In addition, in a secured system, security administrator privileges are required to update VALIDUs.

MODVAL VALIDATION FILE MANAGER

The validation file manager, MODVAL, can be executed from the system console (system origin job) or from a batch job. MODVAL can directly update the VALIDUs file only from a system origin job (using input directives or the K display). When run from a batch job, MODVAL cannot access the VALIDUs file; either a copy of the new file or a directive file is established as a local file and processed later by a system origin job to update the VALIDUs file.

MODVAL CONSOLE INPUT

All batch input directives (refer to MODVAL Batch Input) are available for console input. In addition, the following are provided specifically for console input.

Directive	Description
K.I,username	Inquire option relative to the user identified by the user name username. Information is given on the second MODVAL display (refer to figure 5-2). This option cannot be used for data entry.
K.U,username	Update modification for the user name username which is on the existing VALIDUs file. Modification data is input following the input of this directive.

Directive	Description
K.C,username	The user name username is entered on a VALIDUs file that is being created. The following input line(s) can contain identifiers for this user name.
K.D,username	The user name username is deleted from the existing VALIDUs file.

Information for the previous options is provided on two MODVAL displays (refer to figures 5-1 and 5-2) for each user name specification. For the option types, identifiers must be entered on separate lines following the user name specification.

Directive	Description
K./username,ident=data	This slant (/) directive is used to update username as with the U option; however, if username is not found, a new user name is created automatically. It is possible under this option to switch control directly from one user name to another without returning to the initial MODVAL display (refer to figure 5-1). If the / directive is used exclusively, data entry is analogous to batch input; that is, the card image can be entered with user name and identifier on the same line.
K.+	The plus (+) is used to advance the user display pages (K display).

The console options can be used by the analyst to access VALIDUs with the MODVAL manager according to the following general procedure.

1. The analyst types:

   AB.

   X.MODVAL.

2. The B display appears on the right screen. The analyst notes the job sequence name assigned to MODVAL. To the right of this entry the following intensified message appears:

   REQUEST *K* DISPLAY

3. The analyst types in

   K,jsn.

   where jsn is the job sequence name shown on the B display.

4. The first MODVAL display appears on the left screen. This is a listing of the options available for manipulating the validation file VALIDUs (refer to figure 5-1).

```
                              VALIDUS

                         CREATED    83/02/20.
                         UPDATED    83/08/05.


INPUT DIRECTIVES ARE THE SAME AS BATCH INPUT DIRECTIVES.
THE FOLLOWING DIRECTIVES ARE ALSO PROVIDED -

    /UN  - TERMINATE INPUT FOR PRESENT USER NAME IF ANY,
           UPDATE VALIDUS FILE.  INITIATE ACTION ON *UN*.
    I,UN - INQUIRE OPTION.  THIS DISPLAY ONLY.
    C,UN - CREATE OPTION.  THIS DISPLAY ONLY.
    U,UN - UPDATE OPTION.  THIS DISPLAY ONLY.
    D,UN - DELETE OPTION.  THIS DISPLAY ONLY.
    +    - TOGGLE USER DISPLAY PAGES.
    END  - COMPLETE UPDATE OR INQUIRE OF ACTIVE USER.  FROM
           THIS DISPLAY, END RUN.
    DROP - TERMINATE INPUT FOR ACTIVE USER.
    STOP - TERMINATE INPUT FOR ACTIVE USER, IF ANY.  END RUN.
         UN = 1-7 CHARACTER USER NAME.

DATA ENTRY FORMAT IS OF THE FORM MT=XX,CM=XX,TL=XX, ETC.
ALL NUMERIC FIELDS ARE ASSUMED TO BE DECIMAL UNLESS A POST-
RADIX IS SPECIFIED.  FOR EXAMPLE - 4000B
```

Figure 5-1. First MODVAL Display

```
                        USER              RCS2767      PAGE 1 OF 4.

              CREATED    83/05/23.    UPDATED     83/06/28.


CONTENTS                               DESCRIPTION

 UI =      2767B    USER INDEX (1-377777B).
 MT =          6    MAGNETIC TAPES (0-7).
 RP =          1    REMOVABLE PACKS (0-7).
 AL =         1B    APPLICATION ACCESS LEVEL (1-17B).
 MS =  UNLIMITED              MASS STORAGE PRUS (0-77B).
 CM =  UNLIMITED              CENTRAL MEMORY FL (0-77B).
 EC =         0B  (     0B)   ECS FIELD LENGTH (0-77B).
 TL =        70B  ( 28736)    TIME LIMIT (0-77B).
 DT =        55B  (    45)    DETACHED JOBS (0-77B).
 LP =  UNLIMITED              LINES PRINTED (0-77B).
 CP =        14B  (   768)    CARDS PUNCHED (0-77B).
 PT =         0B  (   512)    UNITS PLOTTED (0-77B).
 CC =  UNLIMITED              COMMANDS (0-77B).
 DF =        45B  (   656)    DAYFILE MESSAGES (0-77B).
 SL =        76B  ( 31808)    SRU LIMIT (0-77B).
 DB =  UNLIMITED              DEFERRED BATCH (0-7).
 DS =          6  ( 32768)    DA FILE SIZE (0-7).
 FS =          6  (   192)    INDIRECT FILE SIZE (0-7).
 FC =          6  (    64)    PERMANENT FILE COUNT (0-7).
 CS =          6  ( 32768)    INDIRECT SPACE (0-7).

 AW = 00000000000002000215     ACCESS WORD (4 CHARACTERS).

 ACCESS WORD IDENTIFIERS LEFT FROM BIT 0 ARE -
 CPWC,CTPC,CLPF,CSPF,CSOJ,CASF,CAND,CCNR,CSRP,CSTP,CTIM,CUCP
 CSAP,CBIO,CPRT,CPLK,CQLK,CUST,CNVE,CMNT,CNOP,CSAF
```

Figure 5-2. Second MODVAL Display (Sheet 1 of 4)

```
                 USER           RCS2767      PAGE 2 OF 4.

      CREATED    83/05/23.    UPDATED    83/06/28.

 CONTENTS                        DESCRIPTION

  CN = 1280                    CHARGE NUMBER (1-10 CHAR.).
  PN = 73CW55770               PROJECT NUMBER (1-20 CHAR.).
  SP =          1B    SYSTEM PROLOGUE FILE INDEX (1-77B).
  UP = PROC           USER PROLOGUE FILE NAME (1-7 CHARS).
  SH =                SHELL PROGRAM NAME (1-7 CHARACTERS).
  SO =         12B    SHELL PROGRAM OPTIONS (4 CHARACTERS).

 REMOTE TERMINAL PROGRAM IDENTIFIERS LEFT FROM BIT 0 ARE -
 CCLM,BCSM,TCSM,SLID,GLID,LFID,ABTM

  RO = SYSTEM         RUBOUTS (0-37B).
  PA = EVEN           TERMINAL PARITY (3-4 CHARACTERS).
  PX = HALF           TRANSMISSION (4 CHARACTERS).
  TT = TTY            TERMINAL TYPE (3-7 CHARACTERS).
  TC = NORMAL         CHARACTER SET (5-6 CHARACTERS).
  IS = NULL           INITIAL SUBSYSTEM (4-8 CHARACTERS).

  UC = BCRBTS         DEFAULT SERVICE CLASS FOR ORIGIN TYPES
                      BC,RB,IA (2 OR 4 CHARS.).
  VM =        34B     VALIDATION MASK (2 CHARACTERS).

 SERVICE CLASS IDENTIFIERS STARTING AT BIT 1 ARE -
 SY,BC,RB,TS,D1,NS,--,MA,CT,I0,I1,I2,I3
```

Figure 5-2. Second MODVAL Display (Sheet 2 of 4)

```
                 USER           RCS2767      PAGE 3 OF 4.

      CREATED    83/05/23.    UPDATED    83/06/28.


      ON/OFF    APPLICATION          ON/OFF    APPLICATION

      ON        IAF                  ON        RBF
      OFF       TAF                  OFF       MCS
      OFF       TVF                  OFF       CS
      OFF       PLATO                OFF       ITF
      OFF       AP1                  OFF       AP2
      OFF       AP3
```

Figure 5-2. Second MODVAL Display (Sheet 3 of 4)

```
                    USER               RCS2767      PAGE 4 OF 4.

     CREATED    83/05/23.              UPDATED    83/06/28.


        CONTENTS                           DESCRIPTION
                                PASSWORDS MUST BE 4-7 CHARACTERS
         XB =  83/12/31.        BATCH PASSWORD EXPIRATION DATE.
         XI =  83/12/31.        INTERACTIVE PASSWORD EXPIRATION DATE.

         SC =          50B      SECURITY COUNT (0-77B).

         SAL =        377B      SECURITY ACCESS LEVELS (1-7 CHAR.).

        SECURITY ACCESS LEVEL IDENTIFIERS LEFT FROM BIT 0 ARE -
        LVL0,LVL1,LVL2,LVL3,LVL4,LVL5,LVL6,LVL7

         SAV =       3760B      SECURITY ACCESS PRIVILEGES (4 CHAR. ).

        SECURITY PRIVILEGE IDENTIFIERS RIGHT FROM BIT 59 ARE -
        CSAP,COLD,CPWX,CFPX,CLJL,CLFL,CWLF,CULT

         SAC =000000000000                 SECURITY ACCESS CATEGORIES
                                                   (1-7 CHARACTERS).

        SECURITY ACCESS CATEGORY IDENTIFIERS LEFT FROM BIT 0 ARE -
        CAT00,CAT01,CAT02,CAT03,CAT04,CAT05,CAT06,CAT07
        CAT08,CAT09,CAT10,CAT11,CAT12,CAT13,CAT14,CAT15
        CAT16,CAT17,CAT18,CAT19,CAT20,CAT21,CAT22,CAT23
        CAT24,CAT25,CAT26,CAT27,CAT28,CAT29,CAT30,CAT31
```

Figure 5-2. Second MODVAL Display (Sheet 4 of 4)

5. The analyst types in one of the five console options. This is either

   K.option,username

   or

   K./username,ident=data

   If a delete (K.D,username) is entered, the user name username is deleted from the validation file VALIDUs at this point. No further action is needed for this option. The user executing MODVAL cannot be the username deleted with this option.

6. For a create, update, or inquire option, the second MODVAL display (refer to figure 5-2) replaces the first on the left screen.

   For a create (either by C or /), the new user name will appear with default values for the parameters. If the ident is included with the slant (/), it will appear on the display but will not, at this point, be entered on the file.

For an update (either by U or /), the existing user name will appear with current parameters. If a modification identifier is included with a / input, the new value will appear on the screen but will not be entered on the file. From here, the analyst would have to go to step 7.

For an inquire, the display contains the information requested and the procedure would stop at this step.

7. For a C or U option, the ident is now typed in with the format:

   K.ident=data

8. To initiate action on the create or update entry, the analyst types:

   END

   If the analyst does not want this entry on the file, he can either type

   DROP

   and erase the entry without terminating this run, or he can type

   STOP

   and terminate the run without action on this entry.

   In the case of DROP, the first MODVAL display (refer to figure 5-1) will return to the left screen and the analyst can enter more user names and their associated parameters.

   To terminate any run without erasure, the analyst types:

   END.

   Table 5-2 summarizes the basic input for console options.

Table 5-2. Input for Console Options

Create	Update	Inquire	Delete
K.C,username	K.U,username	K.I,username	K.D,username
K.ident=data	K.ident=data	K.END	K.END
K.END	K.END		
or	or		
K./username	K./username		
K.ident=data	K.ident=data		
K.END	K.END		

MODVAL BATCH INPUT

Batch jobs that use MODVAL cannot access the VALIDUs file, resident on user name SYSTEMX. Refer to Examples of MODVAL Use, Example 15 for an example of how to update VALIDUs by creating a file of batch input directives with a batch job that is automatically used by a system origin job as MODVAL input.

The following files are used by MODVAL in batch processing.

Default Name	Use
INPUT	File containing the input data directives that will be used to create or update the validation file VALIDUs.
NEWVAL	Interim copy of the new validation file that is to be created or reformatted.
VALIDUs	Old validation file that is to be updated or reformatted.
SOURCE	File to receive the source input for each user name.
VALINDs	File containing all the available user indexes for the present VALINDs file. VALINDs is always used in conjunction with one of the validation files, new=NEWVAL or old=VALIDUs.
OUTPUT	File to receive output listings.

MODVAL Command

The MODVAL validation file manager is accessed with the MODVAL command; the following is the format of the command.

MODVAL,p_1,p_2,...,p_n.

where each parameter is a keyword or a keyword equated to a value.

p_i	Description
CV=option	Specifies the conversion options used when converting from a pre-NOS 2 validation file to a NOS 2 validation file.

option	Description
A	This conversion option is used with OP=C to convert from a pre-NOS 2 validation file to a NOS 2 validation file. During the creation run, the input directive identifier TC=STANDARD is converted to TC=NORMAL.
F	This conversion option is used with OP=C to convert from a pre-NOS 2.2 validation file to a NOS 2.2 validation file. During the creation run, the input directive identifier AW=NUL is converted to AW=NUL,AW=CSAF to force setting of the alternate family permission.

Pi	Description
D	Indicates that MODVAL will not abort when directive errors are detected.
FA	Forces an attach of VALIDUs and VALINDs for system origin type jobs (for options OP=S, U, or R). In a secured system, use of this parameter requires security administrator privileges.
FM=familyname	Name of the family the user wishes MODVAL to access. This option can be specified only from a system origin job.
I=infile	Local file name of the file that will contain input data or source data; default is INPUT.
L=outfile	File to receive list output; default is OUTPUT.
N=newfile	Local file name of the interim file that will become the newly created or reformatted validation file; default is NEWVAL.
OP=C	Create option. Processes the input file and creates the interim validation file (N=NEWVAL) and the file of associated user indices (U=VALINDs).
OP=C,LO=E	Initiates the create (OP=C), then lists the errors encountered in processing.
OP=C,LO=EN or OP=C,LO	Produces a list of errors for the create processing.
OP=K	K display option. All other options (multiple OP specifications) are cleared, and instructions must be entered using the K display. OP=K is valid only for system origin jobs. The system files VALIDUs and VALINDs are automatically attached (the FA parameter is not necessary). In a secured system, use of this parameter requires security administrator privileges. For a system origin job, if no parameters are specified and the call is **MODVAL.** the K display option is automatically selected. If parameters are specified, OP=U is the default.
OP=L or OP=L,LO=A	Reads the validation file, sorts the copy by user name, and writes it to the output file for listing according to the format in figure 5-3.
OP=L,LO=AL	Same as LO=L since A is a default value.
OP=L,LO=EN or OP=L,LO	File will be sorted by user index.

```
      MODVAL,OP=L,LO=N.                          YY/MM/DD. HH.MM.SS.    PAGE      1

  USER        USER      CREATION  LAST MOD
  NAME        INDEX       DATE      DATE

  USERAAA         1     77/06/15. 81/06/21.
  USERBBB        10     79/04/04. 79/04/04.
  USERCCC       130     77/06/15. 78/02/14.
  USERDDD       260     81/10/08. 81/10/08.
  USERXYZ      4263     81/08/07. 81/08/07.
  LIBRARY    377776     77/06/15. 78/04/13.
  SYSTEMX    377777     77/06/15. 78/04/13.
```

Figure 5-3. Format of VALIDATION File Listing

Pi	Description
OP=L,LO=L	Reads the information on the local file identified in the parameter list, sorts by user name, and writes it to the output file for listing according to the format in figure 5-3.
OP=L,LO=N	Reads the validation file, sorts the copy by user index, and writes it to the output file for listing according to the format in figure 5-3.
OP=L,LO=NL	Reads the information on the local file identified in the parameter list, sorts the copy by user index, and writes it to the output file for listing according to the format in figure 5-3.
OP=R	Reformats the validation file by purging all files of each deleted user. Until this option is selected, all files of deleted users remain in the permanent file system even though they cannot be accessed; this allows redefinition of a user (with UI identifier on data input directive) if an error was made in deleting him.
OP=S	Specifies a source run that returns the validation file specified by the P parameter (default=VALIDUs) to source format (directive images) on the file specified by the S parameter (default=SOURCE).
OP=U	Update option. Updates the local copies of VALIDUs and VALINDs with data on input file and sets NORERUN flag to prevent the job from being rerun and toggling validation bits twice. This option can be used with certain other options (for example, OP=URS). It is the default option for a nonsystem origin job or a system origin job where at least one parameter is specified on the MODVAL command.
OP=U,LO=E	Initiates the update (OP=U), and then lists the errors encountered in processing.

Pi	Description
OP=U,LO=EN or OP=U,LO	Produces a list of errors for the update processing.
OP=Z	Statement update option. This is like the update option except that directives are included on the MODVAL command. The Z parameter in this option must be used alone.
OP=Z,LO=E	Initiates the statement update (OP=Z), then lists the errors encountered in processing.
OP=Z,LO=EN or OP=Z,LO	Produces a list of errors for the statement update processing.
P=oldfile	Local file name of the copy of the old validation file that is to be updated or reformatted; default is VALIDUs.
RP	Indicates that passwords do not have to be specified on a create run (can only be used with OP=C). RP should only be used if the input file was created using an OP=S run on an existing user validation file containing passwords with length less than the installation-required minimum.
S=sourcefile	File that will receive source data for each user name; default is SOURCE.
SI	Specifies that the input for a create run (OP=C) was generated by a previous source run (OP=S). The automatic creation of the special user names is suppressed. Special user names are defined later in this section. This parameter should not be used when initially creating a validation file in a secured system.
U=userfile	File containing the available user indices of the current VALIDUs file; default is VALINDs.

Input Directive

An input directive enters user names under a create run (OP=C) and modifies existing user names under an update run (OP=U). The format of the input directive is

/username,ident_1=data_1,ident_2=data_2,...

where username is the one- to seven-character user name being referenced and ident_i=data_i is a system usage definition for this name. Valid characters for username are A through Z, 0 through 9, and *. The user name parameter must begin with a / in column 1. The user name and all other parameters must be terminated by a separator.

Valid separators include any character whose 6-bit display code value exceeds 44_8 (except /, =, and blank), as well as end-of-line. Thus, if an input directive parameter is last on a directive, no other separator need follow it. An asterisk (*) can separate all parameters except user names, charge numbers, and project numbers.

All parameters relative to a user name must appear before another user name or the end of the input stream is encountered.

All data within a user name entry is free format to column 72. A parameter cannot be split between cards or lines. Blanks are ignored. To allow sequencing and/or identification of input directives, all data past column 72 is ignored.

Example:

The following is acceptable.

```
/ROBERTR,AW=CSPF

AW=CLPF
```

However, data cannot continue from line to line.

Example:

The following is not acceptable.

```
/ROBERTR,AW=CSPF,AW=

CLPF.
```

The following is a list of identifiers and their descriptions.

Identifier	Description
AL=al	Application access level. al is a one- or two-digit number in the range 0 through 17_8. This identifier defines the highest level application with which the user can make an application-to-application connection.
AP=appl	Application validation. appl is a one- to seven-character application name that toggles a particular bit in the application permission field (bits 47 through 0) of the application validation word. If more than one application corresponds to a single bit, any of the application names for that bit may be specified for appl. For each bit that is set, a specific application or set of applications is accessible to the user. Blanks are suppressed. The following application permission bits are defined in the application validation word.

appl	Bit	Description
IAF	0	Interactive Facility.
RBF	1	Remote Batch Facility.
TAF	2	Transaction Facility.
MCS	3	Message Control System.
TVF	4	Terminal Verification Facility.

Identifier	Description

appl	Bit	Description
CS†	5	Communication Supervisor. A user validated for this application can become a diagnostic operator, and if also validated for permission bit CNOP, can become a network operator.
PLATO	6	PLATO Education Facility.
ITF	7	Interactive Transfer Facility.
---	8	Reserved for CDC.
---	9	Reserved for CDC.
---	10	Reserved for CDC.
---	11	Reserved for CDC.
AP1	12	Local application 1.
AP2	13	Local application 2.
AP3	14	Local application 3.
---	15-35	Reserved for CDC.
---	36-47	Reserved for installation.

The Network Validation Facility is automatically available to all NAM users; hence, no bit position is defined for this application. By default, no other applications are available to the user (bits 47 through 0 are zero).

To set or clear all application permission bits in the application validation word, the following can be specified for appl.

ALL	Sets all application permission bits in the application validation word.
NUL	Clears all application permission bits in the application validation word.

AW=perm

Access word validation. perm is a four-character designation that toggles a particular permission bit in the access word. For each bit that is set, special permission is allowed to that user. The bit is set when the identifier is first encountered and cleared if the identifier is used again. A maximum of 36 entries per record is allowed. Blanks are suppressed.

†Refer to the NOS 2 Operator/Analyst Handbook for information concerning the network operator and communication supervisor.

Identifier	Description
	The following permission bits are defined in the access word.

perm	Bit	Description
CPWC	0	User can change batch and interactive passwords.
CTPC	1	User can use the access subsystem commands (terminal use only).†
CLPF	2	User can create direct access permanent files.
CSPF	3	User can create indirect access permanent files.
CSOJ	4	User can have system origin capability from any job origin if the debug option is turned on by the operator. User can also assign a device by specifying its EST ordinal. This does not require that the debug option be turned on. User can also call the PP hardware diagnostics of the 881/883 pack reformatting utility FORMAT, if engineering mode is enabled.
CASF	5	User can access the SYSTEM file (with the COMMON,SYSTEM. command).
CAND	6	User can request nonallocatable devices (for example, magnetic tape units).
CCNR	7	User can use system without entry of charge or project number.
CSRP	8	User can issue removable auxiliary device commands.
CSTP	9	Reserved.
CTIM	10	User is not logged off because of timeout.
CUCP	11	User can access system control point facility.
CSAP	12	User has special accounting privileges.††
CBIO	13	User has BIO subsystem privileges.†††

†Refer to the NOS 2 Reference Set, Volume 3 for a description of the access commands.
††Refer to User Accounting for a description of special accounting user privileges.
†††V carriage control character (refer to the NOS 2 Reference Set, Volume 3).

Identifier	Description

perm	Bit	Description
CPRT	14	User can use PROTECT extended memory statements.
CPLK	15	User can access loosely-coupled network for permanent files.
CQLK	16	User can access loosely-coupled network for job or output files.
CUST	17	User can specify a logical identifier on Job or ROUTE command.
CNVE	18	Reserved.
CMNT	19	User can use Remote Diagnostic Facility.
CNOP	20	User can control NPUs (that is, a user who is also validated for the CS application can become a network operator).†
CSAF	21	User can specify alternate family.

By default, all new user names are created with CPWC, CLPF, CCNR, CSPF, and CSAF permissions, unless an AW identifier is entered. In this case, the user is created with only those permissions specified.

To set or clear all permission bits in the access word, the following can be specified for perm.

ALL Sets all permission bits in the access word.

NUL Clears all permission bits in the access word.

CC=cc

Determines the maximum number of batch commands processed for a user. cc consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies unlimited batch command processing. If this identifier is omitted, the system supplies a value of 34_8. The system uses the formula

maximum batch commands = (cc x 20_8) + KCCI††

to calculate the limit of batch commands processed.

†Refer to the NOS 2 Operator/Analyst Handbook for information concerning the network operator.

††Refer to the NOS 2 Installation Handbook for a description of this COMSACC parameter.

Identifier	Description
CM=cm	Determines the maximum central memory space a user is allowed. cm consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies all available central memory space of the machine. If this identifier is omitted, the system supplies a value of 14_8. The system uses the formula central memory limit = (cm x 40_8) + KCMI† to calculate the central memory space limit expressed in units of 100_8 words.
CN=chargenumber	Charge number associated with the user. chargenumber is a 1- to 10-character string. Valid characters are A through Z, 0 through 9, and *. When the default CHARGE command is used (CHARGE,*.), this value is used.
CP=cp	Determines the number of cards that can be punched from a user's routed punch file. cp consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies unlimited punched output. If this identifier is omitted, the system supplies a value of 0. The system uses the formula cards punched = (cp x 100_8) + KCPI† to calculate the limit of cards punched from a routed file.
CS=cs	Cumulative size of all indirect access files for this user. The user is validated for the upper limit corresponding to the cs value specified.

cs	Upper Limit Allowed (Octal Count of PRUs)
0	Use job origin control.
1	1000.
2	2000.
3	5000.
4	10000.
5	50000.
6	100000.
7	Unlimited.

If CS is not specified, CS=0 is assumed.

Identifier	Description
DAC=username	Delete user name. username is the user name that is to be deleted from the VALIDUs file. This user name must match the current user name as specified after the most recent /. This identifier can be used only with update (OP=U) and K display options.

†Refer to the NOS 2 Installation Handbook for a description of these COMSACC parameters.

Identifier	Description
DB=db	Determines the maximum number of jobs the user is allowed to have in the system concurrently; db $\leq$ 7. If db=7, an unlimited number of jobs is allowed. All noninteractive jobs, including queued output files, are counted. If this identifier is omitted, the system supplies a value of 0. The system uses the formula jobs = db x 2 to calculate the limit of jobs. If the user has the permission bit CSOJ set and the system is in debug mode, or the job is system origin, the DB identifier is ignored and an unlimited number of jobs is allowed.
DF=df	Determines the maximum number of MESSAGE requests the user can issue to the system and/or job dayfiles. df consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies unlimited MESSAGE requests. If this identifier is omitted, the system supplies a value of 0. The system uses the formula maximum MESSAGE requests = (df x 20_8) + KDFI† to calculate the limit of job MESSAGE requests.
DS=ds	File size allowed for an individual direct access permanent file. The user is validated for the upper limit corresponding to the ds value specified.

ds	Upper Limit Allowed (Octal Count of PRUs)
0	Use job origin control.
1	1000.
2	2000.
3	5000.
4	10000.
5	50000.
6	100000.
7	Unlimited.

If DS is not specified, DS=0 is assumed.

Identifier	Description
DT=dt	Determines the maximum number of detached jobs the user is allowed to have in the system concurrently. dt consists of two digits followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies an unlimited number of detached jobs is allowed. If this identifier is omitted, the system supplies a value of 0. The system uses the formula detached jobs = dt + KDTI† to calculate the limit of detached jobs.

†Refer to the NOS 2 Installation Handook for a description of these COMSACC parameters.

Identifier	Description
EB=password	Encrypted batch password. A 14 octal digit encrypted password to be used for batch and system origin jobs.
EC=ec	Determines the maximum extended memory space a user is allowed. ec consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies all extended memory space of the machine. If this identifier is omitted, the system supplies a value of 0. The system uses the formula extended memory limit = (ec x 20_8) + KECI† to calculate the extended memory limit expressed in units of 1000_8 words.
EI=password	Encrypted interactive password. A 14 octal digit encrypted password to be used for interactive jobs.
FC=fc	File count. fc is the maximum number of permanent files allowed to the user. The user is validated for the upper limit corresponding to the fc value specified.

fc	Upper Limit Allowed (Octal)
0	Use job origin control.
1	10.
2	20.
3	30.
4	40.
5	50.
6	100.
7	Unlimited.

If FC is not specified, FC=0 is assumed.

Identifier	Description
FS=fs	Maximum file size allowed for an individual indirect access permanent file. The user is validated for the upper limit corresponding to the fs value specified.

fs	Upper Limit Allowed (Octal Count of PRUs)
0	Use job origin control; no controls are enacted.
1	10.
2	30.
3	50.
4	100.
5	150.
6	300.
7	Unlimited.

If FS is not specified, FS=0 is assumed.

†Refer to NOS 2 Installation Handbook for a description of this COMSACC parameter.

Identifier	Description
FUI=userindex	Force user index. userindex is the user index to be assigned to the user name specified after the most recent /, whether the user index is assigned to another user name or not. Use caution with this option because problems can occur when multiple user names are associated with the same user index. If the VALIDUs file is returned to source format (OP=S on MODVAL command) and a new VALIDUs file is created from this source, multiple user name per user index associations will be lost. This identifier can be used only with update (OP=U) and K display options.
IS=subsystem	Initial subsystem for the terminal. One of the following values may be specified for each user name.

subsystem	Description
ACCESS	Access subsystem.
BASIC	BASIC subsystem.
BATCH	Batch subsystem.
EXECUTE	Execute subsystem.
FORTRAN	FORTRAN Version 5 subsystem.
FTNTS	FORTRAN Extended Version 4 subsystem.
NULL	Null subsystem.

LP=lp

Determines the number of lines that can be printed from a user's routed print file. lp consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies unlimited print output. If this identifier is omitted, the system supplies a value of 0. The system uses the formula

lines printed = (lp x 2000_8) + KLPI†

to calculate the limit of lines printed from a routed output file.

MS=ms

Determines the maximum number of mass storage PRUs the user is allowed to additionally allocate. ms consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies unlimited additional mass storage PRUs. If this identifier is omitted, the system supplies a value of 1. The system uses the formula

PRU limit = (ms x 10000_8) + KMSI†

to calculate the PRU equivalent of the actual mass storage tracks additionally allocated to the job files.

†Refer to NOS 2 Installation Handbook for a description of these COMSACC parameters.

Identifier	Description
MT=mt	Number of magnetic tapes allowed; mt $\leq$ 7. If mt=7, unlimited tapes are allowed. If this identifier is omitted, the system supplies a value of 0.
PA=pa	Terminal parity for Remote Diagnostic Facility users. The terminal operates with even or odd parity. One of the following values may be entered for each user name record. **pa** — **Description** EVEN — Terminal operates with even parity. ODD — Terminal operates with odd parity.
PB=password	Batch password. A one- to seven-character password to be used for batch, remote batch, and system origin ojbs. This identifier is processed the same as the PW identifier; however, it applies only to the batch password.
PI=password	Interactive password. A one- to seven-character password to be used for interactive jobs (login to any NAM application). This identifier is processed the same as the PW identifier; however, it applies only to the interactive password.
PN=projectnumber	Project number associated with the user. projectnumber is a 1- to 20-character string. Valid characters are A through Z, 0 through 9, and *. When the default CHARGE command is used (CHARGE,*.), this value is used.
PT=pt	Determines the number of plot units a user is allowed. pt consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies an unlimited number of plot units allowed. If this identifier is omitted, the system supplies a value of 0. The system uses the formula plot unit limit = (pt x 2000_8) + KPTI† to calculate the limit of plot units that a user may have.
PW=password	A four- to seven-character password (A through Z, 0 through 9). Blanks are not significant. This identifier sets both the batch and interactive passwords. The first time PW is entered, when creating a new user name, it also sets the associated password expiration dates to the default value. The minimum required length for passwords can be changed by setting the MODVAL installation parameter RPWL to a value from 0 to 7. The PW identifier is required with OP=C unless the RP parameter is specified on the MODVAL command or the minimum required password length is zero. If this identifier is not required and is omitted, the user must enter a null password at login.

†Refer to the NOS 2 Installation Handbook for a description of this COMSACC parameter.

Identifier	Description
PX=mode	Transmission mode for Remote Diagnostic Facility users. Only one entry should occur per user name record. Since the terminal operates in full or half duplex mode, either of the following values is available for mode.

mode	Description
FULL	System enters echoplex mode automatically.
HALF	System does not enter echoplex mode automatically.

Identifier	Description
RL=ALL	Resource limits. This identifier sets all resource limits to unlimited values. By default, user names SYSTEMX and NETOPS are created with this identifier.

Limits set include:

Identifier	Description
CC	Batch commands.
CM	Central memory field length.
CP	Cards punched.
CS	Cumulative indirect file size.
DB	Deferred batch jobs.
DF	Dayfile messages.
DS	Direct access file size.
DT	Detached jobs.
EC	Extended memory field length.
FC	Permanent file count.
FS	Indirect access file size.
LP	Lines printed.
MS	Mass storage PRUs.
MT	Magnetic tapes.
PT	Units plotted.
RP	Removable disk packs.
SL	SRU limit.
TL	CPU time limit.

Identifier	Description
RP=rp	Number of removable disk packs allowed; rp $\leq$ 7. If rp=7, unlimited removable disk packs are allowed. If this identifier is omitted, the system supplies a value of 0.
RO=ro	Rubout count for Remote Diagnostic Facility users which is the character count delay associated with the user's terminal. ro consists of two numeric characters followed by a radix. Blanks are suppressed. One value from 0 to 37_8 may be entered for each user name record. A value of 37_8 denotes that the system will use the default number for the user's terminal type.
SAC=category	Security access categories. category is a one- to seven-character symbolic name that toggles a particular bit in the access category field (bits 31 through 0) of the security validation word. For each bit that is set, the corresponding access category is available to the user. Blanks are suppressed. These validations are checked only in a secured system.

The following access category bits are defined in the security validation word.

category†	Bit	Description
CATnn	nn	User is validated for access category nn (00 $\leq$ nn $\leq$ 31).

To set or clear all access category bits in the security validation word, the following can be specified for category.

ALL Sets all access level validation bits.

NUL Clears all access level validation bits.

SAL=level

Security access levels. level is a one- to seven-character symbolic name that toggles a particular bit in the access level field (bits 47 through 36) of the security validation word. For each bit that is set, the corresponding access level is available to the user. Blanks are suppressed.

In a secured system, a user must be valid for at least one access level in order to use the system. These validations are not checked in an unsecured system.

The following access level bits are defined in the security validation word.

†The site can redefine the names associated with the access categories. These are default values, which are defined in common deck COMSMLS.

Identifier	Description

level[†]	Bit	Description
LVL7	43	User is validated for access level 7.
LVL6	42	User is validated for access level 6.
LVL5	41	User is validated for access level 5.
LVL4	40	User is validated for access level 4.
LVL3	39	User is validated for access level 3.
LVL2	38	User is validated for access level 2.
LVL1	37	User is validated for access level 1.
LVL0	36	User is validated for access level 0.

By default, all new user names are created with LVL0 validation, unless a SAL identifier is entered. In this case, the user is created with only those access levels specified.

To set or clear all access level bits in the security validation word, the following can be specified for level.

ALL Sets all access level validation bits.

NUL Clears all access level validation bits.

SAV=privilege

Security access validation. This identifier sets privileges that apply to both secured and unsecured systems. privilege is a four-character designation that toggles a particular bit in the privilege field (bits 59 through 48) of the security validation word. For each bit that is set, the corresponding special permission is allowed to that user. A bit is set when the identifier is first encountered and cleared if the identifier is used again. Blanks are suppressed.
The following privilege bits are defined in the security validation word.

privilege	Bit	Description
CSAP	59	User has security administrator privileges. This bit cannot be cleared by its owner; that is, the user executing MODVAL and clearing this permission bit must not be the user whose permission is being cleared.
COLD	58	User can execute on-line diagnostics. This bit applies to both secured and unsecured systems.

†The site can redefine the names associated with the access levels. These are default values, which are defined in common deck COMSMLS.

Identifier	Description

privilege	Bit	Description
CPWX	57	User can assign user password expiration date or term. This bit applies to both secured and unsecured systems.
CFPX	56	User can assign permanent file password and permit expiration date or term. This bit applies to both secured and unsecured systems.
CLJL	55	User can lower (downgrade) the access level of a job. This bit applies to secured systems only.
CLFL	54	User can lower (downgrade) the access level of local or permanent files. This bit applies to secured systems only.
CWLF	53	User can write to or extend files that are at a lower access level than the user's job (write-down privilege). This bit applies to secured systems only.
CULT	52	User can write to unlabeled magnetic tapes. This bit applies to both secured and unsecured systems.

To set or clear all privilege bits in the security validation word, the following can be specified for privilege.

ALL Sets all privilege validation bits.

NUL Clears all privilege validation bits.

SC=count† Security count. This identifier specifies the number of security conflicts allowed before the user is denied access to the system. The security count is decremented by the system when any security conflict occurs. A value of 77_8 indicates an unlimited security count; 0 indicates no access is allowed. If not specified, the default value is SC=50_8. The security count is not included as output from a LIMITS command.

SH=sh Shell program name. sh is a one- to seven-character name of the shell program for screening user commands. For the Remote Diagnostic Facility, the system library program name is RMSHELL.

†If the user name has security administrator privileges (CSAP security privilege), the expiration dates for both batch and interactive passwords are forced to be nonexpiring. The security count is forced to be unlimited. These values are set automatically and cannot be changed.

Identifier	Description
SL=sl	Determines the maximum SRU accumulation for a user's job. sl consists of two numeric characters followed by a radix. All blanks are suppressed. The maximum value is 77_8, specifying unlimited SRU accumulation. If this identifier is omitted, the system supplies a value of 0. The system uses the formula maximum SRU accumulation = $[(sl \times 100_8) + KSLI] \times 10_8$† to calculate the maximum SRU accumulation that a user's job may have.
SO=option	Shell control option. option is a four-character symbolic name that toggles a particular bit in the shell program control word (bits 0 through 6). Each bit that is set identifies a privilege allowed for a remote terminal maintenance user. The bit is set when the identifier is first encountered and cleared if the identifier is used again.

option	Bit	Description
ABTM	0	Clears shell processing if screening program aborts.
LFID	1	Allows load of shell program from local file.
GLID	2	Allows load of shell program from global library.
SLID	3	Allows load of shell program from system library.
TCSM	4	System monitors commands directly from terminal input.
BCSM	5	System monitors commands outside procedures.
CCLM	6	System monitors commands inside procedures.

By default, all new user names are created with shell options SLID and BCSM, unless an SO identifier is entered. In this case, the user is created with only those options specified.

Identifier	Description
SP=sp	System prologue name. sp is a two-digit octal permanent file index that identifies the system prologue to execute. If specified, the prologue named PROCsp will be executed as the first commands of each job belonging to this user. The system prologue file PROCsp must be a permanent file under UN=LIBRARY, permitted to SYSTEMX.

†Refer to the NOS 2 Installation Handbook for a description of this COMSACC parameter.

Identifier	Description
TC=tc	Default character set to be used by the terminal. One of the following values is available for each user name.

tc	Description
NORMAL	ASCII graphic 63/64-character set.
ASCII	ASCII 128-character set.

TL=tl

Determines the maximum CPU time that a user's job step may run. tl consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77_8, which specifies unlimited CPU time for each job step. If this identifier is omitted, the system supplies a value of 0. The system uses the formula

$$\text{CPU time limit} = [(\text{tl} \times 100_8) + \text{KTLI}] \times 10_8{}^{\dagger}$$

to calculate the maximum CPU time that a user's job step may run.

Further, for interactive jobs the sytem establishes a lower bound for the CPU time limit. The lower bound is determined by selecting the larger value of the CPU time limit described above or the CPU time limit calculated by multiplying UTIS†† by 10_8.

TT=tt

Terminal type for Remote Diagnostic Facility users. One of the following values may be specified for each user name.

tt	Description
TTY	Teletype or other ASCII compatible terminal.
BLKEDT	Block mode terminal.
713	CDC 713 display terminal.

UC=otsc

User default service class for each origin type. ot is a two-character display code mnemonic for origin type and sc is a two-character display code mnemonic for the corresponding user default service class.

†Refer to the NOS 2 Installation Handbook for a description of this COMSACC parameter.
††Refer to the NOS 2 Installation Handbook for a description of this COMSREM parameter.

Identifier	Description
	The following origin types and service classes may be specified.

ot	Description
BC	Batch origin type.
RB	Remote batch origin type.
IA	Interactive origin type.

sc	Description
SY	System service class.
BC	Batch service class.
RB	Remote batch service class.
TS	Interactive service class.
DI	Detached interactive service class.
NS	Network supervisor service class.
MA	Maintenance service class.
CT	Communication task service class.
I0	Installation service class 0.
I1	Installation service class 1.
I2	Installation service class 2.
I3	Installation service class 3.

The default service class for each origin type follows.

ot	sc	Description
BC	BC	Batch.
RB	RB	Remote batch.
IA	TS	Interactive.

The origin type is always required. If a service class is also specified, it is assigned as the user default service class for the selected origin type. If no service class is specified, the default service class for the selected origin type is assigned as the user default.

Identifier	Description
UI=userindex	User index to be assigned to this user. If this entry is not supplied, the system assigns the next available user index. userindex consists of six numeric characters followed by a radix. Blanks are suppressed. The maximum value is 377777_8. This identifier cannot be used with the K display or update option.
UP=up	User prologue name. up is a one- to seven-character permanent file name that identifies the user prologue to execute. If specified, the user prologue will be executed as the first commands of each job belonging to the user, following the system and project prologues, if any.
VM=sc	Service classes that a user will be allowed to select. sc is a two-character service class symbol that toggles a particular bit in the validation mask. For each bit that is set, the corresponding service class is allowed to that user. A bit is set when the identifier is first encountered and cleared if the identifier is used again.

After the VM identifier is processed, the bits corresponding to the service classes specified by the UC identifier (or the defaults) are set. Therefore, all users are validated to use the user default service classes specified by the UC identifier regardless of what is specified by the VM identifier (including NUL).

The following service classes may be specified.

sc	Bit	Description
SY	1	System service class.
BC	2	Batch service class.
RB	3	Remote batch service class.
TS	4	Interactive service class.
DI	5	Detached interactive service class.
NS	6	Network supervisor service class.
	7	Reserved.
MA	8	Maintenance service class.
CT	9	Communication task service class.
I0	10	Installation service class 0.
I1	11	Installation service class 1.
I2	12	Installation service class 2.
I3	13	Installation service class 3.

Identifier	Description
	To set or clear all service class bits in the validation mask, the following can be specified for sc. ALL Sets all service class validation mask bits. NUL Clears all service class validation mask bits.
XB=yymmdd†	Batch expiration date. This identifier is the same as the XD identifier except that only the batch password expiration date is set.
XD=yymmdd†	Expiration date. This identifier sets the password expiration date for the batch and interactive passwords to yymmdd. The default date is site defined.
XI=yymmdd†	Interactive expiration date. This identifier is the same as the XD identifier except that only the interactive password expiration date is set.
XT=term†	Password expiration date by term. This identifier adds a one- to four-digit expiration term value to the current date to calculate a new batch and interactive password expiration date. The term value can be from 0 to 4095 (7777_8). Decimal is assumed unless the post radix B is specified. The default term value is site defined, and is used to calculate the expiration date when neither XD nor XT is specified when creating a new user name. XT=0 sets the password expiration date to immediately expire. This is done to temporarily disable a password without deleting it from the validation file. The password expiration date can be set to nonexpiring by entering XT=4095 or XT=7777B or XT=*.
XTB=term†	Batch password expiration date by term. This identifier is the same as the XT identifier except that only the batch password expiration date changes.
XTI=term†	Interactive password expiration date by term. This identifier is the same as the XT identifier except that only the interactive password expiration date changes.

†If the user name has security administrator privileges (CSAP security privilege), the expiration dates for both batch and interactive passwords are forced to be nonexpiring. The security count is forced to be unlimited. These values are set automatically and cannot be changed.

EXAMPLES OF MODVAL USE

The examples in this section give representative commands for exercising the MODVAL options both at the console and by batch input. System files are under user index 377777_8. Refer to section 7 for definitions of the ISF and GENVAL commands.

NOTE

These examples apply only to an unsecured system. In a secured system, the SUI command is not valid, so a USER,SYSTEMX, password. command must be used instead. In examples where the SUI command is used before a validation file exists, a GENVAL command must be used to create a validation file before the USER,SYSTEMX,password. command is executed.

Example 1:

Example 1 is a create at the console with the C,username format. MODVAL is called and the B display indicates the job sequence name for the job (jsn). This is entered via the K display. Following this is an entry of three user names with a password identifier for each.

```
X.MODVAL.

K,jsn.

K.C,USER201

K.PW=ADMIT1

K.END

K.C,USER202

K.PW=ADMIT2

K.END

K.C,USER203

K.PW=ADMIT3

K.END

K.END.
```

Example 2:

In example 2, the previous parameters are entered at the console with the / format.

```
X.MODVAL.

K,jsn.

K./USER201,PW=ADMIT1

K./USER202,PW=ADMIT2

K./USER203,PW=ADMIT3

K.END

K.END.
```

Example 3:

In example 3, the same entries are made as a batch job with default values used for the file names. The following is the command input.

```
ujn.

USER,username,password,familyname.

CHARGE,*.

MODVAL,OP=C.

SAVE,NEWVAL.

SAVE,VALINDs=VAL.

--EOR--

/USER201,PW=ADMIT1

/USER202,PW=ADMIT2

/USER203,PW=ADMIT3

--EOI--
```

This produces indirect access permanent files. These will be made direct access permanent files in the system from the console. The system index (377777_8) must be specified. Input at the console is:

```
X.DIS.

USER,username,password,familyname.

   or SUI,userindex     where userindex is the user index for username.

      FAMILY,familyname.

GET,NEWVAL.

GET,VAL.

SUI,377777.
```

If a VALIDUs file already exists on the system, it will be necessary, at this point, to enter the following from DSD:†

IDLEFAMILY,est.	where est is the EST ordinal of the device to be idled. This is the master device for user index 377777_8 (where the VALIDUs file resides).

When the user count is zero (idle family situation), the IDLEFAMILY command must be entered again so that the system will accept the ISF command.

Under DSD:

```
IDLEFAMILY,est.
```

Under DIS:

```
ISF,R=VALIDUs,FM=familyname.

PURGE,VALIDUs,VALINDs.

DEFINE,VALIDUs,VALINDs.

COPY,NEWVAL,VALIDUs,V.

COPY,VAL,VALINDs,V.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs,FM=familyname.
```

†Before ISF,R=VALIDUs. can be entered, the system must be emptied of all executing jobs. This can be a time-consuming task. Refer to the NOS 2 Operator/Analyst Handbook for more information about the IDLEFAMILY command.

Example 4:

In example 4, the previous create is run with file names supplied. It is assumed that the following indirect access file is on mass storage before the batch input is submitted.

File PUTIN:

```
/USER201,PW=ADMIT1

/USER202,PW=ADMIT2

/USER203,PW=ADMIT3
```

The batch input is:

```
ujn.

USER,username,password,familyname.

CHARGE,*.

GET,PUTIN.

MODVAL,OP=C,I=PUTIN,N=VALNEW.

SAVE,VALNEW.

SAVE,VALINDs=VALX.

--EOI--
```

After this job is executed, the following entries are made at the console.

```
X.DIS.
```

Under DIS:

```
USER,username,password,familyname.

    or SUI,userindex.   where userindex is the user index for user name.

        FAMILY,familyname.

GET,VALNEW.

GET,VALX.

SUI,377777.
```

If a VALIDUs file already exists on the system, it will be necessary, at this point, to enter the following:†

Under DSD:

IDLEFAMILY,est. where est is the EST ordinal of the device to be idled. This is the master device for user index 377777_8 (where the VALIDUs file resides).

When the user count is zero (idle family situation), the IDLEFAMILY command must be entered again so that the system will accept the ISF command.

Under DSD:

```
IDLEFAMILY,est.
```

Under DIS:

```
ISF,R=VALIDUs,FM=familyname.

PURGE,VALIDUs,VALINDs

DEFINE,VALIDUs.

DEFINE,VALINDs.

COPY,VALNEW,VALIDUs,V.

COPY,VALX,VALINDs,V.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs,FM=familyname.
```

†Before ISF,R=VALIDUs. can be entered, the system must be emptied of all executing jobs. This can be a time-consuming task. Refer to the NOS 2 Operator/Analyst Handbook for more information about the IDLEFAMILY command.

Example 5:

Example 5 is an update at the console with the U,username format. The first two user names entered via the previous creates have their passwords changed.

```
X.MODVAL.

K,jsn.

K.U,USER201

K.PW=ENTER1

K.END

K.U,USER202

K.PW=ENTER2

K.END

K.END.
```

Example 6:

In example 6, the previous parameters are entered at the console with the / format.

```
X.MODVAL.

K,jsn.

K./USER201,PW=ENTER1

K./USER202,PW=ENTER2

K.END

K.END.
```

Example 7:

In example 7, the previous update is entered by means of batch input. First, the direct access permanent files VALIDUs and VALINDs are copied to permanent files (direct or indirect) that can be accessed by the batch input and used in the MODVAL command. Before this is done at the console as follows, an idle family situation must be created and the ISF,R=VALIDUs. command must be entered. Refer to the DSD command, IDLEFAMILY, in the NOS 2 Operator/Analyst Handbook.

```
X.DIS.

SUI,377777.

ATTACH,VALIDUs,VALINDs.

COPY,VALIDUs,VAL.

COPY,VALINDs,VALX.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs.

USER,username,password,familyname.

SAVE,VAL,VALX.
```

The batch input is:

```
ujn.

USER,username,password,familyname.

CHARGE,*.

GET,VAL,VALX.

MODVAL,OP=U,P=VAL,U=VALX.

REPLACE,VAL,VALX.

--EOR--

/USER201,PW=ENTER1

/USER202,PW=ENTER2

--EOI--
```

The modified files are returned to the system at the console. The M=W in the ATTACH is needed to establish write permission relative to the direct access files. However, before this is done, an idle family situation must be created and an ISF,R=VALIDUs. command must be entered. Refer to the DSD command, IDLEFAMILY, in the NOS 2 Operator/Analyst Handbook.

```
X.DIS.

SUI,userindex.

FAMILY,familyname.

GET,VAL,VALX.

SUI,377777.

ATTACH,VALIDUs,VALINDs/M=W.

COPY,VAL,VALIDUs.

COPY,VALX,VALINDs.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs,FM=familyname.
```

If the OP=Z option is used, it is not necessary to provide an input file and save it under 377777_8. The Z option makes the changes directly as follows:

```
X.DIS.

MODVAL,OP=Z./USER201,PW=ENTER1

    (one user at a time)
```

Example 8:

In example 8, a delete is done from the console only.

```
X.MODVAL.

K,jsn.

K.D.USER203.

K.END.
```

Example 9:

In example 9, reformatting of the validation file is initiated from the console. Before DIS is used, and commands are typed in (no K display), an idle family situation must be created and the ISF,R=VALIDUs. command must be entered. Refer to the DSD command, IDLEFAMILY, in the NOS 2 Operator/Analyst Handbook. The OUTPUT file will have a listing of the purged indices.

```
X.DIS.

SUI,377777.

ATTACH,VALIDUs,VALINDs/M=W.

MODVAL,OP=R.

REWIND,VALIDUs,NEWVAL.

COPY,NEWVAL,VALIDUs.

OUT.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs.
```

Example 10:

In example 10, to reformat the validation file with batch input, the direct access files have indirect access copies made via the console. Before this is done, an idle family situation must be created and the ISF,R=VALIDUs. command must be entered. Refer to the DSD command, IDLEFAMILY, in the NOS 2 Operator/Analyst Handbook.

```
X.DIS.

SUI,377777.

ATTACH,VALIDUs,VALINDs.

COPY,VALIDUs,VAL.

COPY,VALINDs,VALX.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs.

USER,username,password,familyname.

SAVE,VAL,VALX.
```

Then, the batch input is:

```
ujn.

USER,username,password,familyname.

CHARGE,*.

GET,VAL,VALX.

MODVAL,OP=R,P=VAL,U=VALX.

SAVE,NEWVAL.

REPLACE,VALX.

--EOI--
```

Then from the console, the following is entered after an idle family situation has been created and the ISF,R=VALIDUs. command has been entered. Refer to the DSD command, IDLEFAMILY, in the NOS 2 Operator/Analyst Handbook.

```
X.DIS.

SUI,userindex.

FAMILY,familyname.

GET,NEWVAL,VALX.

SUI,377777.

ATTACH,VALIDUs,VALINDs/M=W.

COPY,NEWVAL,VALIDUs,V.

COPY,VALX,VALINDs,V.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs,FM=familyname.
```

Instead of the ATTACH, in which each COPY writes over an old file, it is possible to use

```
PURGE,VALIDUs,VALINDs.

DEFINE,VALIDUs,VALINDs.
```

and then copy onto the empty files.

Example 11:

In example 11, the validation file is returned to source code via the console.

```
X.DIS.

SUI,377777.

MODVAL,OP=S,FA.

SAVE,SOURCE.
```

Later, this source code file could be used to create a new VALIDUs file with:

```
GET,SOURCE.

MODVAL,OP=C,I=SOURCE,SI.
```

The SI parameter suppresses the automatic creation of the special user names.

Example 12:

In example 12, the validation file is returned to source code using batch input. Before this is done, an idle family situation must be created and the ISF,R=VALIDUs. command must be entered. Refer to the DSD command, IDLEFAMILY, in the NOS 2 Operator/Analyst Handbook.

```
X.DIS.

SUI,377777.

FAMILY,familyname.

ATTACH,VALIDUs,VALINDs.

COPY,VALIDUs,VAL.

COPY,VALINDs,VALX.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs,FM=familyname.

USER,username,password,familyname.

SAVE,VAL,VALX.
```

The batch input is:

```
ujn.

USER,username,password,familyname.

CHARGE,*.

GET,VAL,VALX.

MODVAL,OP=S,P=VAL,U=VALX.

SAVE,SOURCE.
```

From the console:

```
X.DIS.

USER,username,password,familyname.

GET,SOURCE.

SUI,377777.

SAVE,SOURCE.
```

Example 13:

In example 13, a validation file from an existing system (pre-NOS 2.2) is converted to NOS 2.2 format. The analyst first deadstarts the existing system and then enters the following sequence of commands at the console.

```
X.DIS.

SUI,377777.

DEFINE,SOURCE.

MODVAL,OP=S,FA.

DROP.
```

When the validation file is successfully converted to source, any security validations, service class validations, or password expiration dates must be edited into the newly created source file by supplying appropriate directives. The analyst deadstarts a NOS 2.2 system and enters the following sequence of commands at the console. However, if ISF has already been done, an ISF,R=VALIDUs. command must first be entered. To do this an idle family situation must be created using the IDLEFAMILY command (refer to the NOS 2 Operator/Analyst Handbook).

Note that the SI parameter should not be used when initially creating a NOS 2.2 validation file. Special user names such as SYSTEMX must be recreated with new parameter values. Directive errors should be expected when doing this; they occur due to duplicate definitions of the special user names and should be ignored.

```
X.DIS.

SUI,377777.

PURGE,VALIDUs,VALINDs.

DEFINE,VALIDUs,VALINDs.

ATTACH,SOURCE.

MODVAL,OP=C,I=SOURCE,N=VALIDUs,CV=F.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs.

DROP.
```

NOTE

It is not possible to use the source file from a NOS 2.2 validation file to create a validation file for a pre-NOS 2.2 system. Since the passwords are kept in encrypted form, they cannot be used to generate the necessary PW=password directives.

Example 14:

In example 14, a VALIDUs file and a VALINDs file are created when there are no VALIDUs and VALINDs files already present; that is, an initial VALIDUs file and an initial VALINDs file are created.

The local file PUTIN contains input directs for three user names.

```
/USER201,PW=ADMIT1

/USER202,PW=ADMIT2

/USER203,PW=ADMIT3
```

The following are entered at the console.

```
X.DIS.

SUI,377777.

DEFINE,VALIDUs,VALINDs.

MODVAL,I=PUTIN,N=VALIDUs,OP=C.

RETURN,VALIDUs,VALINDs.

ISF,E=VALIDUs.
```

Example 15:

In example 15, the validation file is updated by a system origin job using a directive file created by a batch job.

The batch job does the following:

1. Creates a directive file with the desired changes.

2. Uses local copies of the current VALIDUs/VALINDs files to verify that the input directives are correct. The local copies of the validation files must have been previously created by a system origin job and saved for future use. Note that the current running validation file can be changed by using the PASSWOR, CHVAL, or UPROC commands (refer to the NOS 2 Reference Set, Volume 3).

3. Saves the directive file as a permanent file, whose existence indicates a MODVAL update should be performed. The directive file should be permitted to user name SYSTEMX.

The system origin job is initiated from the system console and periodically checks for the existence of the directive file. A procedure should be defined on file PROCFIL under user name SYSTEMX. The procedure is initiated using the following command.

```
X.BEGIN (procedure)
```

The procedure for this example is:

```
.PROC,procedure.

WHILE,TRUE,LOOP.

GET,file/UN=user,NA.            (file is the directive file saved under user name user.)

IF,FILE(file,AS),UPMOD.

MODVAL,OP=U,FA,I=file.

PURGE,file.

ENDIF,UPMOD.

ROLLOUT,1200.                   (Check again in 20 minutes.)

ENDW,LOOP.
```

SPECIAL USER NAMES

User names whose user indexes are greater than AUIMX (which is defined as 377700_8 in common deck COMSACC) are considered special user names. To protect special user names from unauthorized access and to prohibit user access to the system using special user names, all special user names are invalid during login or on USER commands (except from system origin jobs). Permanent files may be created under the special user names by special system jobs or from system origin jobs.

During a MODVAL creation run, if the SI parameter is not specified on the MODVAL command, 14 special user names are created. These include eight special user names that are used in an MSS environment (SUBFAMi,i=0,1,...,7), the network operations user name (NETOPS), the PLATO user name (PLATOMF), the application library user name (APPLLIB), the flawed files user name (FLAWPF), the library user name (LIBRARY), and the system user name (SYSTEMX). These user names are automatically created; no action by the analyst is required. The following directives create these special user names.

```
/SUBFAM0,UI=377760B,AW=ALL,PW=SUBFAM0,XT=0.
/SUBFAM1,UI=377761B,AW=ALL,PW=SUBFAM1,XT=0.
                  .
                  .
                  .
/SUBFAM7,UI=377767B,AW=ALL,PW=SUBFAM7,XT=0.
/NETOPS,UI=377772B,AW=ALL,PW=NETOPSX,AP=ALL,RL=ALL,XT=0.
/PLATOMF,UI=377773B,AW=ALL,PW=PLATOMF,XT=0.
/APPLLIB,UI=377774B,AW=ALL,PW=APPLLIB,XT=0.
/FLAWPF,UI=377775B,AW=ALL,PW=FLAWPFX,XT=0.
/LIBRARY,UI=377776B,AW=ALL,PW=LIBRARY,XT=0.
/SYSTEMX,UI=377777B,AW=ALL,PW=SYSTEMX,SAL=ALL,SAV=ALL,RL=ALL.
```

Permanent files cataloged under the SUBFAMi,i=0,1,...7, user names are used during MSS processing as discussed in section 3. If a MODVAL creation run is not redone, these user names must be added manually.

NOTE

User indexes 377775_8 and 377760_8 through 377767_8 are used for special purposes in the permanent file system. Because of this, PFDUMP will dump only certain specific files on these user indexes. Therefore, do not attempt to save files on these user indexes.

Permanent files cataloged under the NETOPS user name are network description files which describe the physical and logical configuration of hardware and software elements that comprise the terminal network.

Permanent files cataloged under the PLATOMF user name are defined and used by the PLATO application.

Permanent files cataloged under the APPLLIB user name are application programs that are application usage accounted. Many users access these programs, but they are charged accordingly. All programs to be application usage accounted must be direct access and have execute-only mode. Files cataloged under the APPLLIB user name should be cataloged with the appropriate permanent file category, passwords, and permit information to allow the desired alternate users access to the files.

The FLAWPF user name is used by PFLOAD to designate sectors in the indirect access file chain which have flaws (sectors which produce disk errors when accessed).

Permanent files cataloged under the LIBRARY user name are usually accessed by many users with the interactive LIB command. They can also be accessed with the OLD, GET, or ATTACH commands. (Refer to the NOS 2 Reference Set, Volume 3 for further information.) Typically, the information saved under user name LIBRARY consists of indirect access permanent files containing programs or text of general interest, such as application programs. Files cataloged under the LIBRARY user name should be cataloged with the appropriate permanent file category, passwords, and permit information to allow the desired alternate users access to the files.

Permanent files cataloged under the SYSTEMX user name are validation, project profile, resource, network files, terminated dayfiles, and maintenance and job initiation procedures. Ordinary users should not be able to access this information.

When MODVAL creates the default special user names SUBFAM0 through SUBFAM7, NETOPS, PLATOMF, APPLLIB, FLAWPF, and LIBRARY, it sets the associated passwords as immediately expiring. These passwords are public knowledge since they appear in the source to MODVAL; setting them as immediately expiring forces the security administrator to change these passwords and reset the expiration dates before the special user names can be used. The passwords must be changed from user name SYSTEMX which has a nonexpiring password. The security administrator should also change the password for user name SYSTEMX since it also appears in MODVAL.

USER ACCOUNTING

The special system file PROFILa† contains the information required to control a user's accounting and access to the system. This access is controlled not only by charge numbers and project numbers but also by time in, time out, expiration for charge and project numbers, accumulated SRUs, and up to eight accumulated resources defined by the installation.†† In addition, all exercise of this access by individual users is written by the system to the accounting dayfile, thereby affording the customer a time-log as a basis for account billing. The accumulated SRUs are updated when a user's job terminates or when another CHARGE command is executed.

---

†In this manual, the user validation and accounting files are referred to as VALIDUs, VALINDs, and PROFILa. Refer to table 5-1 for a list of file names that correspond to the appropriate operating system levels.

††Limit and accumulation fields for these eight installation-defined resources have been reserved in PROFILa and are checked for exhaustion of the corresponding resource by routine CHARGE. However, the system provides no facility to dynamically update the accumulation fields as these resources are being used.

PROFILa affords three levels of job accounting.

Level of Accounting	Description
Charge Number	This is the primary division of the customer's job accounting structure. It is a 1- to 10-character billing identifier. Charge numbers can only be entered onto PROFILa by the analyst in a system origin job or by a special accounting user, and their associated parameters may be changed according to the hierarchy of access described later in this section.
Project Number	This is an optional second-level division of the charge number. It is a 1- to 20-character identifier of a particular company project. The project number can be followed by time-access, resource limits, project prologue, and project epilogue parameters for this project. Users who have been declared master users can enter and change project numbers and their associated parameters.
User Name	The third level is a one- to seven-character identifier of the individual user who is allowed access to a designated company project. This is the same user name that VALIDUs furnishes to verify system access (refer to User Validation earlier in this section). User names are entered and deleted by the master user. A user can be validated for more than one project in the same charge category or in different ones.

Although charge numbers, project numbers, and user names can be entered by the analyst at the console, practical dictates of a production situation usually require the analyst to create only a shell of the PROFILa file; that is, he enters just the charge numbers and the associated master users. This relatively constant information is furnished by the customer. Following this, the master users will update the PROFILa file with the projects and users that are under their direct cognizance. Then, if a user's validation for system access includes bit 7 of the access word being clear (AW=CCNR, MODVAL Input Directive section), this user must enter valid charge and project numbers.

There are three classifications of access and modification to PROFILa:

- System origin jobs.
- Special accounting users (CSAP set in the user access validation word).
- Master users.

These classes are listed in the order of the capability they provide. System origin jobs have complete access to PROFILa, with no restrictions regarding PROFILE options and directives. Special accounting users from nonsystem origin jobs have full capabilities on update, list, and inquire runs but may not perform create, source, or reformat runs. Master users from nonsystem origin jobs may not change any charge number entry parameters (such as SRU multiplier indices) or installation-related project number entry parameters (such as installation accumulators or project expiration date). A master user may alter values pertaining only to charge numbers for which that user is the defined master user.

This two-stage structuring of a PROFILa file is illustrated in figure 5-4.

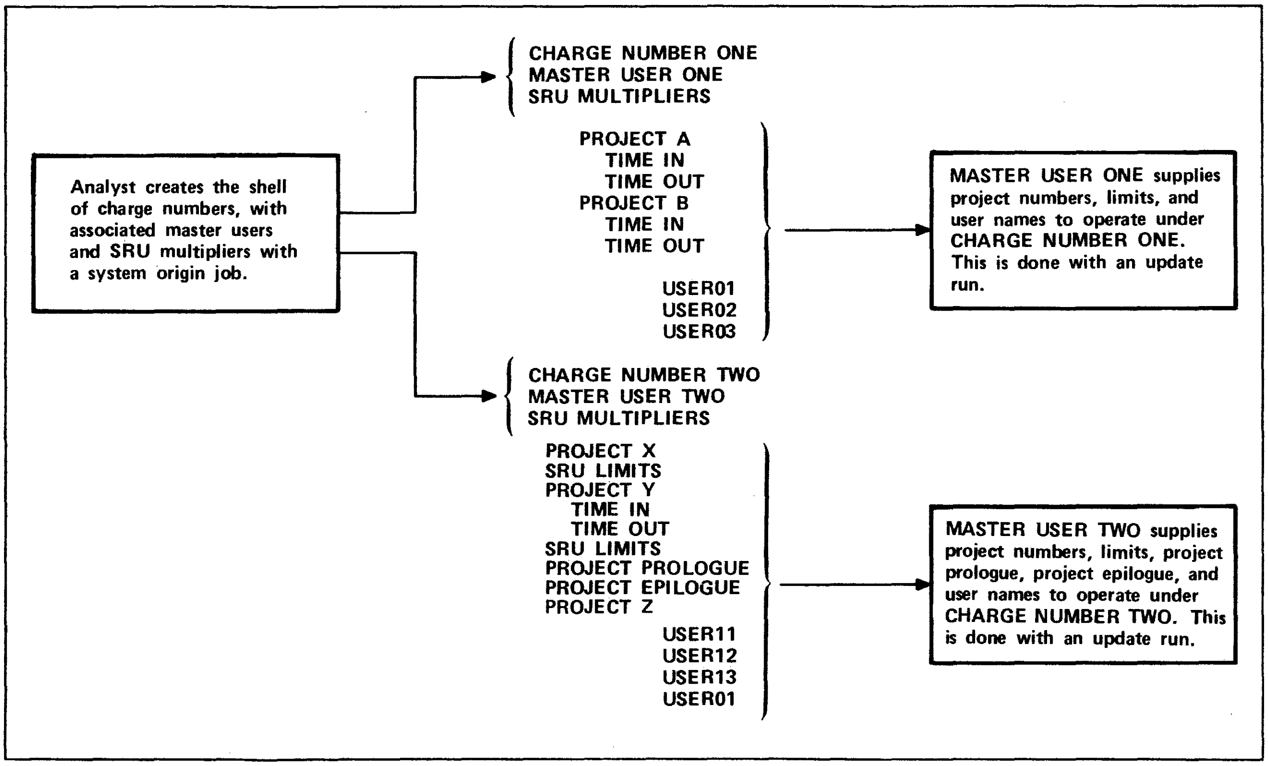


Figure 5-4. Representative Structure of a PROFILa File

PROFILa PROJECT PROFILE MANAGER

The program PROFILE uses the special system file supervisor (SFS) to create and manage the project profile file, PROFILa. Creation of PROFILa can only be done from the console via a system origin job (refer to PROFILE Console Input). Access and modification of an existing PROFILa file can be done from console, card reader (refer to PROFILE Batch Input), or from an interactive terminal (refer to PROFILE Execution from a Terminal), depending on the option. In all cases, options are called into execution with the PROFILE command. The format of the command is

PROFILE, $p_1, p_2, \ldots, p_n$.

where p_i is the identification used in defining project profile operations and files.

Analyst (System Origin Job) Identifications

Identification	Description
OP=C	Create option. Input directives are processed so as to create a new PROFILa file. Directives are entered through the input file. Because this option defines a new project file, it must be previously undefined. This is the only option which does not require an existing project file containing at least one charge number.
OP=K	K display option. All other options (multiple OP specifications) are cleared and instructions must be entered via the K display. For a system origin job, if no parameters are specified and the command is PROFILE. the K display option is automatically selected. In all other cases, OP=U is the default.
OP=R	R indicates a restructure run that rebuilds a copy of the current PROFILa file, discarding any deleted entries and reconstructing the directory to reduce file access. The existing PROFILa file is replaced with this restructured file. OP=R must not be specified if the PROFILa file is attached to any job or is in fast-attach status. Refer to the ISF command, section 7, for information on fast-attach files.

Identification	Description
OP=S	S indicates a source run that returns the PROFILa file to source format (directive images) and places this source code on the source file (either S=source or SOURCE). This source file is used as the input for a later create or update.
FM=familyname	Name of the family the user wishes PROFILE to access. This option can only be specified from a system origin job.
S=filename	File to receive PROFILa source data for the option OP=S. Default is SOURCE.
OP=L,LO=F	Produces a full listing of the whole PROFILa file; figure 5-5 is an example.
OP=L,LO=C	Produces a listing of charge numbers only for the whole PROFILa file; figure 5-6 is an example.
OP=L,LO=P	Produces a complete charge number and project number listing for the whole PROFILa file; figure 5-7 is an example.

```
PROFILC FULL FILE LIST      OF FULL FILE.                  PAGE     1
        CHARGE NUMBER                            83/06/30. 18.09.24.

     1. 0552
           CONTROLS FOR CHARGE NUMBER 0552

            CREATION DATE    83/04/27.    EXPIRATION DATE  UNDEFINED
            ENTRY *ACTIVE*                PROJECT COUNT = 5
            MU  = GSY2447                 PCL = (NO LIMIT)
            ISL = 77B        (NO LIMIT)   IR1 = 77B        (NO LIMIT)
            IR2 = 77B        (NO LIMIT)   IR3 = 77B        (NO LIMIT)
            IR4 = 77B        (NO LIMIT)   IR5 = 77B        (NO LIMIT)
            IR6 = 77B        (NO LIMIT)   IR7 = 77B        (NO LIMIT)
            IR8 = 77B        (NO LIMIT)
            M1  = 77B        (   1.000)   M2  = 74B        (   0.143)
            M3  = 6B         (   0.006)   M4  = 77B        (   0.003)
            AD  = 77B        (   0.000)
```

Figure 5-5. Full File List (OP=L,LO=F) (Sheet 1 of 2)

```
            CONTROLS FOR PROJECT NUMBER 0E00356

              CREATION DATE    83/04/27.    LAST CHANGE DATE 83/06/30.
              LAST UPDATE DATE UNDEFINED    LAST UPDATE TIME UNDEFINED
              ENTRY *ACTIVE*                EXPIRATION DATE  UNDEFINED
              TI  = 0000                    TO  = 0000
              PFN = PPROLOG                 EFN = PEPILOG
              PUN = USERNAM                 EUN = USERNAM
              PPW = *******†                EPW = *******†
              PCR = A                       ISV = 77B       (NO LIMIT)
              SML = (NO LIMIT)              SMA = 45707
              SIL = (NO LIMIT)              SIA = 45707
              LR1 = (NO LIMIT)              AR1 = 0
              LR2 = (NO LIMIT)              AR2 = 0
              LR3 = (NO LIMIT)              AR3 = 0
              LR4 = (NO LIMIT)              AR4 = 0
              LR5 = (NO LIMIT)              AR5 = 0
              LR6 = (NO LIMIT)              AR6 = 0
              LR7 = (NO LIMIT)              AR7 = 0
              LR8 = (NO LIMIT)              AR8 = 0

              USER NUMBERS VALID TO USE 0E00356
          DRK2642   JRL2422   KPH2421   MJP2423   REN2424
          SDL2622

            CONTROLS FOR PROJECT NUMBER 0E00361

              CREATION DATE    83/04/27.    LAST CHANGE DATE 83/06/30.
              LAST UPDATE DATE UNDEFINED    LAST UPDATE TIME UNDEFINED
              ENTRY *ACTIVE*                EXPIRATION DATE  UNDEFINED
              TI  = 0000                    TO  = 0000
              PFN = PPROLOG                 EFN = PEPILOG
              PUN = USERNAM                 EUN = USERNAM
              PPW = *******†                EPW = *******†
              PCR = A                       ISV = 77B       (NO LIMIT)
              SML = (NO LIMIT)              SMA = 43777
              SIL = (NO LIMIT)              SIA = 43777
              LR1 = (NO LIMIT)              AR1 = 0
              LR2 = (NO LIMIT)              AR2 = 0
              LR3 = (NO LIMIT)              AR3 = 0
              LR4 = (NO LIMIT)              AR4 = 0
              LR5 = (NO LIMIT)              AR5 = 0
              LR6 = (NO LIMIT)              AR6 = 0
              LR7 = (NO LIMIT)              AR7 = 0
              LR8 = (NO LIMIT)              AR8 = 0

              USER NUMBERS VALID TO USE 0E00361
          JJC2426   JMC2171   JXC2566   RLM2155   SDL2622
```

†If a password is defined for the project prologue or project epilogue, the password field appears as a string of asterisks. If no password is defined, the field is blank.

Figure 5-5. Full File List (OP=L,LO=F) (Sheet 2 of 2)

```
PROFILC CHARGE NUMBER LIST  OF FULL FILE.                 PAGE     1
        CHARGE NUMBER       MASTER USER         83/06/30. 19.02.40.

     1. ABCD12              PLL2361
     2. BOSTON
     3. TSTCHRG
     4. 0411                PLL2361
     5. 0520                PLL2361
     6. 0522                PLL2361
     7. 0523                PLL2361
     8. 0552                PLL2361
     9. 0560                PLL2361
    10. 0561                PLL2361
    11. 0580                PLL2361
    12. 0593                PLL2361
    13. 0594                PLL2361
    14. 0595                PLL2361
    15. 0912                PLL2361
    16. 0922                PLL2361
    17. 1097                PLL2361
    18. 1205                PLL2361
    19. 1212                PLL2361
    20. 1215                PLL2361
    21. 1218                PLL2361
    22. 1219                PLL2361
    23. 1220                PLL2361
    24. 1221                PLL2361
    25. 1226                PLL2361
    26. 1228                PLL2361
    27. 1229                PLL2361
    28. 1240                PLL2361
    29. 1242                PLL2361
    30. 1247                PLL2361
    31. 1250                PLL2361
    32. 1257                PLL2361
    33. 1258                PLL2361
    34. 1280
    35. 1292                PLL2361
    36. 1492                PLL2361
    37. 1493                PLL2361
    38. 1732                PLL2361
    39. 2908                PLL2361
    40. 3053                PLL2361
    41. 3054                PLL2361
    42. 3056                PLL2361
    43. 3572                PLL2361
    44. 3576                PLL2361
    45. 3585                PLL2361
    46. 3674                PLL2361
    47. 3910                PLL2361
    48. 3914                PLL2361
    49. 3917                PLL2361
    50. 4302
```

Figure 5-6. Full File Charge Number List (OP=L,LO=C)

```
PROFILC PROJECT NUMBER LIST OF FULL FILE.                PAGE     1
        CHARGE NUMBER       MASTER USER          83/06/30. 19.09.01.

     1. 0523                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        5053P01

     2. 0552                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        0E00356                        0E00361
        0E00377                        05527520
        5076M52

     3. 0560                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        05607520

     4. 0561                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        0140107

     5. 0580                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        0107403                        0110107
        0110117

     6. 0593                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        0B25550                        0B25850
        0110103X

     7. 0594                PLL2361
            VALIDATED PROJECT NUMBERS ARE -
        C10508                         C10558
        C20108                         0A301E5
        0C10108                        330103
```

Figure 5-7. Full File Project Number List (OP=L,LO=P)

Analyst and Master User Identifications

Identification	Description
CV	Build a source file from NOS 2.2 PROFILC. Suppress project prologue and epilogue directives. This parameter is meaningful only with OP=S.
I=infile	File that contains input data for a create (OP=C) and an update (OP=U); default is INPUT.
L=outfile	File to receive output listings; default is OUTPUT.
P=profile	Project profile file; default is PROFILa. If specified, profile must not be a fast-attach file.
OP=U	Updates the project profile file with directives supplied by the input file. U is the default option for a nonsystem origin job or a system origin job where at least one parameter is specified on the PROFILE command.
OP=T	Interactive update. Processing is the same as OP=U but preliminary instructions are suppressed at the terminal.
OP=I,CN=chargenumber.	Charge number inquire. All project numbers valid for charge number CN are written to the output file; figure 5-8 is an example.
OP=I,CN=chargenumber, PN=projectnumber.	Project number inquire. The control values and all valid user names for project number projectnumber are written to the output file; figure 5-9 is an example.
OP=L,LO=FM	Full list of everything accessible on the PROFILa file by the master user; a sample listing is given in figure 5-10.
OP=L,LO=CM	Charge number list of all charge numbers accessible on the PROFILa file by the master user; a sample listing is given in figure 5-11.
OP=L,LO=PM	Project number list of all project numbers accessible on the PROFILa file by the master user; a sample listing is given in figure 5-12.
OP=L	Default is LO=F when the list option is called from a system origin job. The default is LO=FM if the job is not system origin.

```
PROFILE,OP=I,CN=0552.                                      83/06/30. 19.16.38.

   CONTROLS FOR CHARGE NUMBER 0552

    CREATION DATE    81/09/23.     EXPIRATION DATE  UNDEFINED
    ENTRY *ACTIVE*                 PROJECT COUNT = 5
    MU  = PLL2361                  PCL = (NO LIMIT)
    ISL = 77B         (NO LIMIT)   IR1 = 77B        (NO LIMIT)
    IR2 = 77B         (NO LIMIT)   IR3 = 77B        (NO LIMIT)
    IR4 = 77B         (NO LIMIT)   IR5 = 77B        (NO LIMIT)
    IR6 = 77B         (NO LIMIT)   IR7 = 77B        (NO LIMIT)
    IR8 = 77B         (NO LIMIT)
    M1  = 77B         (   1.000)   M2  = 74B        (   0.143)
    M3  = 6B          (   0.006)   M4  = 77B        (   0.003)
    AD  = 77B         (   0.000)

    VALIDATED PROJECT NUMBERS ARE -
0E00356                        0E00361
0E00377                        05527520
5076M52
```

Figure 5-8. Charge Number List (OP=I,CN=xxxx)

```
PROFILE,OP=I,CN=0552,PN=0E00356.                              83/06/30. 18.10.04.

  CONTROLS FOR PROJECT NUMBER 0E00356

    CREATION DATE    83/04/27.    LAST CHANGE DATE 83/06/30.
    LAST UPDATE DATE UNDEFINED    LAST UPDATE TIME UNDEFINED
    ENTRY *ACTIVE*                EXPIRATION DATE  UNDEFINED
    TI  = 0000                    TO  = 0000
    PFN = PPROLOG                 EFN = PEPILOG
    PUN = USERNAM                 EUN = USERNAM
    PPW = *******†                EPW = *******†
    PCR = A                       ISV = 77B        (NO LIMIT)
    SML = (NO LIMIT)              SMA = 45707
    SIL = (NO LIMIT)              SIA = 45707
    LR1 = (NO LIMIT)              AR1 = 0
    LR2 = (NO LIMIT)              AR2 = 0
    LR3 = (NO LIMIT)              AR3 = 0
    LR4 = (NO LIMIT)              AR4 = 0
    LR5 = (NO LIMIT)              AR5 = 0
    LR6 = (NO LIMIT)              AR6 = 0
    LR7 = (NO LIMIT)              AR7 = 0
    LR8 = (NO LIMIT)              AR8 = 0

    USER NUMBERS VALID TO USE 0E00356
DRK2642   JRL2422   KPH2421   MJP2423   REN2424
SDL2622
```

†If a password is defined for the project prologue or project epilogue, the password field appears as a string of asterisks. If no password is defined, the field is blank.

Figure 5-9. Project Number List (OP=I,CN=xxxx,PN=xxxxxxx)

```
PROFILC FULL FILE LIST      OF MASTER USER      GSY2447    PAGE      1
        CHARGE NUMBER                                83/06/30. 18.10.29.

    1. 0552
          CONTROLS FOR CHARGE NUMBER 0552

           CREATION DATE    83/04/27.    EXPIRATION DATE  UNDEFINED
           ENTRY *ACTIVE*                PROJECT COUNT = 5
           MU  = GSY2447                 PCL = (NO LIMIT)
           ISL = 77B         (NO LIMIT)  IR1 = 77B        (NO LIMIT)
           IR2 = 77B         (NO LIMIT)  IR3 = 77B        (NO LIMIT)
           IR4 = 77B         (NO LIMIT)  IR5 = 77B        (NO LIMIT)
           IR6 = 77B         (NO LIMIT)  IR7 = 77B        (NO LIMIT)
           IR8 = 77B         (NO LIMIT)
           M1  = 77B         (   1.000)  M2  = 74B        (   0.143)
           M3  = 6B          (   0.006)  M4  = 77B        (   0.003)
           AD  = 77B         (   0.000)

         CONTROLS FOR PROJECT NUMBER 0E00356

           CREATION DATE    83/04/27.    LAST CHANGE DATE 83/06/30.
           LAST UPDATE DATE UNDEFINED    LAST UPDATE TIME UNDEFINED
           ENTRY *ACTIVE*                EXPIRATION DATE  UNDEFINED
           TI  = 0000                    TO  = 0000
           PFN = PPROLOG                 EFN = PEPILOG
           PUN = USERNAM                 EUN = USERNAM†
           PPW = *******†                EPW = *******
           PCR = A                       ISV = 77B        (NO LIMIT)
           SML = (NO LIMIT)              SMA = 45707
           SIL = (NO LIMIT)              SIA = 45707
           LR1 = (NO LIMIT)              AR1 = 0
           LR2 = (NO LIMIT)              AR2 = 0
           LR3 = (NO LIMIT)              AR3 = 0
           LR4 = (NO LIMIT)              AR4 = 0
           LR5 = (NO LIMIT)              AR5 = 0
           LR6 = (NO LIMIT)              AR6 = 0
           LR7 = (NO LIMIT)              AR7 = 0
           LR8 = (NO LIMIT)              AR8 = 0

           USER NUMBERS VALID TO USE 0E00356
       DRK2642   JRL2422   KPH2421   MJP2423   REN2424
       SDL2622
```

†If a password is defined for the project prologue or project epilogue, the password field appears as a string of asterisks. If no password is defined, the field is blank.

Figure 5-10. Master User Full File List (OP=L,LO=FM) (Sheet 1 of 2)

```
                    CONTROLS FOR PROJECT NUMBER 0E00361

                      CREATION DATE    83/04/27.    LAST CHANGE DATE 83/06/30.
                      LAST UPDATE DATE UNDEFINED    LAST UPDATE TIME UNDEFINED
                      ENTRY *ACTIVE*                EXPIRATION DATE  UNDEFINED
                      TI  = 0000                    TO  = 0000
                      PFN = PPROLOG                 EFN = PEPILOG
                      PUN = USERNAM                 EUN = USERNAM
                      PPW = *******†                EPW = *******†
                      PCR = A                       ISV = 77B       (NO LIMIT)
                      SML = (NO LIMIT)              SMA = 43777
                      SIL = (NO LIMIT)              SIA = 43777
                      LR1 = (NO LIMIT)              AR1 = 0
                      LR2 = (NO LIMIT)              AR2 = 0
                      LR3 = (NO LIMIT)              AR3 = 0
                      LR4 = (NO LIMIT)              AR4 = 0
                      LR5 = (NO LIMIT)              AR5 = 0
                      LR6 = (NO LIMIT)              AR6 = 0
                      LR7 = (NO LIMIT)              AR7 = 0
                      LR8 = (NO LIMIT)              AR8 = 0

                      USER NUMBERS VALID TO USE 0E00361
                  JJC2426    JMC2171    JXC2566    RLM2155    SDL2622
```

†If a password is defined for the project prologue or project epilogue, the password field appears as a string of asterisks. If no password is defined, the field is blank.

Figure 5-10. Master User Full File List (OP=L,LO=FM) (Sheet 2 of 2)

```
          PROFILC CHARGE NUMBER LIST  OF MASTER USER      PLL2361   PAGE     1
                  CHARGE NUMBER                            83/06/30. 19.37.42.

               1. ABCD12
               2. 0411
               3. 0520
               4. 0522
               5. 0523
               6. 0552
               7. 0560
```

Figure 5-11. Master User Charge Number List (OP=L,LO=CM)

```
          PROFILC PROJECT NUMBER LIST OF MASTER USER      PLL2361   PAGE     1
                  CHARGE NUMBER                            83/06/30. 19.40.20.

               1. 0552
                      VALIDATED PROJECT NUMBERS ARE -
                  0E00356                      0E00361
                  0E00377                      05527520
                  5076M52
```

Figure 5-12. Master User Project Number List (OP=L,LO=PM)

INPUT DIRECTIVES

Directives are available as input to PROFILE to add or update information concerning each charge number. The input stream for a PROFILE create (OP=C) or update (OP=U) is divided into two types of entries, charge number entries and directives.

A charge number entry must begin with a / in column 1 or with the CN= or ACN= directive. The 1 to 10 characters following the / or directive are the charge number name. This name is terminated by a separator. Separators consist of all nonalphanumeric characters (except /, +, -, *, and :), end-of-line, and end-of-card. Additional directives may immediately follow the separator.

The directives associated with a particular charge number must follow the charge number entry. All directives following a charge number entry apply to that charge number until another charge number entry occurs. A particular charge number can appear only once in an input stream on a create run.

The directives applying to a particular charge number are further divided into master user and SRU multipliers, project number, and associated project number entries. The project number entry contains the data identifiers that establish the control values for this project and the list of user names that may access this project. The occurrence of duplicate project numbers under the same charge number entry is not allowed on a create run.

Figure 5-13 illustrates a sample input stream.

```
Charge Number - - - - - - - - - - - /CHNUMBER01

                 Master User - - -    MU=USERAAA
                 Project Number - -   PN=PROJECTNUMBER001
                                         TI=1200
                                         TO=1700
                           Project
                           Number
                           Entry
                                         AUN=USERA11
    Charge
    Number                               AUN=USERA12
    Entry

                 Project Number - -   PN=PROJECTNUMBER002
                                         TI=0800
                           Project       TO=1200
                           Number
                           Entry         AUN=USERA21
                                         AUN=USERA22
                                         AUN=USERA23
Charge Number - - - - - - - - - - -   CN=CHNUMBER02
                 Master User - - -    MU=USERBBB
                 Project Number - -   PN=PROJECTNUMBER011
                                         TI=0000
    Charge
    Number                               TO=0800
    Entry                  Project
                           Number
                           Entry
                                         AUN=USERB11
                                         AUN=USERB12
```

Figure 5-13. Sample Input Stream for Use with PROFILE

All directives following a charge number entry are in free format to column 72. Directives cannot be split between cards or lines. Blanks are ignored.

The format of a directive is:

ident=data

Parameter	Description
ident	A two- or three-character designation of the limiting parameter.
data	Value applied to the project under which this directive appears.

The following identifiers are available for PROFILE input.

ident	Description
ACN	Add or activate charge number. A charge number is created if it does not already exist or is activated if it is inactive. However, the charge number must not exist when OP=C is specified.
AD	Index for the SRU constant used to charge for resources not directly measurable by the system for this charge number. This may be one or two numeric digits. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. The maximum and default value of 77_8 gives system default. AD can only be set from a system origin job. (Refer to Multiplier Index Values and Actual Multiplier Values for more information on the usage of this parameter.)
APN	Add or activate project number. A project number is created if it does not already exist or is activated if it is inactive. However, the project number must not exist when OP=C is specified. This entry can be specified by a master user.
ARn†	For installation accumulator n, where n = 1,2,...,8. For each n, ARn specifies the current number of resource units the project has used. When ARn surpasses LRn, the project is not available to users until either the limit or accumulator is respecified.
AUN	Add user name. A one- to seven-alphanumeric identification of the individual or individuals who will have access to the project or projects under which this user name is entered. It is also the identification used by VALIDUs to establish system access (MODVAL Validation File Manager). Under NOS, all files are cataloged by user name (refer to section 1). A maximum of 4095 user names can be validated for a single charge and project number. If no user names are specified for a project, then all user names are allowed to use it. This entry can be specified by a master user.

†The system does not update these fields. Each site must provide this capability, if desired.

ident	Description
CEX	Charge number expiration date expressed as yymmdd. When the current date surpasses the expiration date, the charge number entry and all project entries under it are not available to users. However, a value of zero implies no restriction.
CN	Charge number. This is a 1- to 10-character alphanumeric designation. This directive performs the same function as the /. The specified charge number must exist and be active unless OP=C or CV is also specified; the identifier would then be interpreted as ACN. This entry can be specified by a master user.
DCN	Deactivate charge number. This directive does not destroy the specified charge number entry but sets its status such that the entry and all project entries under it are not available to users. PROFILE reformat runs purge all deactivated entries. This entry is not legal when OP=C is specified.
DPN	Deactivate project number. This directive does not destroy the specified project number entry but sets its status such that the entry is not available to users. PROFILE reformat runs purge all deactivated entries. This entry is not legal when OP=C is specified. This entry can be specified by a master user.
DUN	Delete user name. Deletes the user name from the list of those who may access the project number. This entry can be specified by a master user.
EFN	Epilogue file name. A one- to seven-character alphanumeric file name that identifies the file on which the project epilogue program resides for a specified charge/project number. The project epilogue can be a procedure or a binary program. This entry can be specified by a master user. A null value means no project epilogue program is defined.
EPW	Epilogue file password. A one- to seven-character alphanumeric password associated with the project epilogue file. This entry can be specified by a master user. A null value means no password is present.
EUN	Epilogue file user name. A one- to seven-character alphanumeric user name under which the project epilogue file is catalogued. An epilogue user name must be defined to execute the project epilogue file. This entry can be specified by a master user. A null value means the file is accessed from the user's catalog.
IRn	Index for default value of installation limit register n, where n = 1,2,...,8.
ISL	Index for default value of the SRU installation limit register.
ISV	Index for SRU validation limit. It indicates the maximum SRU accumulation for any job using this charge/project number. This entry can be specified by a master user.

ident	Description
LRn	Installation limit register n, where n = 1,2,...,8. For each n, LRn specifies the maximum number of resource units (as defined by the installation) the project can use. However, a value of zero implies no restriction.
MU	Master user name which has the ability to update, inquire, and make listings for the projects entered under the same charge number as this master user. This master user name must be specified on the USER command for batch input (refer to PROFILE Batch Input) or when logging in (for interactive, refer to PROFILE Execution from a Terminal) in order for the master user to exercise the project-oriented privileges specified. The master user name is one- to seven-alphanumeric characters. There can be only one master user per charge number.
M1	Index for the SRU multiplier to weight calculated system resources used against those not directly measurable for this charge number. This may be one or two numeric digits. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. The maximum and default value of 77_8 gives system default. M1 can only be set from a system origin job. (Refer to Multiplier Index Values and Actual Multiplier Values for more information on the usage of this parameter.)
M2	Index for the SRU multiplier to weight input/output usage for this charge number. This may be one or two numeric digits. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. The maximum and default value of 77_8 gives system default. M2 can only be set from a system origin job. (Refer to Multiplier Index Values and Actual Multiplier Values for more information on the usage of this parameter.)
M3	Index for the SRU multiplier to weight central memory field length usage for this charge number. This may be one or two numeric digits. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. The maximum and default value of 77_8 gives system default. M3 can only be set from a system origin job. (Refer to Multiplier Index Values and Actual Multiplier Values for more information on the usage of this parameter.)
M4	Index for the SRU multiplier to weight extended memory field length usage for this charge number. This may be one or two numeric digits. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. The maximum and default value of 77_8 gives system default. M4 can only be set from a system origin job. (Refer to Multiplier Index Values and Actual Multiplier Values for more information on the usage of this parameter.)
PCL	Project count limit. Maximum number of projects allowed under this charge number.

ident	Description
PCR	Prologue charge required. This entry specifies under what conditions the charge required flag will be set upon termination of the project prologue program. **Entry** / **Description** PCR=null — Charge required flag is not set (default). PCR=U — Charge required flag is set unconditionally. PCR=A — Charge required flag is set only if the project prologue program aborts. This entry can be specified by a master user.
PEX	Project number expiration date expressed as yymmdd. When the current date surpasses the expiration date, the project number is not available to users. However, a value of zero implies no restriction. This entry can be specified by a master user.
PFN	Prologue file name. A one- to seven-character alphanumeric file name that identifies the file on which the project prologue program resides for a specified charge/project number. The project prologue can be a procedure or a binary program. This entry can be specified by a master user. A null value means no project prologue program is defined.
PN	Project number. This is a 1- to 20-character alphanumeric designation of a particular customer activity. The specified project number must exist and be active unless OP=C or CV is also specified; this identifier would then be interpreted as APN. This entry can be specified by a master user.
PPW	Prologue file password. A one- to seven-character alphanumeric password associated with the project prologue file. This entry can be specified by a master user. A null value means no password is present.
PUN	Prologue file user name. A one- to seven-character alphanumeric user name under which the project prologue file is catalogued. A prologue user name must be defined to execute the project prologue file. This entry can be specified by a master user. A null value means the file is accessed from the user's catalog.
SIA	SRU installation accumulator. This value specifies the current number of accumulated SRUs the project has used. This accumulator is updated at the end of a job or terminal session and/or when a second or subsequent CHARGE command is issued. When the SIA value surpasses the SIL value, the project is not available to users until either the limit or accumulator is respecified.
SIL	SRU installation limit register. This value specifies the maximum number of accumulated SRUs the project may use as controlled by the installation. However, a value of zero implies no restriction.

ident	Description
SMA	SRU master user accumulator. This value specifies the current number of accumulated SRUs the project has used. This accumulator is updated at the end of a job or terminal session and/or when a second or subsequent CHARGE command is issued. When the SMA value surpasses the SML value, the project is not available to users until either the limit or accumulator is respecified. This entry can be specified by a master user.
SML	SRU master user limit register. This value specifies the maximum number of accumulated SRUs the project may use as controlled by the master user. However, a value of zero implies no restriction. This entry can be specified by a master user.
TI	Time of day before which the validated user cannot use this project number. This is expressed in four-digit military time notation. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. Maximum value is 2400. This entry can be specified by a master user.
TO	Time of day after which the validated user cannot use this project number. This is expressed in four-digit military time notation. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. Maximum value is 2400; however, TI=TO implies no restriction. This entry can be specified by a master user.

PROFILE CONSOLE INPUT

A PROFILa file can only be created by calling PROFILE from the console (system origin job). Likewise, an existing PROFILa file can be restructured, returned to source, or read to an output file as a full file listing only from the console. The remaining operations (update, inquire, and master user listings) can be executed from console, batch (PROFILE Batch Input), or a terminal (PROFILE Execution from a Terminal).

A new PROFILa file can be created from the console by means of the DIS display. A preestablished input file of control values is called and the PROFILE command with OP=C is entered. The following example, given an input file (INPUT) with control values for structuring a new PROFILa file, is a create run from the console.

X.DIS.

SUI,377777.

NOTE,INPUT.+/CN1000 (Where CN1000 is the first charge number to be created.)

PACK,INPUT.

PROFILE,OP=C,I=INPUT.

ISF,E=PROFILa.

The K display can be used only for an update. With the K option, directives are entered directly from the console instead of from an input file. If directives are entered for an existing charge and project number, the control values are changed according to the directive.

The K display is called with:

```
X.PROFILE.
```

The B display indicates the job sequence name assigned to PROFILE. To the right of this entry the following intensified message appears:

```
REQUEST *K* DISPLAY
```

The analyst types

```
K,jsn.
```

where jsn is the job sequence name for PROFILE. This brings the K display for PROFILa to the left screen (refer to figure 5-14). The analyst is now ready to create or update. The following example illustrates an update input stream.

```
K./CHARGNUM1        (The / is used when PROFILE is updating an existing charge number.)

K.MU=MUSE1

K.END

K./CHARGNUM2

K.MU=MUSE2

K.END

K.STOP
```

```
 PROFILC CREATED  83/04/27.   LAST MOD DATE   83/08/04.

END - UPDATE PROFILE FILE AND TERMINATE CURRENT CHARGE.
DROP - DROP DIRECTIVES ENTERED SINCE CHARGE OR PROJECT.
STOP - END PROCESSING.
/ OR CN= CHARGE NUMBER, ACTIVE CHARGE MUST EXIST.
ACN= ADD OR ACTIVATE CHARGE.  DCN= DEACTIVATE CHARGE.
PN= PROJECT NUMBER, ACTIVE PROJECT MUST EXIST.
APN= ADD OR ACTIVATE PROJECT.  DPN= DEACTIVATE PROJECT.

          CHARGE NUMBER  1234
 CREATION DATE    83/04/27.   EXPIRATION DATE  UNDEFINED
 ENTRY *ACTIVE*               PROJECT COUNT  =3
 MU   =                       PCL = (NO LIMIT)
 M1   = 77B        (   1.000) M2   = 77B        (   0.100)
 M3   = 77B        (   0.003) M4   = 77B        (   0.003)
 AD   = 77B        (   0.000) ISL  = 77B        (NO LIMIT)
 IR1  = 77B        (NO LIMIT) IR2  = 77B        (NO LIMIT)
 IR3  = 77B        (NO LIMIT) IR4  = 77B        (NO LIMIT)
 IR5  = 77B        (NO LIMIT) IR6  = 77B        (NO LIMIT)
 IR7  = 77B        (NO LIMIT) IR8  = 77B        (NO LIMIT)

          PROJECT NUMBER    12345678
 CREATION DATE    83/04/27.   LAST CHANGE DATE UNDEFINED
 LAST UPDATE DATE 83/08/05.   LAST UPDATE TIME 13.57.10.
 ENTRY *ACTIVE*               EXPIRATION DATE  UNDEFINED
 TI   = 0000                  TO   = 0000
 PFN  =                       EFN  =
 PUN  =                       EUN  =
 PPW  =                       EPW  =
 PCR  =                       ISV  = 77B         (NO LIMIT)
 SML  = (NO LIMIT)            SMA  = 11158
 SIL  = (NO LIMIT)            SIA  = 11158
 LR1  = (NO LIMIT)            AR1  = 0
 LR2  = (NO LIMIT)            AR2  = 0
 LR3  = (NO LIMIT)            AR3  = 0
 LR4  = (NO LIMIT)            AR4  = 0
 LR5  = (NO LIMIT)            AR5  = 0
 LR6  = (NO LIMIT)            AR6  = 0
 LR7  = (NO LIMIT)            AR7  = 0
 LR8  = (NO LIMIT)            AR8  = 0
```

Figure 5-14. PROFILa Left K Display

PROFILE BATCH INPUT

A master user can initiate an update, inquire, or listing of the projects under his charge number via card reader input. The following is an example of a batch update in which master user MASTR1 adds a time-in (TI) and a time-out (TO) to one of his projects (PROJ2).

```
JOBUPDA.

USER,MASTR1.

PROFILE,OP=U.

--EOR--

/CHARGNUM1

PN=PROJ2

TI=1400

TO=1800

--EOI--
```

PROFILE EXECUTION FROM A TERMINAL

A master user can initiate an update, inquire, or listing of the projects under his charge number from an interactive terminal. To do this he must have his master user status validated at login. After this validation is affirmed, the master user must enter the batch subsystem or use the X command in order to use the PROFILE command.

Update from a Terminal

The interactive master user can initiate an update by issuing the command PROFILE,OP=U. Once initiated, the system prints the following block of information at the terminal.

```
THE FOLLOWING ARE VALID INPUT DIRECTIVES FOR
UPDATE-
    CN OR   /     -  CHARGE NUMBER.
    PN      -  PROJECT NUMBER.
    APN     -  ADD OR ACTIVATE PROJECT NUMBER.
    DPN     -  DEACTIVATE PROJECT NUMBER.
    PEX     -  PROJECT NUMBER EXPIRATION DATE.
    TI      -  TIME IN.
    TO      -  TIME OFF.
    PFN     -  PROLOGUE FILE NAME.
    PUN     -  PROLOGUE USER NAME.
    PPW     -  PROLOGUE PASSWORD.
    PCR     -  PROLOGUE CHARGE REQUIRED OPTION.
               NULL   -  CHARGE REQUIRED NOT SET.
               U      -  UNCONDITIONAL.
               A      -  ON ABORT.
    EFN     -  EPILOGUE FILE NAME.
    EUN     -  EPILOGUE USERNAME.
    EPW     -  EPILOGUE PASSWORD.
    ISV     -  SRU VALIDATION LIMIT INDEX.
    SML     -  SRU MASTER USER LIMIT.
    SMA     -  SRU MASTER USER ACCUMULATOR.
    AUN     -  ADD USER NUMBER.
    DUN     -  DELETE USER NUMBER.
    ACN     -  ADD OR ACTIVATE CHARGE NUMBER.
    DCN     -  DEACTIVATE CHARGE NUMBER.
    MU      -  MASTER USER NUMBER.                        )
    PCL     -  PROJECT COUNT LIMIT.                       |
    M1   -  M4    -     SRU MULTIPLIER INDICES.           |
    AD      -  SRU CONSTANT INDEX.                        |
    CEX     -  CHARGE NUMBER EXPIRATION DATE.             |  Only for users with
    ISL     -  INSTALLATION SRU LIMIT INDEX.              >  special accounting
    IR1  -  IR8   -     INSTALLATION LIMIT INDICES.       |  privileges.
    SIL     -  SRU INSTALLATION LIMIT.                    |
    SIA     -  SRU INSTALLATION ACCUMULATOR.              |
    LR1  -  LR8   -     INSTALLATION LIMIT REGISTERS.     |
    AR1  -  AR8   -     INSTALLATION ACCUMULATORS.        )
A NULL LINE COMPLETES DIRECTIVE INPUT PROCESSING.
```

This informative printout can be suppressed by using the command option OP=T instead of OP=U. In all other regards, the operation of T is identical to U.

If charge and project numbers are required, the example would run as follows:

```
/ENTER DIRECTIVES
?/CHARG1
? PN=PROJ2
? TI=0800
? TO=1200
? CR
PROFILa UPDATED.
/
```

Inquire from a Terminal

The master user can request information on his current charge number and its project numbers by means of an inquire from a terminal. To do this, the master user issues the command

```
PROFILE,OP=I,CN=chargenumber,PN=projectnumber.
```

where chargenumber is his charge number and projectnumber is the particular project for which he wants information.

If the charge number has not been supplied, PROFILE outputs

```
ENTER CHARGE NUMBER
```

when it processes the command. The user must type in the appropriate charge number. If a null line is entered, it is treated as end-of-file (end processing).

After output of the desired information or if a charge number has not been supplied in the PROFILE command, PROFILE issues

```
ENTER CHARGE NUMBER
```

to the terminal and waits for the user to enter the desired charge number. If a null line is entered, it is treated as end-of-file (end processing).

If a project number has not been entered on the command or if a charge number has just been supplied in response to ENTER CHARGE NUMBER, PROFILE issues

```
ENTER PROJECT NUMBER
```

to the terminal and waits for the user to enter the desired project number. If a null line is entered, output consists of a list of valid project numbers under this charge number, and PROFILE again responds

```
ENTER PROJECT NUMBER
```

If a project number is entered, output consists of a list of the controls for and valid users of this project number. PROFILE again responds

```
ENTER PROJECT NUMBER
```

until a null line is entered to indicate end of processing for the current charge number.

List from a Terminal

The master user can request an FM, CM, or PM listing from a terminal (refer to PROFILa Project Profile Manager). Sample listings are given in figures 5-10, 5-11, and 5-12.

As with an update and an inquire, the master user must enter the batch subsystem or use the X command to use this option.

CHARGE COMMAND†

The system routine CHARGE provides validation of a user's charge and project number for access to define segments of his resources within the system. A call to CHARGE will be required for either a master user or a project-level user if the AW=CCNR option in his access word is not set (refer to the MODVAL Validation File Manager section).

If validation fails, the job is aborted and the appropriate error message is issued to the dayfile. If the user is at a terminal, the message is returned to the terminal.

If validation is successful, the following events occur.

- Accounting information is written to the accounting dayfile (refer to Account Dayfile Messages for message formats).

- The accounting parameters associated with the user's charge/project number are inserted into the accounting formula (refer to the SRU Formula). They are used in calculating the billing unit until the end of job/session or until another charge/ project number is entered.

- The SRU accumulator is set to zero. The CP, MS, MT, and PF accumulators are not altered in any way. If the minimum charge installation option has been selected and if the accumulated SRUs are less than the minimum charge amount, the minimum charge value is entered into the account dayfile (the Resource Accounting section describes the parameters and the minimum charge installation option).

- A project prologue program is executed, if one is defined for the project number entered on the CHARGE command. If PCR=U is specified on the PROFILE command, the charge-required flag will be set upon termination of the project prologue program. If PCR=A is specified on the PROFILE command, the charge-required flag will be set only if the project prologue program aborts. When the charge-required flag is set, the user must enter a valid CHARGE command to continue processing.

  The PCR=U option allows a master user to restrict the use of a project number to a single application executed as a project prologue program.

  The PCR=A option allows a master user to ensure that the project prologue program completes before any user programs can be run under the same project number. A master user could use this feature to perform further validation checks on a user who executes a CHARGE command before allowing use of the project number. If the validation check fails, the project prologue program could execute the ABORT macro to set the charge-required flag for a binary program; or the project prologue program could execute a REVERT,ABORT. command to set the charge-required flag for a procedure.

†Refer to the NOS 2 Reference Set, Volume 3, for further information about the CHARGE command.

The following is the ordered list of the account dayfile and user's dayfile messages issued whenever a new charge number is entered. These messages are not issued, however, as a result of a required CHARGE command that immediately follows an initial USER command.

```
hh.mm.ss.  jsn s.  UDCP, xxxxxx.xxxSECS.
hh.mm.ss.  jsn s.  UDMS, xxxxxx.xxxKUNS.
hh.mm.ss.  jsn s.  UDMT, xxxxxx.xxxKUNS.
hh.mm.ss.  jsn s.  UDPF, xxxxxx.xxxKUNS.
hh.mm.ss.  jsn s.  UDAD, xxxxxx.xxxKUNS.
hh.mm.ss.  jsn s.  UDAC, xxxxxx.xxxUNTS.
hh.mm.ss.  jsn s.  ACSR, xxxxxx.xxxUNTS.
hh.mm.ss.  jsn s.  ACCN, chargenumber, projectnumber.  (Account dayfile only)
```

Account dayfile messages are described in detail later in this section.

USER NAMES AND CHARGE NUMBERS

System access privileges are given to a user through the assignment of a user name and a password. Once a system access is attained, all billable activity is associated with a charge number. The system provides the central site with the flexibility of equating a charge number to a user name or maintaining them as separate entities. This flexibility is attained through the use of the CHARGE required flag (CCNR bit in the VALIDUs access word) and the availability of a charge number in the PROFILa† file. Table 5-3 indicates the combinations possible and the effective billing number.

Table 5-3. Effective Billing Number

PROFILa File	Charge Number Required	Charge Number Not Required
Not available.	This option is not possible since a charge number is required.	The user name is used as the billing number.
Available.	The resources used during job/session initialization (login and user validation) are accumulated and billed under the required charge number.	The user name is used as the billing number until the user decides to enter the charge number.

†In this manual, the user validation and accounting files are referred to as VALIDUs, VALINDs, and PROFILa. Refer to table 5-1 for a list of file names that correspond to the appropriate operating system levels.

RESOURCE ACCOUNTING

The basic accounting unit for NOS is the SRU. The SRU is a measurement of the resources used by a job or a terminal session. The SRU algorithm combines measurements of the following resources into a single unit.

Central memory field length
Extended memory field length
CPU time
Mass storage usage
Magnetic tape usage
Permanent file usage
Matrix algorithm processor (MAP) usage
Application usage

The SRU calculation is dynamic; that is, each time additional amounts of the above resources are utilized by the job or session, the SRU value is updated. The following sections describe the algorithm for calculating SRU values and a detailed description of SRU components.

SRU FORMULA

The following formula is used by the system for SRU computation.

SRU = M1[CP + M2 x IO + M3(CP + IO)CM + M4(CP + IO)EM + MM x MP + AUC] + AD

Parameter	Description
CP	Central processor unit usage expressed in milliunits. The value of this parameter is determined by the following formula. CP = S0 x CP0 + S1 x CP1 CP0 — Time accumulated on CPU 0 in milliseconds. CP1 — Time accumulated on CPU 1 in milliseconds. S0,S1 — Multipliers used to normalize CPU time when the system is running on a dual CPU machine.

Parameter	Description
IO	A measure of the accumulated input-output system activity for a user. This parameter, expressed in milliunits, is defined by the following formula.

IO = S2 x MS + S3 x MT + S4 x PF

MS	Mass storage activity accumulator. The components of this parameter are described in detail in the IO Increments section.
MT	Magnetic tape activity accumulator. The components of this parameter are described in detail in the IO Increments section.
PF	Permanent file activity accumulator. The components of this parameter are described in detail in the IO Increments section.
S2,S3,S4	Multipliers used to weight MS, MT, and PF activity against one another.

CM	Central memory field length expressed in words divided by 1000_8.
EM	Extended memory field length expressed in words divided by 1000_8.
M1	Multiplier used to scale the overall SRU value.
M2	Multiplier used to weight the I/O activity against CPU time, central memory field length, and extended memory field length usage.
M3	Multipliers used to weight central memory field length, CPU time, and I/O activity.
M4	Multiplier used to weight extended memory field length, CPU time, and I/O activity.
MM	Multiplier used to scale MAP usage.
MP	A measure of the accumulated MAP activity for a user.
AUC	A measure of the accumulated application activity for a user.
AD	Incremental adder which is applied to the SRU value during accounting initialization.

The multipliers S0 through S4 and MM, as well as the default values for units of MS, MT, PF, MP, and AUC are installation options which do not change during system execution. The multipliers M1 through M4 and the adder AD are also installation options, but they may change once system activity has begun. The default values for M1 through M4 and AD are set during job or session initialization. When a charge number is entered, different values for M1 through M4 and AD may be specified for use in the SRU calculation (refer to PROFILE Console Input). These parameters are retained in PROFILa and provide the central site with the flexibility of varying the billing unit for selected users.

SRU PARAMETERS

The common deck COMSSRU contains the definitions for the SRU multipliers and associated parameters. The absolute ranges for these values are also defined. To obtain a listing of COMSSRU, assemble CALLSYS; the default values are shown. To change any default values, modifications must be made in COMSSRU.

The following paragraphs describe the SRU parameters and list the absolute ranges and default values. The COMSSRU name is listed along with the default value for each parameter. When SRU parameter default values are set, these values must lie within the absolute range for each parameter.

S0 and S1

The values used for S0 and S1 are selected by the system at deadstart time from a list of multipliers defined for each type of CPU detectable by NOS. S0 is the primary multiplier and is used for all single CPU machines. For dual CPU machines, S0 is used for the first CPU (CPU 0) and S1 is used for calculations involving the second CPU (CPU 1). For example, if a site is running a 6700, S0 is assigned the value defined for a 6600 CPU and S1 is assigned the value defined for a 6400 CPU. This allows a site with several systems to use different multipliers for different CPUs while using only one deadstart tape.

It is possible for an analyst to transform this selection at deadstart by the use of the IPRDECK entry CPM. Use of this entry allows an analyst to select any multiplier from the list in COMSSRU, which follows, to be used instead of the normally selected value. One advantage of this entry is that a site may charge differently for the use of a 6200 CPU or a 6400 CPU although the software cannot normally detect the difference.

COMSSRU Name	Default Value	Description
CP62	1.0	6200 CPU
CP64	1.0	6400 CPU
CP65	1.0	6500 CPU
CP66	1.0	6600 CPU
CP67	1.0	6700 CPU
CP71	1.0	CYBER 71 CPU
CP72	1.0	CYBER 72 CPU
CP73	1.0	CYBER 73 CPU
CP74	1.0	CYBER 74 CPU
C171	1.0	CYBER 171 CPU
C172	1.0	CYBER 172 CPU
C173	1.0	CYBER 173 CPU
C174	1.0	CYBER 174 CPU
C175	1.0	CYBER 175 CPU
C176	1.0	CYBER 176 CPU
C720	1.0	CYBER 720 CPU
C730	1.0	CYBER 730 CPU

COMSSRU Name	Default Value	Description
C740	1.0	CYBER 740 CPU
C750	1.0	CYBER 750 CPU
C760	1.0	CYBER 760 CPU
C815	1.0	CYBER 815 CPU
C825	1.0	CYBER 825 CPU
C835	1.0	CYBER 835 CPU
C845	1.0	CYBER 845 CPU
C855	1.0	CYBER 855 CPU
C865	1.0	CYBER 865 CPU
C875	1.0	CYBER 875 CPU
ICM1	1.0	Installation selected CPU multiplier values
ICM2	2.0	
ICM3	3.0	
ICM4	4.0	
ICM5	5.0	

Absolute range: 0.1 to 50.0

S2, S3, and S4

These multipliers are used in the calculation of the IO parameter. In addition to providing weighting factors, these multipliers also convert units of resource usage (MS, MT, or PF) to milliunits of IO. For example, if the default value for S2 is used, 300 units of MS usage result in 300 milliunits of IO.

COMSSRU Name	Default Value	Description
S2SR	1.0	MS multiplier (S2)
S3SR	1.0	MT multiplier (S3)
S4SR	1.0	PF multiplier (S4)

Absolute range: 0.1 to 50.0

M1

This multiplier is used as a scaling factor to increase or decrease the overall SRU value. This value may be changed from the system default for each charge number when this charge number is entered (refer to PROFILE Console Input and Multiplier Index Values and Actual Multiplier Values for further information).

COMSSRU Name	Default Value	Description
M1SR	1.0	M1 multiplier

Absolute range: 0.1 to 25.5

M2, M3, and M4

These multipliers provide weighting of the various terms in the SRU calculation. These values may be changed from the system default values for each charge number when this charge number is entered (refer to PROFILE Console Input and Multiplier Index Values and Actual Multiplier Values for further information).

COMSSRU Name	Default Value	Description
M2SR	0.100	M2 multiplier
M3SR	0.003	M3 multiplier
M4SR	0.003	M4 multiplier

Absolute range: 0.001 to 1.023

MM

This multiplier is used as a scaling factor for the MAP term in the SRU calculation.

COMSSRU Name	Default Value	Description
MPSR	1	MAP multiplier (MM)

Absolute range: 1 to 100

AD

The value assigned to this parameter is applied to the SRU value during accounting initialization of a job or session. It thus serves as an overhead increment. This value may be changed from the system default for each charge number when this charge number is entered (refer to PROFILE Console Input and Multiplier Index Values and Actual Multiplier Values for further information).

COMSSRU Name	Default Value	Description
ADSR	0	Incremental adder (AD)

Absolute range: 1 to 1000

In addition to the parameters which make up the SRU formula, the following values are also defined in COMSSRU.

Minimum Display Value

This parameter defines the minimum value to be displayed at the end of each interactive job step. If the accumulated SRUs are less than this value, they are not displayed.

COMSSRU Name	Default Value	Description
MDSR	0.100	Minimum display value

Absolute range: 0.001 to 1.000

Minimum Charge Value

This parameter defines the minimum SRU value to be applied against a charge number. If accumulated SRUs are less than this value, then a charge equal to this value is applied.

COMSSRU Name	Default Value	Description
MCSR	1.000	Minimum charge value

Absolute range: 0.001 to 10.000

IO INCREMENTS

The IO parameter in the SRU formula is a measure of the accumulated input-output system activity for a user. It accounts for MS activity, MT activity, and PF activity. This parameter is controlled by central site-defined increments. These increments are assigned to various functions performed by the system. These functions include data transfer as well as other operations such as file positioning.

This section describes the increment of MS, MT, and PF which make up the measurable portion of the IO parameter. The common deck COMSSRU contains the definitions, default values, and absolute ranges for these increments. To obtain a listing of COMSSRU, assemble CALLSYS. If an analyst wants to change any of the default increments, modifications must be made in COMSSRU. This section lists the IO increments with COMSSRU names, default values, and absolute ranges.

MS Increments

The formula for calculating the MS increment is

$$\text{MS increment} = \text{operation charge} + \text{penalty} + (\text{PRUs transferred} \times 2^{\text{IMPT}})$$

The system applies operation charges for the defined functions as follows:

COMSSRU Name	Default Increment	MS Activity
IMLL	1	Library load
IMRD	2	Read
IMWT	2	Write
IMSK	2	Skip†
IMOP	1	Open
IMCL	1	Close
IMRU	1	Return, unload, or evict††

Absolute range for MS increments: 0 to 63

†No charge if the file is assigned to a terminal or if it is nonrandom and assigned to mass storage.

††No charge if the file is not present.

The rewind and indefinite skip backward (skip count=777777_8) functions incur no operation charge.

The close return and close unload functions incur an operation charge of

IMCL + IMRU.

The system applies an additional penalty for read with list operations (READLS, RPHRLS) based on the positioning interval.

COMSSRU Name	Default Value	MS Activity
IMRL	3	Read-with-list
IMPL	128	Positioning interval for IMRL penalty

For each random repositioning for a read-with-list operation, the system adds a penalty of IMRL for the following cases:

- When the random address specified by the next list entry is less than the previous random address (requiring a backward repositioning).
- When the random address specified by the next list entry exceeds IMPL PRUs forward from the previous position.

The formula for calculating the increments charged for PRUs transferred is

Number of increments = number of PRUs transferred x 2^{IMPT}

COMSSRU Name	Default Value	MS Activity
IMPT	2	Combined input-output (CIO) read, write, skip, open, and close operations requiring data transfer to/from mass storage (does not include system sector or EOI sector transfers)

The system accumulates the number of PRUs transferred for all operations requiring a data transfer, including the following:

- CIO read, write, and skip.
- Random file directory positioning.
- Transfer for open and close operations.
- Skip backwards to end of record/end of file mark (EOR/EOF).†
- Random open directory positioning.†

† Charges are not incurred for the excess PRUs read to determine EOR and EOF boundaries.

MT Increments

The formula for calculating the MT increment is

MT increment = (tape blocks transferred) x (operation charge)

The following increments are charged for each magnetic tape operation.

COMSSRU Name	Default Increment	MT Activity
ITRW	4	Read or write
ITRL	5	Read L tape
ITPO	2	Position
ITCL	1	Open or close
ITWL	6	Write L tape

Absolute range for MT increments: 0 to 63

PF Increments

The formula for calculating the PF increment is

PF increment = operation charge + IPPR (PRUs transferred/IPPN)

The following increments are charged for each permanent file operation.

COMSSRU Name	Default Increment	PF Activity
IPSV	1	Save
IPRP	1	Replace
IPGT	1	Get
IPAP	20	Append
IPDF	4	Define
IPAT	4	Attach
IPPM	1	Permit
IPCG	1	Change
IPPG	1	Purge
IPCT	1	Catlist
IPCS	4	Catalog search
IPCE	0	Catalog entry returned
IPVA	1	VALIDUs access
IPPA	1	Permit file access
IPAD	1	Alternate device access

The following increment is charged each time a specified number of PRUs are transferred.

COMSSRU Name	Default Increment
IPPR	4

The following specifies the number of PRUs transferred before the IPPR increment is charged.

COMSSRU Name	Default Value	Description
IPPN	10	Using the default value, the IPPR increment is charged each time 10 PRUs are transferred.

Absolute range for PF increments: 0 to 63

Example:

The charge for an ATTACH,filename/PN=packname,UN=username. command is calculated as follows.

IPAT+IPAD+IPVA+IPCS+IPPA (if permit data is available)

EXAMPLE OF SRU CALCULATION

This section illustrates how an SRU value is obtained. The SRU formula is as follows.

SRU = M1 [CP + M2 x IO + M3 (CP + IO) CM + M4 (CP + IO)EM + MM x MP + AUC] + AD

The parameters are described in the SRU Formula section. For this example, all default values are assumed, except AD which equals 1.0. Therefore, the following parameters are known.

S0 = 1.0	M1 = 1.0	AD = 1.0
S1 = 1.0	M2 = 0.100	
S2 = 1.0	M3 = 0.003	
S3 = 1.0	M4 = 0.003	
S4 = 1.0	MM = 1.0	

For the purpose of this example, it is assumed that the job or session accumulated the following amounts of the specified resources.

9135 milliseconds of CPU time on CPU 0 (CP0 = 9135)
0 millisecond of CPU time on CPU 1 (CP1 = 0.0)
28,880 units of mass storage (MS = 28880)
No magnetic tape or permanent file usage (MT = 0.0, and PF = 0.0)
No extended memory usage (EM = 0.0)
10500_8 central memory field length
No MAP usage (MP = 0.0)
No application usage (AUC = 0.0)

To solve for the CP parameter, the following formula is used.

```
CP = S0 x CP0 + S1 x CP1
   = 1.0 x 9135 + 1.0 x 0.0
   = 9135
     so
CP = 9135 milliseconds
```

To solve for the IO parameter, the following formula is used.

```
IO = S2 x MS + S3 x MT + S4 x PF
   = 1.0 x 28880 + 1.0 x 0.0 + 1.0 x 0.0
   = 28,880
     so
IO = 28,880 milliunits
```

To solve for the CM parameter, the following formula is used.

$CM = (\text{central memory field length} + 777_8)/1000_8$ (the 777_8 is used as a roundup factor)
$= (10500_8 + 777_8)/1000_8$
$= 11_8$
$= 9$
so
$CM = 9$ units

To solve for the EM parameter, the following formula is used.

```
EM = extended memory field length in tracks
   = 0
     so
EM = 0 units
```

To solve for the MP parameter, the following formula is used.

```
MP = MAP usage
   = 0
     so
MP = 0 milliunits
```

To solve for the AUC parameter, the following formula is used.

```
AUC = application usage
    = 0
      so
AUC = 0 milliunits
```

Since the AD parameter is specified in units and the remainder of the SRU equation is specified in milliunits, this part is computed first and converted into units. It can then be added to the AD parameter to obtain the number of SRUs.

```
M1 [CP + M2 x IO + M3 (CP + IO) CM + M4 (CP + IO) EM + MM x MP + AUC]
     =  1.0[9135 + 0.100 x 28880 + 0.003(9135 + 28880)9 + 0 + 1 x 0 + 0]
     =  9135 + 2888 + 1026.405 + 0
     =  13049.405
     =  13049 milliunits
     =  13.049 units
        so
SRU  =  13.049 + AD
     =  13.049 + 1.0
     =  14.049 units
```

So, during this job or session, 14.049 SRUs have been accumulated.

MULTIPLIER INDEX VALUES AND ACTUAL MULTIPLIER VALUES

When an analyst assigns charge numbers, he can specify certain multipliers (M1 through M4) and the adder (AD) in the SRU multiplier formula as other than the system default values. (The system default values are described in the IO Increments section.) In fact, each charge number may be assigned a unique set of multiplier and adder values. This is done using the PROFILE command and the M1 through M4 directives (refer to PROFILE Console Input). An index from 0 to 77_8 is specified with each directive which is converted to the actual multiplier or adder value. The actual multiplier or adder value must lie within the absolute range defined by the system for that parameter. However, an analyst can also specify a subrange for each multiplier or adder in which all multipliers or adders must lie. This is done by specifying upper and lower bounds for these parameters. The released values for these upper and lower bounds are contained in COMSSRU. To obtain a listing of COMSSRU, assemble CALLSYS. To change these values, modifications must be made in COMSSRU. The following lists the COMSSRU names and gives the released values.

COMSSRU Name	Released Value	Description
M1SL	0.5	M1 lower bound
M1SU	1.5	M1 upper bound
M2SL	0.050	M2 lower bound
M2SU	0.150	M2 upper bound
M3SL	0.001	M3 lower bound
M3SU	0.064	M3 upper bound
M4SL	0.001	M4 lower bound
M4SU	0.064	M4 upper bound
MASL	1	Adder (AD) lower bound
MASU	64	Adder (AD) upper bound

When a site analyst specifies an index value for M1, M2, M3, M4, or AD under PROFILE, it is converted to the actual multiplier (or adder) value by the following formula.

MI = I(MISU - MISL)/64 + MISL

Parameter	Description
MI	Actual multiplier (or adder) obtained.
I	Multiplier (or adder) index value entered with a PROFILE directive.
MISU	Multiplier (or adder) upper bound.
MISL	Multiplier (or adder) lower bound.

Two exceptions are:

- If the index value 0 is entered in the PROFILE directive, an actual multiplier (or adder) value of 0 is assigned.
- If the upper index value 77_8 is entered or if no index value is entered in the PROFILE directive, the system default multiplier (or adder) is assigned.

The actual multiplier (or adder) value MI and the index value I are displayed on the PROFILa K display (refer to figure 5-15).

The following example illustrates a conversion of an index value to an actual multiplier.

Example 1:

Assume that the released upper and lower bounds for M2 are used. That is:

```
M2SL = .050
M2SU = .150
```

The site analyst specifies a PROFILE directive

```
M2 = 32
```

for a particular charge number. This implies that the index value I in the formula

```
MI = I(MISU - MISL)/64 + MISL
```

is equal to 32.

Upon substitution:

```
M2 = 32(.150 - .050)/64 + .050
   = 3.200/64 + .050
   = .050 + .050
   = .10
```

Thus, the actual M2 multiplier used for this charge number is .10.

After a site analyst has chosen upper and lower bounds for its multipliers (and adder), he may desire to assign different actual multiplier values to certain charge numbers. In order to choose the proper index value to be specified on the PROFILE directives, the following formula is used. (This is merely the previous formula solved for I.)

```
I = 64(MI - MISL)/(MISU - MISL)
```

I, MI, MISL, and MISU are the same as those defined previously.

Example 2:

Assume that the released upper and lower bounds for M2 are used. That is:

```
M2SL = .050
M2SU = .150
```

The site analyst wishes to assign an actual M2 multiplier value of .10 to a particular charge number. To determine the appropriate index value for the PROFILE directive, the following formula is used.

```
I = 64 (MI - MISL)/(MISU - MISL)
```

MI = .10 in this case.

Upon substitution:

$$\begin{aligned} I &= 64(.100 - .050)/(.150 - .050) \\ &= 64(.050)/(.100) \\ &= 64 \times .5 \\ &= 32 \end{aligned}$$

Thus, the PROFILE directive M2 = 32 should be entered for the particular charge number to specify an actual M2 multiplier value of .10.

SCREEN MANAGEMENT FACILITY AND FULL SCREEN EDITOR

When the SMF subsystem is called by the operator, it performs some of the text editing functions on behalf of the user-callable editor FSE. Since SMF uses resources which would otherwise be used by FSE and be accounted to the user, SMF and FSE use the Application Unit Charge to simulate comparable resource accounting.

FSE calculates the Application Unit Charge, using accumulators provided by SMF for mass storage operations, mass storage data transfer, and terminal output data transfer. The two mass storage accumulators provide a close approximation to the mass storage resource which would have been actually used by FSE if SMF had not been available. The terminal output accumulator is used to estimate the CP time used by SMF on behalf of each user, assuming a close correlation between output formatting and central processor overhead. The following parameter in COMSSRU is used to provide the proportion of terminal output to CP resources.

COMSSRU Name	Default Value	Description
IFCO	0.100	Full Screen Editor CP resource, expressed as milliseconds per word of terminal output.

FSE converts the SMF accumulators into estimated central processor and mass storage resources, using the calculations:

CP = (output words transmitted) x IFCO

MS = (operations x IMRD) + (PRU's transferred x 2^{IMRW})

Then the application unit charge is calculated using the SETAUC macro. Refer to the NOS 2 Reference Set, Volume 4 for a description of the SETAUC macro.

ACCOUNT DAYFILE MESSAGES

The purpose of the account dayfile is to provide a history of system usage over the life of the account dayfile. This history is used for the following purposes.

- It provides the information necessary to properly bill the users of the system.
- It provides the information necessary to analyze the use of the system or any part of it by the site analyst. For example, he may want to determine the amount of magnetic tape usage.

Therefore, a standardized message format is provided to ease in the account dayfile analysis. The following is the general format of the account dayfile message. All account dayfile messages have this general format.

```
hh.mm.ss. jsn s. geac, additional information.
```

Message	Description
hh.mm.ss.	Current time in the form of hour.minute.second. This field begins in column 2 and ends with a period. The system always appends this field in this format to the beginning of the message at the time it is entered into the account dayfile.
jsn	Job sequence name of the job which caused the entry of this message into the account dayfile. This field begins in column 13 and ends in column 16. The system appends this field to the beginning of the message along with the time.
s	A single character in column 17 which describes the service class of the job. The system automatically appends this character when the message is entered into the account dayfile. The following service class types can be specified.

s	Service Class
A	Deadstart sequencing service class.
B	Batch service class.
C	Communication task service class.
D	Detached interactive service class.
M	Maintenance service class.
N	Network supervisor service class.
R	Remote batch service class.
S	System service class.
T	Interactive service class.
X	Subsystem service class.
0	Installation service class 0.
1	Installation service class 1.
2	Installation service class 2.
3	Installation service class 3.

Message	Description
geac	A unique four-character message identifier which defines the particular activity identified. The field begins in column 21 and ends with a comma-blank (,) or a period. The first character identifies the information group, the second character identifies the event which caused the message to be entered into the account dayfile, and the last two characters identify the activity being recorded. This field is further described in the following section.
additional information	Information that gives further detail to the activity identified by geac. The field begins in column 27 and ends with a period. This field is further described in the following section.

These message lines are free format. That is, each field defined in a message ends in either a comma-space or a period if it is the last field in the message. If a field is not used, it appears only as a comma-space, or it does not appear if it is the last field in the message. The separator immediately follows the last character of the field. The field size can be any length, depending on the information being supplied.

Example:

SPAT, filename, , packname.

No alternate user access was specified during the permanent file attach operation.

SPAT, filename.

No pack name was required and no alternate user access was specified during the permanent file attach operation.

All account dayfile entries are grouped by a particular information type. Each group type is identified by the first character of the geac field (that is, g of geac) in the account dayfile message. The following are the group types.

Type	Description
Aeac	Accounting information.
Seac	Statistical information.
Ueac	Job usage information.
Ieac	Installation information (reserved).
Meac	Multilevel security information.

ACCOUNTING INFORMATION

The A message group provides the information necessary for accounting purposes. These messages include information denoting the beginning and end of an accounting sequence, as well as all resources used. The message formats are:

Aeac, additional information.

The events (e character of Aeac) are defined as follows:

Character	Event Description
B	Beginning of a job.
C	Change in the accounting activity.
D	Disk activity.
E	End of a job.
M	Magnetic tape activity.
P	Permanent file activity.
R	Recovery operation.
S	Suspension of a job.
U	Unable to update PROFILa.

The activity identifier (ac of Aeac) identifies the information being recorded and is event-dependent.

The following is a list of the B activity messages.

```
ABAA, appl, name 1, name 2.
ABAC, C1, username, familyname, appl.
ABAC, C2, snode, dnode.
ABAE, C1, username, familyname, appl.
ABAE, C2, snode, dnode.
ABAP, C1, username, familyname, terminalname.
ABAP, C2, application.
ABAR, appl, snode, dnode.
ABCN, chargenumber, projectnumber.
ABCN, SYSTEM, .
ABEA, appl, name 1, name 2.
ABER, C1, username, familyname, terminalname.
ABER, C2, password.
ABLQ, C1, jsn, yymmdd, hhmmss, dc.
ABLQ, C2, xxxxxx.xxxKUNS.
ABRE, appl.
ABST, system title.
ABSV, system version.
ABSY, yy/mm/dd.
ABUN, username, familyname, terminalname.
```

Identifier	Description
ABAA	Denotes the successful establishment of an application to application connection by application appl in this host to another application identified by name 1 and name 2 in the same or another host.
ABAC	Denotes the successful establishment of an application to application connection to application appl in this host by an application identified by user username and family familyname in the same or another host using logical link snode and dnode.
ABAE	Denotes an unsuccessful attempt to establish an application to application connection to application appl under user username and family familyname in this host using logical link snode and dnode.
ABAP	Denotes transfer of terminal terminalname logged in under user username in the specified family to application after validation by NVF.
ABAR	Denotes an invalid attempt to establish an application to application connection to application appl in this host using logical link snode and dnode.
ABCN	Denotes the beginning of a charge sequence: chargenumber 1- to 10-alphanumeric character charge number. projectnumber 1- to 20-alphanumeric character project number. The second form is issued during unit record accounting if no charge number is in effect when the file is queued.
ABEA	Denotes an unsuccessful attempt to establish an application to application connection by application appl in this host to another application identified by name 1 and name 2 in the same or another host.
ABER	Denotes an incorrect login attempt at terminal terminalname under user username in family familyname.
ABLQ	Denotes a file with job sequence name jsn is placed in the input or output queue for the first time on date yymmdd and time hhmmss. The file has a disposition of dc. Refer to the ROUTE command in the NOS 2 Reference Set, Volume 3, for a description of disposition codes that may appear in this message. If subsequent ARRQ or AEPQ messages are issued for this file, their jsn will correspond to the jsn for this message, even if the file's job sequence name in the system has changed. The file length is specified in PRUs.
ABRE	Denotes that application appl has reached the maximum number allowed of unsuccessful attempts to establish an application to application connection.
ABST	Denotes the beginning of an account file from the system with the indicated system title.

Identifier	Description
ABSV	Denotes the beginning of an account file from the system with the indicated system version.
ABSY	Denotes the beginning of a new account dayfile through initialization of dayfiles or dayfile termination on date yy/mm/dd. Two blanks separate yy from the comma that precedes it.
ABUN	Denotes the beginning of a job or terminal session under user username in the permanent file family familyname. terminalname is optional; if present, message represents NAM login at terminal terminalname.

The following is a list of the C activity messages.

```
ACCN, chargenumber, projectnumber.
ACDT, DS, DATE. yy/mm/dd.
ACDT, DS, TIME. hh.mm.ss.
ACLK, jsn, pid, lid, ERR.
ACSC, sc, newjsn, sruunits.
ACSO, sruunits.
ACSR, sruunits.
ACUN, username, familyname.
```

Identifier	Description
ACCN	Denotes a change of charge with charge chargenumber and project projectnumber.
ACDT	Denotes new date or time entered into the system.
ACLK	Denotes remote host usage.

Parameter	Description
jsn	Job sequence name of the job on the remote host for which the accounting entry is being made.
pid	Physical identifier of the remote host.
lid	Logical identifier of the mainframe that initiated the link.
ERR	If ERR is present, the output file was discarded because user limits were reached.

Identifier	Description
ACSC	Denotes service class has changed to sc or job sequence name has changed to newjsn. sruunits is the SRU accumulation at the time of the service class change.
ACSO	Denotes overflow of SRU accumulation in SRU units.
ACSR	Denotes the end of an accounting block that used sruunits of SRUs. The SRU accumulator is displayed and cleared and is associated with the entering of a new charge/project number.
ACUN	Denotes the change to user username under the permanent file family familyname.

The following is a list of the D activity messages.

ADDI, est, familyname, dn.
ADDR, est, familyname, dn, lowerlevel, upperlevel.
ADDU, est, familyname, dn.
ADPD, est, packname, username.
ADPI, est, packname, username.
ADPM, est, packname, username, lowerlevel, upperlevel.

Identifier	Description
ADDI	Denotes initialization operation on a permanent file device with EST ordinal est, family familyname, and device number dn.
ADDR	Denotes recovery operation on a permanent file device with EST ordinal est, family familyname, and device number dn. The device has access level limits lowerlevel and upperlevel.
ADDU	Denotes unloading operation on a permanent file device with EST ordinal est, family familyname, and device number dn.
ADPD	Denotes dismounting operation on an auxiliary removable disk pack with EST ordinal est, pack packname, and user username.
ADPI	Denotes initialization operation on an auxiliary removable disk pack with EST ordinal est, pack packname, and user username.
ADPM	Denotes mounting and recovery operation on an auxiliary removable disk pack with EST ordinal est, pack packname, and user username. The disk pack has access level limits lowerlevel and upperlevel.

The following is a list of the E activity messages.

AEAA, C1, appl, name 1, name 2.
AEAA, C2, xxxxxxSECS.
AEAP, C1, username, familyname, terminalname.
AEAP, C2, application, xxxxxxSECS.
AEQP, C1, jsn, yymmdd, hhmmss, dc.
AEQP, C2, xxxxxx.xxxKUNS.
AERR, DS.
AESR, sruunits.
AESY, yy/mm/dd.
AEUN, username, familyname, terminalname.

Identifier	Description
AEAA	Denotes that an application to application connection between application appl and another application identified by name 1 and name 2 has ended after an elapsed time of xxxxxx seconds.
AEAP	Denotes end of connection of terminal terminalname to specified application. Elapsed time of connection (xxxxxx, in seconds) may not agree exactly with interval between corresponding ABAP and AEAP messages, because calculation of elapsed time is independent of the system function that prefixes the time field to the account dayfile message.

Identifier	Description
AEQP	Denotes an active or inactive queued file with original job sequence name jsn is released from the system on date yymmdd and time hhmmss. The file has a disposition of dc. The file length is specified in PRUs.
AERR	Denotes that the job was rerun after a deadstart.
AESR	Denotes the end of a job that used sruunits SRUs under the current charge number. If sruunits is blank, the message AESR, . follows the completion of a print or punch file.
AESY	Denotes the end of an active account file on the date yy/mm/dd. Two blanks separate yy from the comma that precedes it.
AEUN	Denotes the end of a terminal session under user username in the permanent file family familyname from terminal terminalname.

The following is a list of the M activity messages.

```
AMAS,  est, vsn.
AMRT,  est, onX.
```

Identifier	Description
AMAS	The magnetic tape equipment est is assigned with a volume serial number vsn. If the tape is unlabeled, vsn is not used. Two blanks separate est from the comma that precedes it.
AMRT	Denotes magnetic tape equipment est returned from the user. onX specifies the type of drive returned and is specified as 66X or 67X. Two blanks separate est from the comma that precedes it.

The following is a list of the P activity messages.

```
APPN.
APPN, packname.
```

Identifier	Description
APPN	Denotes entering the default pack name. If no pack name is specified, the message denotes the clearing of the default pack name.

The following is a list of the R activity messages.

```
ARRQ, C1, jsn, yymmdd, hhmmss, dc.
ARRQ, C2, xxxxxx.xxxKUNS.
ARSY, ln, yy/mm/dd.
ARUN, username, familyname.
```

Identifier	Description
ARRQ	Denotes a file with original job sequence name jsn is reentered in the active queue on date yymmdd and time hhmmss. The file has a disposition of dc. The file length is specified in PRUs.
ARSY	Denotes the recovery of the account dayfile at recovery level ln on the date yy/mm/dd.
ARUN	Denotes the recovery of an interactive job with user username and family familyname.

The following is the S activity message.

ASTx, username, familyname.

Identifier	Description
ASTx	Denotes that the user's job has been suspended:

x	Description
D	The suspension was caused by a user detach.
H	The suspension was caused by a line disconnect.
R	The suspension was caused by the recovery of the interactive subsystem.
T	The suspension was caused by a session timeout.

The following is the U activity message.

AUSR, sruunits.

Identifier	Description
AUSR	Denotes that sruunits of SRUs could not be recorded in PROFILa at overflow or end of account block.

STATISTICAL INFORMATION

The S message group provides information relating to the various activities of the system. The message formats are:

Seac, additional information.

The events (e character of Seac) are defined as follows:

Character	Event Description
A	Subsystem abort.
B	Subsystem begin.
C	Accumulator displayed and cleared.

Character	Event Description
D	Accumulator displayed and continued.
E	Subsystem end.
I	Informative message.
P	Permanent file information.
R	Subsystem recovery.
T	MSS staging/destaging requests.

The following is the A activity message.

```
SANW, application, jsn.
```

Identifier	Description
SANW	Denotes application failure during job with job sequence name jsn.

The following is a list of the B activity messages.

```
SBER, application, jsn.
SBNW, application, jsn.
```

Identifier	Description
SBER	Denotes illegal NETON attempt by application during job with job sequence name jsn.
SBNW	Denotes successful NETON by application during job with job sequence name jsn.

The following is a list of the C activity messages.

```
SCLI, node, C1, port, 0, ttttttllllll.
SCLI, node, C2, sssssscccccc.
SCLI, node, C3, bbbbbb.
SCMT,  est, pppppppp, t.
SCNQ, node, C1, ccccccddddddllllll.
SCNQ, node, C2, ggggggrrrrrrssssss.
SCNQ, node, C3, ppppppiiiiiinnnnnn.
SCNQ, node, C4, wwwwww.
SCTU, node, C1, port, 0, ttttttllllll.
SCTU, node, C2, sssssscccccc.
SCTU, node, C3, bbbbbb.
```

Identifier	Description
SCLI	Denotes the number of blocks and characters transmitted and received on the line connected to the indicated port of the NPU with node number node. The port number is hexadecimal; all other values are decimal.

Field	Description
tttttt	Number of blocks transmitted.
llllll	Number of blocks received.
ssssss	Number of characters transmitted.
cccccc	Number of characters received.
bbbbbb	Number of bad blocks retransmitted.

SCMT	Denotes the number of magnetic tape PRUs transferred to or from unit est; t denotes whether the blocks were read (t=R) or written (t=W). Two blanks separate est from the comma that precedes it.
SCNQ	Indicates various statistics about the NPU with node number node. All values are decimal.

Field	Description
cccccc	Percentage of CPU used in tenths of a percent.
dddddd	Average number of data buffers.
llllll	Lowest regulation level reached.
gggggg	Number of inputs rejected due to NPU regulation.
rrrrrr	Average number of characters per second received from the host.
ssssss	Average number of characters per second sent to the host.
pppppp	Number of active batch output devices.
iiiiii	Number of active batch input devices.
nnnnnn	Number of interactive connections.
wwwwww	Average number of worklists processed per second.

SCTU	Denotes the number of blocks and characters transmitted and received on the line connected to the indicated port of the NPU with node number node. The port number is hexadecimal; all other values are decimal.

Field	Description
tttttt	Number of blocks transmitted.
llllll	Number of blocks received.
ssssss	Number of characters transmitted.
cccccc	Number of characters received.
bbbbbb	Number of bad blocks retransmitted.

The following is a list of the D activity messages.

SDCA, seconds.
SDCI, seconds.
SDCM, kilomoves.
SDMR, kilorollouts.
SDMS, kilosectors.
SDPX, kilounits.
SDTO, kiloslices.
SDTS, kiloslices.

Identifier	Description
SDCA	Denotes accumulated time since deadstart that the CPU was active at the system control point while in program mode.
SDCI	Denotes accumulated time since deadstart that the CPU was not assigned to any control point; that is, executing its idle loop.
SDCM	Number of storage moves, divided by 1000, in which a job field length was moved.
SDMR	Number of rollouts, divided by 1000, for all jobs.
SDMS	Number of sectors rolled out, divided by 1000, for all jobs.
SDPX	Number of PP exchange priority requests, divided by 1000, for all jobs.
SDTO	Number of user limits detected by 1SJ, divided by 1000, for all jobs.
SDTS	Number of time slices detected by 1SJ, divided by 1000, for all jobs.

The following is a list of the E activity messages.

SEMC, xxxxxx.xxxKUNS.
SENW, application, jsn.

Identifier	Description
SEMC	Denotes program disconnection from message control system (MCS) and weighted number of calls to MCS.
SENW	Denotes NETOFF by application during job with job sequence name jsn.

The following is a list of the I activity messages.

SIAD.
SIDT, yy/mm/dd.
SISC, nn.
SISC.
SIUN, username.

Identifier	Description
SIAD	Denotes dumping of the account dayfile.
SIDT	Current date issued every hour, on the hour. Two blanks separate yy from the comma that precedes it.
SISC	Denotes user security count decremented to the value nn. If issued with no parameter, denotes user has violated security, but the system was unable to decrement the user security count because VALIDUs was not currently available.
SIUN	Denotes attempt to enter a secondary user username, while the secondary user command feature is disabled or the username/password/familyname is incorrect.

The following is a list of the P activity messages.

```
SPAC, filename, username, packname.
SPAL, filename, username, packname.
SPAP, filename, username, packname.
SPAS, filename, username, packname.
SPAT, filename, username, packname.
SPCG, filename, username, packname.
SPCT, filename, username, packname.
SPDD, filename, username, packname.
SPDF, filename, username, packname.
SPGT, filename, username, packname.
SPPG, filename, username, packname.
SPPM, filename, username, packname.
SPRP, filename, username, packname.
SPSA, filename, username, packname.
SPSD, filename, username, packname.
SPSF, filename, username, packname.
SPSV, filename, username, packname.
SPUA, filename, username, packname.
```

Identifier	Description
SPAC	Denotes permanent file SETPFAC operation.
SPAL	Denotes permanent file SETPFAL operation.
SPAP	Denotes permanent file APPEND operation.
SPAS	Denotes permanent file ASSIGNPF operation.
SPAT	Denotes permanent file ATTACH operation.
SPCG	Denotes permanent file CHANGE operation.
SPCT	Denotes permanent file CATLIST operation.
SPDD	Denotes permanent file DROPDS operation.
SPDF	Denotes permanent file DEFINE operation.
SPGT	Denotes permanent file GET or OLD operation.
SPPG	Denotes permanent file PURGE operation.
SPPM	Denotes permanent file PERMIT operation.
SPRP	Denotes permanent file REPLACE operation.
SPSA	Denotes permanent file SETASA operation.
SPSD	Denotes permanent file SETDA operation.
SPSF	Denotes permanent file SETAF operation.
SPSV	Denotes permanent file SAVE operation.
SPUA	Denotes permanent file UATTACH operation.

The following is a list of the T activity messages.

```
STD1, filename.
STD2, filename.
STD3, filename.
STD4, filename, length.
STD5, filename.
STF1, newfl.
STF2, newfl.
STF3, newfl.
STF4, newfl.
STS2, filename.
STS3, filename.
STS4, filename, length.
STS5, filename.
STS6, filename.
```

Identifier	Description
STD1	Denotes file attached for MSS destage.
STD2	Denotes MSS cartridge loaded for destage.
STD3	Denotes MSS copy to be initiaated for destage.
STD4	Denotes MSS copy complete for destage.
STD5	Denotes PFC has been updated for destage.
STF1	Denotes acquiring MSS streaming buffer.
STF2	Denotes returning MSS streaming buffer.
STF3	Denotes MSS FL increase.
STF4	Denotes MSS reduced to IDLE FL.
STS2	Denotes MSS cartridge loaded for stage request.
STS3	Denotes MSS copy to be initiated for stage request.
STS4	Denotes MSS copy complete for stage request.
STS5	Denotes PFC has been updated for stage request.
STS6	Denotes MSS copy from first cartridge complete for a multicartridge file.

USAGE INFORMATION

The U message group provides a breakdown of the usage of the system for a particular user. The message formats are:

Ueac, usage count descriptor.

The events (e character of Ueac) are defined as follows:

Character	Event Description
B	Accumulator begun.
C	Accumulator displayed and cleared.
D	Accumulator displayed and continued.
E	Accumulator displayed and ended.

The activities (ac characters of Ueac) are defined as follows:

Character	Activity Description
AC	Application unit charge.
AD	SRU adder accumulator.
AU	Application program accumulator.
CI	Characters transmitted into the system.
CO	Characters transmitted out of the system.
CP	CPU time.
CR	Cards read.
LP	Lines printed.
LS	Link size (size of file in PRUs transmitted over the link).
LV	Lines printed, V carriage control encountered.
MP	Matrix array processor III (MAP III) activity accumulator.
MS	Mass storage activity.
MT	Magnetic tape activity.
PC	Cards punched.
PF	Permanent file activity.
PL	Plotter activity.

Each accumulator is displayed in F10.3 format with a four-character unit descriptor after the value. The following are the descriptors.

Descriptor	Value
KCHS	Kilocharacters.
KCDS	Kilocards.
KLNS	Kilolines.
KPLS	Kiloplotunits.
KUNS	Kilounits.
SECS	Seconds.
UNTS	Units.

The following is a B activity message.

UBAU, xxxx.

Identifier	Description
UBAU	Denotes the beginning of the application program accumulator for the application xxxx.

Certain C event activity messages contain fields, mi and eqn, identifying the equipment upon which the particular activity took place. The mi characters are the machine identifier (MID entry in CMRDECK; refer to the NOS 2 Installation Handbook). The eqn characters are either the EST ordinal or terminal name of the device that performed the activity.

The following is a list of the C activity messages.

UCAC, xxxxxx.xxxUNTS.
UCAD, xxxxxx.xxxKUNS.
UCCI, xxxxxx.xxxKCHS.
UCCO, xxxxxx.xxxKCHS.
UCCR, mi, eqn, xxxxxx.xxxKCDS.
UCLP, mi, eqn, xxxxxx.xxxKLNS.
UCLV, mi, eqn, xxxxxx.xxxKLNS.
UCLS, ty, xxxxxx.xxxKUNS.
UCMP, xxxxxx.xxxKUNS.
UCMS, xxxxxx.xxxKUNS.
UCMT, xxxxxx.xxxKUNS.
UCPC, mi, eqn, xxxxxx.xxxKCDS.
UCPF, xxxxxx.xxxKUNS.
UCPL, mi, eqn, xxxxxx.xxxKPLS.

Identifier	Description
UCAC	Denotes the value of the AUC accumulator for a job when overflow occurred.
UCAD	Denotes the value of the SRU adder accumulator for a job when overflow occurred.
UCCI	Denotes the number of characters transferred into the system for a job (for interactive subsystem).
UCCO	Denotes the number of characters transferred out of the system for a job (for interactive subsystem).
UCCR	Denotes the number of cards read into the system for a job on equipment mi, eqn (described previously).
UCLP	Denotes the number of lines printed for a job on equipment mi, eqn (described previously).
UCLS	Denotes the amount of data sent or received over the network. The file length is specified in PRUs for file type ty.

ty	Description
IN	Input file.
PF	Permanent file.
PR	Print file.
PU	Punch file.

Identifier	Description
UCLV	Denotes the number of lines printed for a job in which the V carriage control character was used on equipment mi, eqn (described previously).
UCMP	Denotes the value of the MAP III activity accumulator for a job when overflow occurred.
UCMS	Denotes the value of the mass storage activity accumulator for a job when overflow occurred.
UCMT	Denotes the value of the magnetic tape activity accumulator for a job when overflow occurred.
UCPC	Denotes the number of cards punched for a job on equipment mi, eqn (described previously).
UCPF	Denotes the value of the permanent file activity accumulator for a job when overflow occurred.
UCPL	Denotes the number of plot units plotted for a job on equipment mi, eqn (described previously).

The following is a list of the D activity messages.

```
UDAC, xxxxxx.xxxUNTS.
UDAD, xxxxxx.xxxKUNS.
UDCI, xxxxxx.xxxKCHS.
UDCO, xxxxxx.xxxKCHS.
UDCP, xxxxxx.xxxSECS.
UDMP, xxxxxx.xxxKUNS.
UDMS, xxxxxx.xxxKUNS.
UDMT, xxxxxx.xxxKUNS.
UDPF, xxxxxx.xxxKUNS.
```

Identifier	Description
UDAC	Denotes the AUC accumulator for a job.
UDAD	Denotes the SRU adder accumulator for a job.
UDCI	Denotes the number of characters transferred into the system for a job (currently available only for interactive jobs).
UDCO	Denotes the number of characters transferred out of the system for a job (currently available only for interactive jobs).
UDCP	Denotes the accumulated CPU time for a job.
UDMP	Denotes the MAP III activity accumulator for a job.
UDMS	Denotes the mass storage activity accumulator for a job.
UDMT	Denotes the magnetic tape activity accumulator for a job.
UDPF	Denotes the permanent file activity accumulator for a job.

The following is a list of the E activity messages.

```
UEAC, xxxxxx.xxxUNTS.
UEAD, xxxxxx.xxxKUNS.
UEAU, xxxxxx.xxxUNTS.
UECI, xxxxxx.xxxKCHS.
UECO, xxxxxx.xxxKCHS.
UECP, xxxxxx.xxxSECS.
UEMP, xxxxxx.xxxKUNS.
UEMS, xxxxxx.xxxKUNS.
UEMT, xxxxxx.xxxKUNS.
UEPF, xxxxxx.xxxKUNS.
```

Identifier	Description
UEAC	Denotes the AUC accumulator for a job.
UEAD	Denotes the SRU adder accumulator for a job.
UEAU	Denotes the application program accumulator for a job step.
UECI	Denotes the number of characters transferred into the system for a job (currently available only for interactive jobs).
UECO	Denotes the number of characters transferred out of the system for a job (currently available only for interactive jobs).
UECP	Denotes the CPU time for a job.
UEMP	Denotes the MAP III activity accumulator for a job.
UEMS	Denotes the mass storage activity accumulator for a job.
UEMT	Denotes the magnetic tape activity accumulator for a job.
UEPF	Denotes the permanent file activity accumulator for a job.

The following usage summary for a job is always issued.

```
UeCO, xxxxxx.xxxKCHS.          Interactive jobs only.
UeCI, xxxxxx.xxxKCHS.          Interactive jobs only.
UeAC, xxxxxx.xxxUNTS.
UeAD, xxxxxx.xxxKUNS.
UePF, xxxxxx.xxxKUNS.
UeMS, xxxxxx.xxxKUNS.
UeMT, xxxxxx.xxxKUNS.          Tape users only.
UeCP, xxxxxx.xxxSECS.
```

e is an event identifier described in this section.

MULTILEVEL SECURITY INFORMATION

The M message group provides information relating to multilevel security activities. The message formats are:

Meac, additional information.

The events (e character of Meac) are defined as follows:

Character	Event Description
F	Local file security activity.
J	Job access level security activity.
P	Permanent file security activity.
S	System operation security activity.
U	User operation security activity.

The activity identifier (ac of Meac) identifies the information being recorded and is event dependent.

The following is the F activity message.

MFFI, filename, newlevel.

Identifier	Description
MFFI	Denotes an invalid attempt to change the access level of local file filename to newlevel.

The following is the J activity message.

MJJI, oldlevel, newlevel.

Identifier	Description
MJJI	Denotes an invalid attempt to change the job access level from oldlevel to newlevel.

The following is the P activity message.

MPNF, filename, username, packname.

Identifier	Description
MPNF	Indicates the user has attempted to access file filename belonging to alternate user username on pack packname and has been denied access for any reason (file-not-found error).

The following is a list of the S activity messages.

MSSA, username.
MSSI, username.
MSEQ, est, lowerlevel, upperlevel.
MSOT, ot, lowerlevel, upperlevel.

Identifier	Description
MSSA	Security unlock status has been set at the console with user username.
MSSI	Denotes an invalid attempt to set security unlock status at the console with user username.
MSEQ	The operator has changed the equipment access level limits for the unit record equipment with EST ordinal est.
MSOT	The operator has changed the origin type access level limits for origin type ot.

The following is a list of the U activity messages.

MUPW.
MUPX.

Identifier	Description
MUPW	Indicates the user has changed the user password.
MUPX	Indicates the user has changed the user password expiration date.

SYSEDIT 6

After the system is loaded, the SYSEDIT command provides a method of performing modifications to the system library. A job containing a SYSEDIT command must either be a system origin job, or the user must be validated for system origin privileges and the system must be in debug mode. In addition, to prevent unauthorized modification of the operating system on a secured system, SYSEDIT will be allowed only from jobs with security administrator privileges.

NOTE

> The use of SYSEDIT in a production environment may cause unpredictable results and is not recommended. The system should be idle to ensure predictable results.

The format of the command is

SYSEDIT,p_1,p_2,...,p_n.

where parameter p_i is either a keyword or a keyword equated to a value.

p_i	Description
B=repfile	Replacement records are on file repfile.
B	Same as B=LGO.
B=0	No replacement file.
B omitted	Same as B=LGO.
C	Checkpoint of the system follows SYSEDIT.
C omitted	No checkpoint is performed unless the system was generated employing the alternate system library residency feature, and in that case the checkpoint automatically follows SYSEDIT.
I=infile	Directive input is on file infile.
I	Same as I=INPUT.
I=0	No directive input.
I omitted	Same as I=INPUT.
L=outfile	List output is on file outfile.
L	Same as L=OUTPUT.

Pi	Description
L=0	No list output.
L omitted	Same as L=0.
NA	SYSEDIT does not abort if the system file is busy. Execution continues when the system file is no longer busy.
R=n	Restoration is made to copy n of the system. The system copy number is printed on the output listing.
R	Restoration is made to initial deadstart system.
R=0	No system file restoration.
R omitted	Same as R=0.
Z	Directive input follows the terminator on the command. The I option is ignored.
Z omitted	The system uses the I option for directive input.

NOTE

If the Z option is specified, a terminator must not be placed after the input directives.

DIRECTIVES

The following are input directives to SYSEDIT. *CM, *MS, *AD, *PROC, *SC, *FL, and */ directives can be placed on LIBDECK (refer to the NOS 2 Installation Handbook). A list of valid record types follows the directive descriptions.

*CM DIRECTIVE

The *CM directive specifies the system library routines that are to reside in CMR. These routines will reside in the resident peripheral library (RPL) and resident central library (RCL).

The format of the directive is:

$*CM,ty_1/rec_1,ty_2rec_2,\ldots,ty_n/rec_n$

Parameter	Description
ty_i/rec_i	Record type and record name of the routine.

Central memory has the best accessibility of all storage devices for PP programs. The following programs will automatically reside in central memory.

- Mass storage drivers.
- Programs specified in the internal tables of SLL (SYSEDIT service routine), such as 1DD and 0DF.

In addition, it is suggested that high usage PP programs (such as 1MT, 1MS, and PFM) reside in central memory.

Any addition to central memory allows less space for user jobs.

REL type records cannot reside in central memory.

*MS DIRECTIVE

The *MS directive identifies which system library routines will reside on the system device. It is the default residence for routines; any routine not specified as *CM will automatically reside on the system device, even if *MS is not entered in the LIBDECK.

The format of the directive is:

*MS,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n

Parameter	Description
ty_i/rec_i	Record type and record name of the routine.

*AD DIRECTIVE

The *AD directive places copies of specific system library routines on particular mass storage devices so that they will be accessed from a device other than the system device. For example, it is advantageous:

- To place frequently used system library routines in extended memory for faster access than is possible from the system device. Observe that CPU programs residing in extended memory can be accessed faster than CPU programs residing in central memory.
- To place PP routines on a mass storage device that has better latency than does the system device.

Once a routine is on an alternate system device, it is accessed from that device instead of from the system device (*MS LIBDECK entries), except in the following cases of error recovery.

- If there is an unrecoverable error for a PP routine on an alternate system device, all of the PP routines will subsequently be accessed from the system device instead of from any of the alternate system devices.

- If there is an unrecoverable error for a CPU, ABS, or OVL routine on an alternate system device, only that routine will subsequently be accessed from the system device.

- If there is an unrecoverable error for an REL CPU routine, the alternate system device must be turned off by the operator to prevent further access to the routine. In this case, the system copy will be used for backup. The alternate system device is not used for loads.

The devices that are to be used as alternate system devices are specified with the ASR entry in the CMRDECK (refer to the NOS 2 Installation Handbook); the routines that are to reside on each alternate system device are specified in LIBDECK.

The format of the directive is:

$*AD,xx,ty_1/rec_1,ty_2/rec_2,\ldots,ty_n/rec_n$

Parameter	Description
xx	One- to two-digit EST ordinal or two-character equipment type of the equipment to be used as an alternate system device. The equipment can be any nonremovable mass storage device (including extended memory) except for a system device. The EST ordinal specified cannot be larger than 37_8. If the equipment is not specified in the EQPDECK with the ASR entry, the *AD entry is ignored without an error indication when the system is loaded.
ty_i/rec_i	Record type and record name of the routine.

ty_i Record type of routine:

Record Type	Description
ABS	CPU multiple entry point overlay.
OVL	CPU overlay.
PP	PP absolute.
REL	Relocatable CPU routine.

If a record type other than ABS, OVL, PP, or REL is specified, the message ILLEGAL CM/AD RESIDENCE. is issued to the output device; the run is aborted.

rec_i Record name of routine. A routine is allowed on only one alternate system device.

The following are additional qualifications.

- Once a routine is placed on an alternate system device, SYSEDIT may be used to prohibit access to the routine; however, the space for that routine is not released until LIBDECK is modified and the system is reloaded.

- If extended memory is an alternate system device, all ABS, OVL, or REL routines residing there will be loaded from extended memory directly to the load address.

- If DDP is available, PP programs residing in extended memory will be loaded via DDP, and CPU programs will be loaded via the CPU access to extended memory.

*PROC DIRECTIVE

The *PROC directive identifies a record as a procedure. As such, it can be treated as any command, invoked by name with parameters as required by the procedure itself. Further information on procedure creation and execution can be found in the NOS 2 Reference Set, Volumes 2 and 3.

The format of the directive is:

*PROC,rec_1,rec_2,...,rec_n

Parameter	Description
rec_i	Record name of routine to be defined as a procedure file.

*SC DIRECTIVE

The *SC directive specifies the commands in a certain program that are to be processed in product set format rather than in NOS format (refer to the NOS 2 Reference Set, Volume 3).

The format of the directive is:

*SC,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n

Parameter	Description
ty_i/rec_i	Record type and record name of the routine to be processed in product set format.

*FL DIRECTIVE

The *FL directive specifies the field length that routines to be loaded require to begin execution.

The format of the directive is:

*FL,ty_1/rec_1-fl_1,ty_2/rec_2-fl_2,...,ty_n/rec_n-fl_n

Parameter	Description
ty_i/rec_i	Record type and record name of the routine.
fl_i	Field length divided by 100_8 required by the routine.

The actual field length obtained is subject to the rules governing RFL= and MFL= entry points, since the specified fl_i field is placed in the library directory. The system uses this information to determine field length in the following manner.

1. If bit 11 is not set, an RFL= entry point is indicated. The field length is set to the value in the entry.

2. If bit 11 is set (indicating a value of 400000_8), an MFL= entry point is indicated. The field length is determined in one of two ways.

a. If bit 10 is also set, the field length is set to the maximum of the value of the last RFL command and the value in the entry after masking off these upper 2 bits.

b. If bit 10 is not set, the field length is set to the maximum of the existing field length and the value in the entry after masking off these upper 2 bits.

*/ DIRECTIVE

The */ directive specifies comment lines that are listed on the output file. Other than being listed on the output file, comment lines are ignored. They can occur any place in the directives file or on LIBDECK.

The format of the directive is:

```
*/ comment
```

Parameter	Description
comment	A comment line can contain any valid characters and be used for any purpose.

*DELETE DIRECTIVE

The *DELETE directive deletes a record from the system. It cannot, however, delete a user library (ULIB type record).

The format of the directive is:

*DELETE,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n
    or
*D,ty_1/rec_1,...,ty_n/rec_n

Parameter	Description
ty_i/rec_i	Record type and record name to be deleted from the system. ty_i must not be ULIB.

*FILE DIRECTIVE

The *FILE directive declares an additional file containing records to be added to the system or to logically replace records on the system.

The format of the directive is:

```
*FILE,filename
    or
*FILE,filename,NR
```

Parameter	Description
filename	Name of local file containing addition or replacement records to be placed on the system. File filename is rewound before processing if NR is omitted.
NR	Optional parameter that inhibits rewinding of file filename before processing.

*IGNORE DIRECTIVE

The *IGNORE directive specifies that records on a replacement file are to be ignored. If no *FILE directive precedes an *IGNORE directive, SYSEDIT ignores the records named on this directive on the replacement file specified by the B parameter. If one or more *FILE directives precede an *IGNORE directive, SYSEDIT ignores the records on the file specified in the most recent *FILE directive.

The format of the directive is:

$*IGNORE,ty_1/rec_1,ty_2/rec_2,\ldots,ty_n/rec_n$

Parameter	Description
ty_i/rec_i	Record type and record name to be ignored on the current replacement file.

*PPSYN DIRECTIVE

The *PPSYN directive specifies one or more names to be synonymous with the name of an existing PP routine.

The format of the directive is:

$*PPSYN,name/name_1,name_2,\ldots,name_n$

Parameter	Description
name	Name of existing PP routine.
$name_i$	Additional (synonymous) name for name.

RECORD TYPES

The following record types may be specified in SYSEDIT directives.

Type	Description
ABS	Multiple entry point overlay.
CAP	Fast dynamic load capsule.
OPL	Modify old program library deck.

Type	Description
OPLC	Modify old program library common deck.
OPLD	Modify old program library directory.
OVL	Central processor overlay.
PP	Peripheral processor program.
PPU	Peripheral processor unit program.
PROC	Procedure file.
REL	Relocatable central processor program.
TEXT	Unrecognizable as a program.
ULIB	User library.

SYSTEM FILE INITIALIZATION 7

This section describes the system mechanisms used to initialize the fast-attach files used by MODVAL, PROFILE, and RESEX.

ISF

The ISF command initializes the fast-attach system files VALIDUs, PROFILa, RSXDid, and RSXVid.† A fast-attach file is a special direct access file under user index 377777_8 that is initialized with the E parameter on the ISF command and released with the R parameter on the ISF command. However, in order to release a fast-attach file, an idle family situation must be present. That is, the job containing the ISF,R=filename. command must be the only job in the family (family count is zero, and the direct access file count equals the number of fast-attach files). Therefore, the DSD command, IDLEFAMILY, must be used to clear the system of all other jobs, and when the above conditions have been met [refer to the mass storage status display (E,M) in the NOS 2 Operator/Analyst Handbook], the IDLEFAMILY command must be used again to allow the ISF command to be entered. The ISF command is entered using the DSD command, X., to release the fast-attach file(s). Refer to the NOS 2 Operator/Analyst Handbook for information about the DSD commands.

The fast-attach file mechanism provides a method to be used by special system jobs for files which are to be retained as permanent files but have a high enough access rate to make permanent file ATTACHs excessively time-consuming. When a permanent file is activated as a fast-attach file, an entry in the system FNT is made which retains the basic data normally kept in the catalog entry and system sector of the file (interlocks and file name). This dispenses with the catalog search and system sector read normally necessary to attach a permanent file.

If the file is a shared (global) fast-attach file for a multimainframe network, additional information is also maintained in the fast-attach table (FAT) on the link device. The type of file determines whether it is entered as global fast-attach or local fast-attach. This criterion is kept internal to ISF. Basically, VALIDUs and PROFILa are entered as global fast-attach files if they reside on a shared device. The resource files are always entered as local fast-attach. A limit of 77_8 exists on the number of files that can be entered as global fast-attach in a multimainframe environment.

Because of the special nature of fast-attach files, a job containing an ISF command must be a system origin job. Processing of the command causes a search of the system permanent file catalog (UI=377777_8) for files with the predefined names previously listed. They are defined in a table internal to ISF. The format of the ISF command is:

```
ISF,er,FM=familyname,SJ=filename,SP=filename.
```

†The resource files are generated and maintained uniquely for each machine id in a multimainframe or single-mainframe system by appending the machine id to the file name (for example, RSXVid becomes RSXVAB on the machine with an id of AB).

Parameter	Description
er	File to be initialized or released.

er	Description
E=filename	System file that is initialized. If E=0 or no filename is specified (neither E nor R appear), all files defined in the ISF table are initialized (refer to table 5-1).
R=filename	Currently active system file that is released from fast-attach status. If R=0, all of the files in the ISF table for the specified family that are currently active are released. When this option is specified, an idle family situation (family count is zero, and the direct access file count equals the number of fast-attach files) must first be created with the IDLEFAMILY command. When the family is idle, the IDLEFAMILY command must be entered again so that the system will accept the ISF command. (Refer to the NOS 2 Operator/Analyst Handbook for information about the IDLEFAMILY command.)

NOTE

Since initialization and release are mutually exclusive, E and R cannot appear on the same command.

Parameter	Description
FM=familyname	Family of devices. If FM is not specified, the calling job's current family is used. The calling job's family will be restored upon exit from ISF.
SJ=filename	Job file that ISF submits as a system origin job. The file must be an indirect access permanent file stored under the system user index (377777_8). If SJ is specified without =filename, ISF assumes SJ=SYSJOB. If SJ=0 is specified, no job is submitted.
SP=filename	Procedure file that ISF calls with system origin. The file must be an indirect access permanent file stored under the system user index. If SP is specified without =filename, ISF assumes SP=SYSPROC. If SP=0 is specified, no procedure is called.

ISF is automatically executed at each deadstart (refer to Deadstart Sequencing later in this section). This enables the use of SYSJOB and/or SYSPROC to SYSEDIT local modifications into the system.

ISF can also be entered as a command from the console with the DSD X. command (refer to the NOS 2 Operator/Analyst Handbook) or from any system origin job.

The matrix in table 7-1 shows how the initialize (E) and release (R) parameters affect individual fast-attach files.

Table 7-1. Initialize and Release Parameters of Fast-Attach Files

Name of Fast-Attach System File	Option	
	Initialize (E)	Release (R)
VALIDUs PROFILa	Make global fast attach.	Return from fast attach to normal direct access.
RSXDid RSXVid	Make local fast attach. If the file does not exist in the system catalog (UI=377777_8), ISF creates the file and makes it a fast-attach file. The file is created with the backup requirement set to none (BR=N). This prevents PFDUMP from dumping the file. If either RSXDid or RSXVid is specified, ISF initializes both files.	Return from fast attach to normal direct access. If either RSXDid or RSXVid is specified, ISF returns both files to normal direct access.

One use of the R option is to release fast-attach files activated on a device that is to be initialized or unloaded. Device initialization is not initiated as long as any direct access files are active on the device (an activated fast-attach file is treated the same as an active direct access file). Until these files are released, the system will reply to an attempted device initialization with the error message:

```
ACTIVE FILES ON DEVICE
```

Similarly, a device cannot be unloaded until all its fast-attach files are released.

DEADSTART SEQUENCING

During a level 0 deadstart, a job is queued for input with a service class of DSSC. This job executes the PP routine CMS, whose normal functions include mass storage initialization and recovery. After completing these functions, CMS checks its service class. If the service class is DSSC (indicating a deadstart sequencing call), CMS places one of the following ISF commands in its command buffer and causes the system to execute it.

```
ISF,FM=0,SJ.     (recovery deadstarts)
ISF,FM=0,SJ,SP.  (other deadstarts)
```

The CMS deadstart sequencing job begins execution only after job processing has been enabled by the DSD AUTO. or MAINTENANCE. command. The job scheduler prohibits scheduling of all other jobs until the CMS job completes, thereby ensuring that all system files in the default family are initialized and that a SYSPROC procedure (if any) is executed before normal job processing begins (refer to ISF).

GENVAL

The GENVAL command creates a VALIDUs file and a corresponding VALINDs file on a family device that does not already have a VALIDUs file. This is usually a family device that has just been initialized. The new VALIDUs file contains only the special user names (refer to Special User Names in section 5).

GENVAL can be entered from the console or from a system origin job. The format is:

```
GENVAL,FM=familyname.
```

The default family is used if the FM=familyname parameter is not specified. GENVAL aborts if a VALIDUs file currently exists under user index 377777_8. After GENVAL creates the validation files, the ISF,FM=familyname. command is used to make the files fast-attach files (refer to ISF).

After this procedure is completed, MODVAL can be used to add new user names to the VALIDUs file created.

MULTIMAINFRAME OPERATION 8

Multimainframe operation provides mechanisms by which more than one computer can share mass storage devices. Each mainframe in the multimainframe has access to the shared devices and their preserved files. Preserved files are those which are retained across a level 0 deadstart (nonsystem recovery). Types of preserved files are permanent files, queued files, and system dayfiles.

There are two types of multimainframe operation: extended memory multimainframe and independent shared device multimainframe. Extended memory multimainframe maintains the critical device tables in extended memory, while the independent shared device multimainframe maintains the tables on each shared device (refer to Overview later in this section). Because the independent shared device multimainframe maintains the tables on the shared devices, it causes some performance degradation. In an ECS multimainframe complex, up to 4 computers may access shared mass storage devices; in an independent shared device multimainframe complex, up to 16 computers may access shared mass storage devices.

Any combination of 1 to 16 model 71, 72, 73, 74, 171, 172, 173, 174, 175, 176,† 720, 730, 740, 750, 760, 815,† 825,† 835,† 845,† 855,† 865, 875 mainframes or 6000 Computer Systems mainframes may comprise a multimainframe complex. For an ECS multimainframe complex, each mainframe requires one CPU port. The presence of a DDP on a CPU port decreases by one the total number of mainframes that may run together.

Each mainframe in a complex may operate in a multimainframe mode or in stand-alone mode; however, two machines may not access the same device unless both are in multimainframe mode. A device is considered shared if it can be accessed by more than one of the mainframes; it need not be accessible to all the mainframes in the complex. ECS multimainframe supports 844 (single and double density), 885-11/12, and extended memory devices as shared devices. The independent shared device multimainframe supports 844 (single and double density) and 885-11/12 (single and double density) devices as shared devices.

The fact that a computer is operating as part of a multimainframe complex is not apparent to the user, except for some degrading of performance for the independent shared device multimainframe. However, there are operational changes and additions which are of importance to the operator. These include deadstart commands, displays, on-line commands necessary in the event of an interruption on one of the sharing mainframes, and the UNLOAD/MOUNT process for removable devices.

The MSS can be used in a multimainframe complex. In an independent shared device multimainframe complex, MSS is physically connected to one mainframe in the complex and only that mainframe can access it. In an ECS multimainframe complex, one mainframe in the complex is physically connected to MSS and is called the master mainframe; all other mainframes in the complex can access MSS files and are called slave mainframes. MSSEXEC runs on the master mainframe and is the main processing program that controls MSS activity. MSSSLV runs on each slave mainframe and communicates with MSSEXEC to retrieve files from MSF in response to ATTACH requests by jobs running on the slave mainframes.

†Models 176, 815, 825, 835, 845, and 855 can be used in an independent shared device multimainframe environment but not in an ECS multimainframe complex.

OVERVIEW

In an ECS multimainframe complex, the means and medium for controlling shared mass storage and intermainframe communication is extended memory. Each mainframe has a CPU port into extended memory through which system activity is controlled. In order to control shared mass storage devices, several extended memory-resident tables are required. The device access table (DAT) contains the logical description (family name/pack name and device number) of each mass storage device (shared or nonshared) which is accessible by any machine in the complex. For each device in the DAT which is to be accessed by more than one machine, a corresponding MST (image of central memory resident MST) and TRT also reside in extended memory. In addition, a machine recovery table (MRT) exists in extended memory for each machine and device (that is, there are as many MRTs for each shared device as there are mainframes in the complex).

In the independent shared device multimainframe complex, each shared device contains in its label track all of the tables necessary to control multimainframe access. These tables include the MST, TRT, device index table (DIT), and MRT for each mainframe sharing the device. Whenever a mainframe needs to access a shared device, it is necessary for the mainframe to ensure its copies of these tables are up-to-date.

In an independent shared device multimainframe complex one or more of the mainframes can have extended memory, but each mainframe's extended memory must be used as a nonshared device.

Recovery allows a machine to either join other machines operational in a multimainframe complex or to operate in a stand-alone mode. The stand-alone system is not allowed to use the same mass storage devices as other machines. In the event of a system interruption to one machine, it is possible to operate the remaining machines in a multimainframe environment.

Automatic detection of extended memory is not provided, because it is not possible to determine its absence and continue to run on all machine types. For example, a 6600 will hang if an attempt is made to execute an extended memory instruction without extended memory. Extended memory status is checked during deadstart when processing an extended memory entry in the EQPDECK.

Except where explicity specified that controllers and/or equipment can be shared between mainframes, assume they cannot be shared. For example, NOS does not support sharing a two-channel tape controller between mainframes; nor does it support sharing mass storage controllers except as specified in this section.

DEADSTART

A multimainframe environment is defined at deadstart by CMRDECK and EQPDECK entries in each machine. The following entries are used to do this.

CMRDECK Entry	Description
MID=id.	Two-character machine identification. This identification is used to associate a specific machine with its access to a shared device. It is required, however, even if no devices are shared during system operation. This id must be unique for each machine in the complex. (If not specified, the default value is MID=AA.)

EQPDECK Entry	Description
SHARE=$est_1,est_2,\ldots,est_n$.	est_i are the EST ordinals of the mass storage devices which will be shared with other machines in an ECS multimainframe complex. The MST/TRT for each device resides in extended memory.
ISHARE=$est_1,est_2,\ldots,est_n$.	est_i are the EST ordinals of the mass storage devices which will be independently shared with other machines in the independent shared device multimainframe complex. The ISHARE entry must precede the PRESET entry. The MST/TRT resides on each shared device.
PRESET,n. or PRESET=$est_1,est_2,\ldots,est_n$.	The first format is used for ECS multimainframe. The second format is used for the independent shared device multimainframe. Only one PRESET entry can be specified. This entry can be specified only at the system console. For ECS multimainframe, n is the number of devices to be shared in the complex. The PRESET entry must be specified on a level 0 deadstart on the first machine to be deadstarted in the multimainframe complex. This entry initializes the flag register and ECS multimainframe resident tables. If n is not supplied, the default value is the number of shared devices defined for the particular machine. For the independent shared device multimainframe, est_i is the EST ordinal of the shared mass storage device to be preset. The PRESET entry can be specified only on a level 0 deadstart by the first machine accessing the device and must follow the ISHARE entry. PRESET initializes the tables residing on the label track of the shared devices.

These entries are also described in the NOS 2 Installation Handbook.

Since in a multimainframe complex two or more machines can utilize the same mass storage devices, the device assignments and EQPDECKs of all machines are interrelated. Care must be taken to ensure proper EQPDECK settings for each machine to obtain the desired device configuration. The following items are important in obtaining this proper device configuration.

- Each machine must specify a unique machine identification (using the MID entry in the CMRDECK). This id associates a particular machine with its files on a shared device. There are no external characteristics associated with this identification. However, if the machine identification specified on a machine deadstarting into a multimainframe complex is identical to a machine identification on a machine already operating, the deadstart process halts and an appropriate message is displayed.

- The assignment of shared mass storage devices should be made properly to ensure the recoverability of the device and the proper operation of the system (refer to Shared Mass Storage).

- If SHARE EQPDECK entries are present, indicating an ECS multimainframe environment, an ECS entry (DE or DP equipment type) must also be present in the EQPDECK. If none is found, an error message is given to the operator indicating that no link device has been defined.

- Each machine in an independent shared device multimainframe complex must specify the ISHARE=est EQPDECK entry to inform the system that devices will be shared in the independent shared device mode.

- The first machine deadstarted (level 0 only) in an ECS multimainframe complex must specify the PRESET EQPDECK entry. This command causes tables to be preset in ECS, and in so doing, assures that no other machine has arrived at the same point in the deadstart sequence and is attempting the same thing. These other machines should not have the PRESET entry specified during deadstart. All other machines which arrive at that point in the deadstart process display a message indicating that they are waiting for deadstart on the preset machine. A machine that does not preset extended memory has no means of detecting whether extended memory has been preset previously by another machine. Therefore, the operator must ensure that extended memory has been preset by a prior deadstart before deadstarting another machine which is to be in the multimainframe complex.

- On a level 0 deadstart in an independent shared device multimainframe complex, any shared device that has not been shared prior to this deadstart must include the PRESET entry in its definition.

- On a level 0 deadstart in an independent shared device multimainframe complex, if a device was previously shared by the deadstarting machine, the MRT and DIT device resident tables must be zeroed out.

  - If the independent shared device multimainframe machines that share the device are not currently running, the device must be preset or initialized to zero out the tables.

  - If any independent shared device multimainframe machine that shares the device is running, the machine recovery utility (MREC) must be run from a running independent shared device multimainframe machine to remove the machine id of any machines that are not currently running and to clear all interlocks held by these machines. Refer to the NOS 2 Operator/Analyst Handbook.

- On a level 0 deadstart in an independent shared device multimainframe complex, if a device was previously shared by a machine other than the deadstarting machine, the MRT and DIT device-resident tables may or may not have to be zeroed out.

  - If another independent shared device multimainframe machine that is sharing the device is running, the device must not be preset.

  - If no independent shared device multimainframe machines that will be sharing the device are running and one or more of them will be deadstarted at a level 1, 2, or 3, the device must not be preset.

  - If all independent shared device multimainframe machines that will be sharing the device are not currently running and all will be deadstarted at level 0, the device can be preset or initialized.

- If extended memory is initially placed in maintenance mode (half of extended memory used for on-line diagnostics), the first machine deadstarted in a complex must have the INITIALIZE and PRESET EQPDECK entries specified when deadstarting (level 0 only). The remaining machines must have the extended memory size correspondingly reduced in their EQPDECKs.

When a mainframe joins an independent shared device multimainframe complex, it is identified only by its machine id (MID). When a mainframe joins an ECS multimainframe complex, it is associated with an identification which it utilizes during system operation but which is independent of the machine id. This association is done during deadstart when the machine investigates the multimainframe (MMF) tables residing on the link device and places its machine id in an empty slot of the four that are available. Associated with each slot is a unique machine index and a unique machine mask, which the machine uses either to index itself into various MMF tables or to identify itself in these tables. The indices are 1, 2, 3, and 4. The masks are 1, 2, 4, and 8.

When a level 0 recovery deadstart will be performed on one of the machines in an ECS or an independent shared device multimainframe complex, the MREC utility should be run on some or all of the remaining machines before the deadstart proceeds. The purpose of this utility is to clear interlocks held by the machine to be deadstarted which have not been cleared by CPUMTR. It can also recover mass storage space on a shared device that is currently not accessible because of a machine interruption (necessitating a level 0 deadstart). MREC may have to be run from more than one machine since it affects only shared devices (that is, devices specified on the SHARE EQPDECK entry) of the machine on which MREC is run. If the interrupted machine shares different devices with different machines, MREC must be run from enough machines to account for all devices shared with the interrupted machine. The operator interface to MREC is described in the NOS 2 Operator/Analyst Handbook.

Figure 8-1 generally illustrates the steps needed to deadstart a machine in a multimainframe complex.

If a level 3 recovery deadstart will be performed in an ECS multimainframe complex, ECS must be intact as well as CMR. For a level 1 or 2 recovery in an MMF environment, ECS must be intact.

In an independent shared device multimainframe complex, as in a stand-alone system, critical tables which reside on the device must be intact for a level 1, 2, or 3 deadstart recovery.

SHARED MASS STORAGE

A major reason for operating a multimainframe complex is to be able to share mass storage devices between machines. Thus, the users of two systems may be able to utilize the same files if these files reside on a shared mass storage device. Having the ability to share files between systems also means that several additional procedures are required when operating a multimainframe complex. Additional consideration must also be given when assigning mass storage. This material, which is unique to multimainframe operation, is discussed in the following sections.

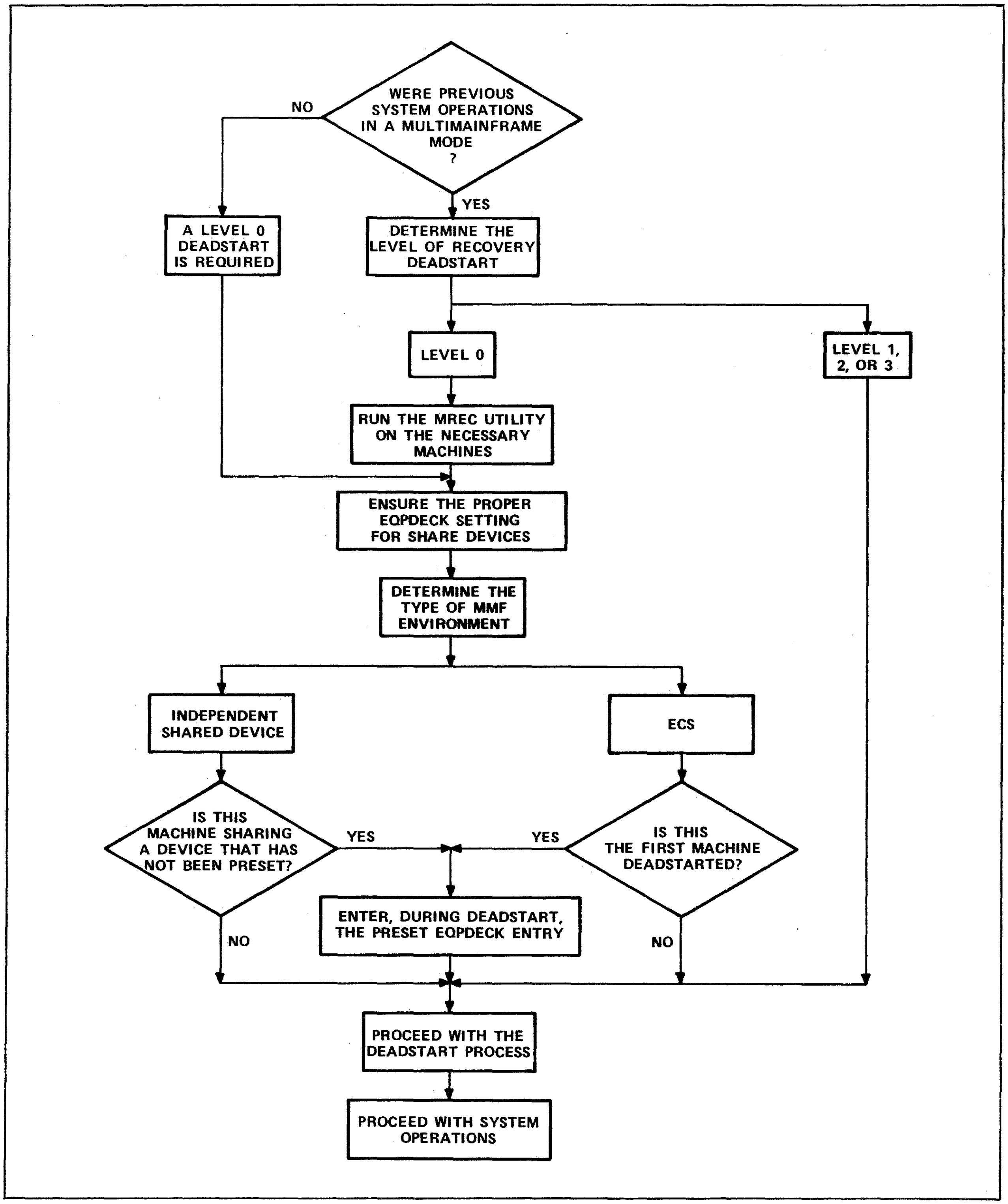


Figure 8-1. Deadstarting a Machine in a Multimainframe Complex

ASSIGNING SHARED MASS STORAGE

Some consideration should be given as to which devices should be made shared devices and which ones should not. Since a shared device contains preserved files which can be accessed by more than one machine, it must be physically connected to and logically defined (as shared) by each machine sharing the device. If one device of a family is defined as shared, then normally all devices in the family should be defined as shared for accessibility. If a removable device will be treated as shared, it must be defined as removable in each machine sharing it. If a shared device is not removable, additional use of the device (beyond preserved files) is defined by each machine, independently of any other machine definition (that is, each machine must decide whether the device is to contain such things as a copy of the system or temporary files).

There is no real advantage in having nonpreserved files on a shared device, unless spreading them across shared devices outweighs having them on a dedicated device. A key factor is drive and controller contention. Another factor is whether or not enough drives and accesses to those drives are available to warrant the spreading of temporary files across several devices from all systems. Also, additional overhead is incurred by the system for each shared device. This includes additional CMR space for each device (100_8 CM words) and additional time that is required to maintain the device-related tables (such as the MST or the TRT) on the link device. These factors must be weighed to determine how best to configure shared devices.

In an independent shared device multimainframe complex, where device-related tables are maintained on the device itself, system performance degradation can occur if the shared devices are not properly configured. Since the device must be accessed every time its tables in CMR are not up to date, drive and controller contention is increased and system performance is affected. The following can be done to reduce the impact on system performance:

- Put the system and temporary files on nonshared devices.

- Put only those fast-attach files that must be global on shared devices.

- Use multiple channels and multiple controllers to improve performance and provide additional paths to shared devices.

DEVICE ACCESS TABLES

Mainframes in an ECS multimainframe complex determine device usage via DATs. The DATs identify the status of all the shared and nonshared devices for the mainframes in the complex. One DAT for each machine resides in extended memory.

In order to minimize configuration problems, shared removable equipment should be configured the same way on all machines in the complex. For example, if one system defines three shared units as three single-unit devices and another system defines the same units as one three-unit device, the first system can accommodate a two-unit device on these units, whereas the second system would consider it an error. Unless the configurations are the same on all machines, any devices mounted on those drives may not necessarily be recoverable on all machines.

NOTE

RESEX considers only the configuration of the machine on which it is executing in its over-commitment algorithm.

DEVICE INDEX TABLES

In an independent shared device multimainframe complex, DITs are used to determine device usage. The DITs contain the MIDs of the mainframes that can access the shared device. The shared device maintains a DIT for each mainframe that shares it. The DITs reside on each shared device within the MST on the device's label track.

MASS STORAGE RECOVERY TABLES

One problem that is created by having more than one machine sharing a mass storage device is that of recovering the mass storage space and interlocks of a machine, should it require recovery processing. This problem is solved by defining a table which provides the information needed to recover the mass storage space of a machine and by having a machine recovery utility which performs the recovery. The table is called the MRT. There is one MRT for each mainframe per device. It tells which tracks are interlocked and which tracks are first tracks of files local to a particular machine. The MRT is utilized by CPUMTR on another machine to clear track interlocks and by the MREC on another machine to recover the mass storage space of the interrupted machine. For specific information on the MRT, refer to the NOS 2 Systems Programmer's Instant.

DEVICE INITIALIZATION

To initialize a mass storage device, it is necessary first to prevent any new activity from starting up on the device, then to wait until all current activity has completed, and finally to interlock the device and proceed with initialization. To accomplish this on shared mass storage devices in a multimainframe environment, the following steps must be taken.

1. All machines sharing the device must unload it by entering the DSD UNLOAD command to prevent any new activity. (This command can be used for both removable and nonremovable shared devices.) Refer to the Device Unload section in the NOS 2 Operator/Analyst Handbook.

2. The DSD INITIALIZE command should be entered on the machine from which the initialization is to take place.

    - In an ECS multimainframe complex, if it is found that the INITIALIZE command has been entered from another machine, an error message is displayed. Refer to the NOS 2 Operator/Analyst Handbook.

    - In an independent shared device multimainframe complex, each entry of the INITIALIZE command toggles INITIALIZE on and off. If two machines in the complex enter the INITIALIZE command, the INITIALIZE command is toggled off and no error message is displayed.

3. The machine from which the INITIALIZE was entered monitors the status of the other machines that are sharing the device. Once they have unloaded the device and user activity has ceased, initialization proceeds.

    - In ECS multimainframe, the device tables are updated and the device is checkpointed.

    - In the independent shared device multimainframe, the device tables are updated.

4. To activate the device on the other machines, the DSD MOUNT command must be entered from each machine. This command clears the UNLOAD status.

   - In an ECS multimainframe complex, if initialization is still in progress on another machine when a MOUNT command is entered, the MOUNT process is terminated with an error. Refer to the NOS 2 Operator/Analyst Handbook.

   - In an independent shared device multimainframe complex, if initialization is still in progress on another machine when a MOUNT command is entered, the machine waits for INITIALIZE to finish and then continues with the MOUNT process.

DEVICE UNLOAD

In a multimainframe environment, unloading a device involves more than it does under a one machine system. A device can be unloaded from a machine (referred to as a local unload), or it can be unloaded from the entire multimainframe complex (referred to as a global unload). A device can be physically removed from the complex only after a global unload has been accomplished. The general procedure to complete a global unload is illustrated in the following.

1. Enter the UNLOAD command from each machine. This is an indication to the machine that no new accesses should be initiated. This command must be entered from each machine sharing the device.

2. When all local unloads are set and user access has ceased, global unload status is set if the device is a removable device. This global unload status is displayed on all machines, indicating that there is no activity on the device from any machine and that the device may be physically unloaded.

3. The operator can then switch packs and enter the MOUNT command at the console to initiate recovery of the device. The MOUNT command clears the global unload status and the local unload status on the machine from which it was entered and indicates that this machine is now accessing the device. All other machines continue to ignore the device until the MOUNT command is entered on each machine. The MOUNT command does nothing if local unload status is not set on the machine.

4. In an independent shared device multimainframe complex, a pack which has not been previously mounted in this system must be preset with a MOUNT,est,P. command.

DEVICE RECOVERY

Deadstart and on-line recovery methods are similar in logic for recovering mass storage devices.

In an independent shared device multimainframe complex, for a machine to recover a device, the MID of the machine must be in the device's DIT. If the MID is not in the DIT, an error message is issued and recovery is impossible. When recovering a device in a stand-alone environment, the device is not checked if it is/was an independent shared device.

When a device is recovered in an ECS multimainframe, the DAT in ECS is interlocked while a check is made to see if an entry exists for this device. The presence of an entry indicates that another machine is also accessing the device. If an entry is found and the machine recovering the device has not been instructed to share it, an error is indicated and recovery halts with an appropriate message displayed. If the machine already accessing the device is not allowing it to be shared, the same error condition occurs. Therefore, if an ECS multimainframe device is being accessed, another machine can recover that device only if the recovering machine and the accessing machine use the device in an ECS multimainframe mode.

NOTE

In an ECS multimainframe complex, if two devices recovered on separate machines have the same family name/device number or pack name, there is no method of determining whether or not they are the same device if both are shared. If they are different devices, they are both destroyed when used.

DEVICE CHECKPOINT

Local MST information for each machine which shares a mass storage device is maintained on the device. MST information for other machines may also be present on the device. The information for each machine is kept in one sector on the label track following the TRT sectors. Entries for up to 31 unique machine ids can exist.

During checkpoint, only the local MST information of the machine performing the checkpoint is updated. Since local MST information for many machines is kept on the device, updating of all these areas by one machine could cause a loss of information needed if the device were to be used with another system.

For shared devices in an ECS multimainframe complex, duplication of checkpointing by more than one machine is prevented. If a machine attempts to checkpoint a shared device and determines that another machine is performing the checkpoint (a checkpoint request bit is set in the local MST area of another machine), no action is taken. Only one checkpoint bit is set at any given time for a device.

In an independent shared device multimainframe complex, the MST and TRT information is maintained on the device. If the MST and/or TRT information changes during a device access, the system updates the MST and/or TRT information making it unnecessary for the system to periodically checkpoint the device.

MSS PROCESSING IN A MULTIMAINFRAME ENVIRONMENT

MSS processing is available in a multimainframe environment. Unlike other mass storage devices (disk and ECS), the MSF is not shared by mainframes. Rather, MSF is physically connected to and driven by one mainframe.

- In an independent shared device multimainframe complex, the only machine that can access the MSF-resident files is the physically connected independent shared device mainframe. MSS processing is the same in an independent shared device mainframe as it is in a single mainframe environment. Refer to section 3.

- In an ECS multimainframe complex, the physically connected mainframe is called the master mainframe. All other mainframes in the complex share the permanent files with the master mainframe and are called slave mainframes. The disks to which MSF-resident files are staged must be shared devices and accessible by all ECS mainframes. The following paragraphs describe the operation of MSS in an ECS multimainframe complex.

MSSEXEC runs on the master mainframe and is the main program that controls MSS processing activities. MSSEXEC is activated via the following commands that are entered at the system console.†

```
ENABLE,MASTER MSS.
MSSffff
```

MSSSLV runs on each slave mainframe and is the program that supports file retrieval from MSF for jobs running on a slave mainframe. MSSSLV is activated via the following commands that are entered at the system console.†

```
DISABLE,MASTER MSS.
MSSffff
```

When a job running on a slave mainframe attaches an MSF-resident file that has no disk image, MSSSLV is requested to stage the file to disk. However, MSSSLV cannot access MSF directly. MSSSLV must communicate with MSSEXEC, which stages the file to shared disk and then notifies MSSSLV when the file is available. MSSSLV then causes the requesting job to be resumed so that the file ATTACH can complete.

The permanent files used for communication between MSSEXEC and MSSSLV are initialized and recovered automatically and require no backup or recovery processing by the site analyst. The name of the permanent file used by MSSSLV running on mainframe i (i=1, 2, 3, 4) to send requests to MSSEXEC is STOMNOi. The name of the permanent file used by MSSEXEC to respond to all requests by all MSSSLVs is MTOSPFN. These files belong to the family that contains extended memory and are saved under the user index 377760_8.

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†Refer to the NOS 2 Operator/Analyst Handbook for more information about these commands.

580 PROGRAMMABLE FORMAT CONTROL 9

Spacing and format control for 580 line printers is provided by the use of carriage control format tapes or programmable format control. The carriage control format tape is punched to indicate particular format channels for each frame. A printer with programmable format control does not use carriage control format tapes; instead, it contains a microprocessor plus memory. Programmable format control arrays are loaded into this memory, performing the same function as the format tape. This section describes the creation and loading of programmable format control arrays. A description of format tapes may be found in the NOS 2 Reference Set, Volume 3.

Certain 580 printers are not equipped with a carriage control tape; instead, a microprocessor plus memory referred to as programmable format control is used. Instead of a tape controlling the page format, software is used. This software is referred to as a programmable format control array. A programmable format control array consists of numbers from 0 to 12 and 17_8. Each nonzero character represents a channel. A zero specifies that no channel is selected. An array is similar to a format tape since each number in a programmable format control array corresponds to a line on the print form. As each line of a page is printed, the next number in the programmable format control array buffer is addressed. A carriage control character in column 1 of the output line, indicating a skip to a particular channel, causes the memory in the programmable format control array buffer to be sequentially addressed until the particular number is found. The paper is spaced a similar number of spaces.

A programmable format control array differs from a format tape because only one channel can be specified per line. A number of channels can be specified per line using a format tape. Also, programmable format control arrays are accessed in pairs, one for 6 lines per inch (lpi) printing and one for 8 lpi printing. The 8-lpi array is usually larger, allowing more lines to be printed on the same size page.

BUILDING PROGRAMMABLE FORMAT CONTROL ARRAYS

Observe the following rules when building a programmable format control array.

1. Enter only valid numbers (0 through 12 and 17_8) in the programmable format control array.

2. A 1 must be the first number in the programmable format control array, indicating a top-of-form position.

3. A 12 should always indicate the last line of the form (bottom of page).

4. A 17_8 should appear as the last number in the array, denoting the end of valid numbers for a given array. This number does not correspond to any particular line on the form.

5. Maximum length programmable format control arrays (132 for 6 lpi and 176 or 136 for 8 lpi) must include a 9 only at location 132 for 6 lpi and location 176 or 136 for 8 lpi. Improper paper alignment may occur if a 9 is placed elsewhere.

To properly load the appropriate programmable format control buffer for a particular form, it is necessary to assemble data that will contain, when transmitted and stored in the programmable format control array buffer, as many numbers as lines on the form. As stored within the programmable format control array buffer, each number is a 4-bit code used to represent channels (1 through 12) or a null code (no channel selected).

NOTE

Channels 13 and 14 are valid channels but they are not selectable. No programmable format control error occurs when loading these numbers into the programmable format control buffer.

The maximum capacity of the 6-lpi programmable format control buffer is 132 numbers (22-inch form maximum) plus the last line number whereas the 8-lpi programmable format control buffer has a capacity of 176 or 136 numbers (22-inch or 17-inch form maximum) plus the last line number. Fewer than the maximum amount of numbers may be legally loaded into the programmable format control buffer, but an excessive amount of numbers will cause a programmable format control overflow error.

ADDING PROGRAMMABLE FORMAT CONTROL ARRAYS

Programmable format control arrays must occur in pairs (one 6-lpi array and one 8-lpi array); therefore, when a particular array is specified with the SC option of the ROUTE command, it is possible to switch from 6- to 8-lpi spacing except when using 8.5-inch forms which are always printed at 8-lpi spacing. Four pairs of arrays are provided with the operating system; two pairs of arrays for 11 inch forms and two pairs of arrays for 8.5-inch forms (refer to table 9-1). The numbers are omitted for 6-lpi 8.5-inch forms because this combination is not selectable.

To add additional programmable format control arrays, BIO must be modified to contain these additional arrays as overlays in QAP. The overlay names and corresponding ROUTE command SC parameter options must be added to PFCO, and the programmable format control overlay table in QAP. The first entry in this table indicates the default programmable control format array. This array is used when the SC parameter is not specified. If an added array is to be the default array, the PFCO entry for it should be placed at the beginning of the table. The value which must be specified with the SC parameter is included in this entry. This value can be any 6-bit binary value. The arrays that are also added to QAP must follow the same format, structure, and labeling conventions as the arrays already provided in QAP.

To generate the numbers to be loaded into the programmable format control buffer, the DPFC (define programmable format control code) macro is used with the following format. Only the lower 4 bits of each 6 bits are used as programmable format control numbers.

Location	Operation	Variable
	DPFC	a,b,c,d

Variable	Description
a, b, c, d	Programmable format control numbers for 6 or 8 lpi. These numbers can be any value from 0 to 12 and 17_8.

NOTE

In each macro call, all four parameters must be specified (0 denotes no channel is selected). If all four are not required to complete an array (the number of lines on the form is not a multiple of 4), zeros should be used for the remaining parameters.

Table 9-1. Released Programmable Format Control Arrays (Sheet 1 of 4)

Location	6 lpi Default†		6 lpi Alternate††		8 lpi Default		8 lpi Alternate	
	Form Length		Form Length		Form Length		Form Length	
	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.
1	1		1		1	1	1	1
2	6		6		6	6	6	6
3	0		0		0	0	0	0
4	2		2		0	2	0	2
5	0		0		2	0	2	0
6	0		0		0	0	0	0
7	3		3		0	3	0	3
8	0		0		0	0	0	0
9	0		0		3	0	3	0
10	4		4		0	4	0	4
11	0		0		0	0	0	0
12	0		0		0	0	0	0
13	5		5		4	5	4	5
14	0		0		0	0	0	0
15	0		0		0	0	0	0
16	2		7		0	2	0	7
17	0		0		5	0	5	0
18	0		0		0	0	0	0
19	3		8		0	3	0	8
20	0		0		0	0	0	0
21	0		0		2	0	7	0
22	4		10		0	4	0	10
23	0		0		0	0	0	0
24	0		0		0	0	0	0
25	5		11		3	5	8	11
26	0		0		0	0	0	0
27	0		0		0	0	0	0
28	2		2		0	2	0	2
29	0		0		4	0	10	0
30	0		0		0	0	0	0
31	3		3		0	3	0	3
32	0		0		0	0	0	0
33	0		0		5	0	11	0
34	4		4		0	4	0	4
35	0		0		0	0	0	0
36	0		0		0	0	0	0
37	5		5		2	5	2	5
38	0		0		0	0	0	0
39	0		0		0	0	0	0
40	2		7		0	2	0	7
41	0		0		3	0	3	0
42	0		0		0	0	0	0
43	3		8		0	3	0	8
44	0		0		0	0	0	0

†Default (SC=0).
††Alternate (SC=1).

Table 9-1. Released Programmable Format Control Arrays (Sheet 2 of 4)

Location	6 lpi Default†		6 lpi Alternate††		8 lpi Default		8 lpi Alternate	
	Form Length		Form Length		Form Length		Form Length	
	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.
45	0		0		4	0	4	0
46	4		10		0	4	0	10
47	0		0		0	0	0	0
48	0		0		0	0	0	0
49	5		11		5	5	5	11
50	0		0		0	0	0	0
51	0		0		0	0	0	0
52	2		2		0	2	0	2
53	0		0		2	0	7	0
54	0		0		0	0	0	0
55	3		3		0	3	0	3
56	0		0		0	0	0	0
57	0		0		3	0	8	0
58	4		4		0	4	0	4
59	0		0		0	0	0	0
60	0		0		0	0	0	0
61	5		5		4	5	10	5
62	0		0		0	0	0	0
63	0		0		0	0	0	0
64	12		12		0	2	0	7
65	0		0		5	0	11	0
66	0		0		0	12	0	12
67	1		1		0	0	0	0
68	0		0		0	0	0	0
69	0		0		2	1	2	1
70	2		2		0	0	0	0
71	0		0		0	0	0	0
72	0		0		0	2	0	2
73	3		3		3	0	3	0
74	0		0		0	0	0	0
75	0		0		0	3	0	3
76	4		4		0	0	0	0
77	0		0		4	0	4	0
78	0		0		0	4	0	4
79	5		5		0	0	0	0
80	0		0		0	0	0	0
81	0		0		5	5	5	5
82	2		7		0	0	0	0
83	0		0		0	0	0	0
84	0		0		0	0	0	7
85	3		8		12	0	12	0
86	0		0		0	0	0	0
87	0		0		0	3	0	8
88	4		10		0	0	0	0

†Default (SC=0).
††Alternate (SC=1).

Table 9-1. Released Programmable Format Control Arrays (Sheet 3 of 4)

Location	6 lpi Default†		6 lpi Alternate††		8 lpi Default		8 lpi Alternate	
	Form Length		Form Length		Form Length		Form Length	
	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.
89	0		0		1	0	1	0
90	0		0		0	4	0	10
91	5		11		0	0	0	0
92	0		0		0	0	0	0
93	0		0		2	5	2	11
94	2		2		0	0	0	0
95	0		0		0	0	0	0
96	0		0		0	2	0	2
97	3		3		3	0	3	0
98	0		0		0	0	0	0
99	0		0		0	3	0	3
100	4		4		0	0	0	0
101	0		0		4	0	4	0
102	0		0		0	4	0	4
103	5		5		0	0	0	0
104	0		0		0	0	0	0
105	0		0		5	5	5	5
106	2		7		0	0	0	0
107	0		0		0	0	0	0
108	0		0		0	2	0	7
109	3		8		2	0	7	0
110	0		0		0	0	0	0
111	0		0		0	3	0	8
112	4		10		0	0	0	0
113	0		0		3	0	8	0
114	0		0		0	4	0	10
115	5		11		0	0	0	0
116	0		0		0	0	0	0
117	0		0		4	5	10	11
118	2		2		0	0	0	0
119	0		0		0	0	0	0
120	0		0		0	2	0	2
121	3		3		5	0	11	0
122	0		0		0	0	0	0
123	0		0		0	3	0	3
124	4		4		0	0	0	0
125	0		0		2	0	2	0
126	0		0		0	4	0	4
127	5		5		0	0	0	0
128	0		0		0	0	0	0
129	0		0		3	5	3	5
130	12		12		0	0	0	0
131	0		0		0	0	0	0
132	9		9		0	2	0	7

†Default (SC=0).
††Alternate (SC=1).

Table 9-1. Released Programmable Format Control Arrays (Sheet 4 of 4)

Location	6 lpi Default†		6 lpi Alternate††		8 lpi Default		8 lpi Alternate	
	Form Length		Form Length		Form Length		Form Length	
	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.	11 in.	8.5 in.
133	17_8	17_8			4	0	4	0
134					0	12	0	12
135					0	0	0	0
136					0	9	0	9
137					5	17_8	5	17_8
138					0		0	
139					0		0	
140					0		0	
141					2		7	
142					0		0	
143					0		0	
144					0		0	
145					3		8	
146					0		0	
147					0		0	
148					0		0	
149					4		10	
150					0		0	
151					0		0	
152					0		0	
153					5		11	
154					0		0	
155					0		0	
156					0		0	
157					2		2	
158					0		0	
159					0		0	
160					0		0	
161					3		3	
162					0		0	
163					0		0	
164					0		0	
165					4		4	
166					0		0	
167					0		0	
168					0		0	
169					5		5	
170					0		0	
171					0		0	
172					0		0	
173					12		12	
174					0		0	
175					0		0	
176					9		9	
177					17_8		17_8	

†Default (SC=0).
††Alternate (SC=1).

EXPRESS DEADSTART DUMP INTERPRETER 10

The deadstart dump interpreter (DSDI) is a utility program, called by a batch command, which converts selected portions of the binary information on an express deadstart dump (EDD) file into reports to be listed. The EDD file is generated on magnetic tape by the express deadstart dump utility which may be run at deadstart time after a system malfunction has occurred. Refer to the NOS 2 Operator/Analyst Handbook for complete information concerning the use of EDD.

Selection of data to be listed by DSDI is provided through input directives, either on an input file or on the DSDI command. Normal octal dumps of central memory, extended memory, and PP memory can be produced by these directives as well as specially formatted dumps of specific system tables and buffers.

The following features are provided through the use of EDD and DSDI.

- The EDD tape file contains a dump of memory, the executing exchange packages, the CYBER 170 status and control (S/C) registers, where applicable, models 815, 825, 835, 845, 855, 865, and 875 maintenance registers, register file, exchange package, processor control store, where applicable, and all PPs except for PP0 which can be saved by either copying it to another PP or by biasing the PP switch on the deadstart panel, if the hardware exists. EDD can optionally dump all or part of extended memory and the selected buffer controllers. This permits analysis of a system malfunction to be performed entirely off-line.

- Because DSDI copies the EDD file to a word-addressable random file on mass storage, dump data can be accessed in any order.

- EDD requires only a small amount of time during deadstart because the data is transferred in binary form to magnetic tape.

- The tape file created by EDD can be retained on magnetic tape or mass storage until it is no longer needed. Thus, a selective listing can be generated at any time.

- General information from the EDD file appears in the title and subtitle line of each page of listed output. The first 50 columns of each input directive are included in the title line of the output list it produces. An input directive is provided which enables insertion of comments into the subtitle line.

- Use of DSDI is possible from an interactive terminal as well as from the batch environment. The output produced by several directives is formatted for terminal output (72 columns). From a batch environment, output is formatted for a 136-column printer.

CALLING THE EXPRESS DEADSTART DUMP INTERPRETER

Processing of the EDD file is initiated with the DSDI command. The format of the command is:

DSDI,p_1,p_2,...,p_n.

where each parameter p_i is either a keyword or a keyword equated to a value. All parameters are optional and order-independent.

Pi	Description
D	This option creates a random dump file with the same name as the EDD file and returns the original EDD file. The created file can then be used as the dump file on subsequent executions of DSDI, eliminating the need to read the entire dump tape on each call.
D omitted	No random dump file is to be created.
DMB	A binary dump file produced by the DMB command is to be analyzed instead of an EDD file.
DMB omitted	EDD file is to be analyzed.

When this parameter is specified, DSDI uses directives as though the job was running at control point one. The DMB command dumps the exchange package, central memory, and extended memory in binary (refer to the NOS 2 Reference Set, Volume 3). Use the following directives to dump selected portions of memory to be analyzed.

Directive	Description
CP,1	Dump exchange package.
RAC,1/C,fwa,lwa	Dump central memory in C format.
RAC,1/D,fwa,lwa	Dump central memory in D format.
RA,0/EC/C,fwa,lwa	Dump extended memory in C format.
RA,0/EC/D,fwa,lwa	Dump extended memory in D format.

fwa and lwa are the first and last word addresses of memory to be dumped.

Pi	Description
F=dumpfile	One- to seven-character name of the EDD file that DSDI will interpret.
F omitted	Same as F=DUMP.
I=infile	One- to seven-character name of file on which input directives are written.
I omitted	Same as I=INPUT.
L=outfile	One- to seven-character name of file on which list output is to be written. User must save or print the file.
L omitted	Same as L=OUTPUT, except that the file is automatically printed.

Pi	Description
NR	EDD file is not to be rewound.
NR omitted	EDD file is to be rewound before processing.
P	CMR pointers from the running system are to be used. Selecting this option causes the CMR pointers from the running system to be used to locate tables and buffer areas on the EDD file. This option is typically used when it is known that the CMR pointers on the EDD file were destroyed by the system malfunction (for example, a CPUMTR error exit leaves an exchange package in memory locations 0 through 20_8). Directives used to dump CMR will dump the pointers contained on the EDD file, not those from the running system. This option should be used only when the configuration of the running system is the same as the system in use when the EDD file was created.
P omitted	CMR pointers from EDD file are to be used.
PD=n	Print density in number of lpi (3, 4, 6, or 8).
PD	Same as PD=8.
PD omitted	Same as PD=6.
Z	Input directives are contained on the command after the terminator. The I option is ignored. This eliminates the need to use a separate input file for the directives when only a few directives are needed.
Z omitted	Input directives are not contained on the command. The system uses the I option.

When input directives appear on the DSDI command, the first character following the command terminator is the separator character for all directives on the command. Any display code character which is not used in any of the directives, including a space, can be used as the separator character. Each directive must be preceded by a separator and terminated by a period. The directives can extend to column 72 on the command. Continuation cards are not permitted.

For example, (slant used for separator):

```
DSDI,Z./SC./XP./P./D,0,20000./EC./D,0,10000.
```

If the directives are included in the input file, the following equivalent job would appear.

```
:
DSDI.
--EOR--
SC.             Dump CYBER 170 S/C register.
XP.             Dump executing exchange packages.
P.              Dump all PPs.
D,0,20000.      Dump the first 20000(8) locations of central memory.
EC.             Set memory type to extended memory.
D,0,10000.      Dump the first 10000(8) locations of extended memory.
--EOI--
```

A request for the EDD tape must precede the DSDI command. Since EDD writes information on an unlabeled, seven- or nine-track tape at a density of 800 characters per inch (cpi) for seven-track and 1600 cpi for nine-track, the request should appear as follows:

```
LABEL,DUMP,D=density,tape,F=S,LB=KU,VSN=DUMP.
```

Parameter	Description
density	800 cpi for seven-track tape. 1600 cpi for nine-track tape.
tape	MT for seven-track tape. NT for nine-track tape.

It is recommended that the vsn parameter be specified in the request. If this is done, the request is presented in the resource mounting preview display and the job is rolled out until the tape is mounted and assigned. Although the default express dump file name (DUMP) is used in this example, a different file name can be specified, provided the same file name is also specified on the DSDI command (F option).

INPUT DIRECTIVES

DSDI input directives provide the capability to selectively dump only those portions of the EDD file that are of interest. The input directives are grouped into the following categories.

- List Control Directives.

  Enable user to control line printer page eject and print density, and to specify comments in subtitle line of the output listing.

- File Manipulation and Control Directives.

  Enable user to specify alternate files for DSDI input directives and listing output.

- Central Memory/Extended Memory Dump Directives.

  Provide octal dumps of specified portion of central memory or extended memory. Absolute or relative addresses can be printed (three print formats are available). Two additional dump formats are available to print 64-bit memory in hexadecimal for models 815, 825, 835, 845, and 855.

- PP Dump Directives.

  Provide octal memory dumps of all or selected PPs (two print formats are available). PP analysis data can be included in the dumps. Six additional formats are available to print 16-bit PP memory for models 815, 825, 835, 845, and 855.

- CMR Dump Directives.

  Provide specially formatted dumps of selected areas in central memory resident. These areas are specified by name rather than by address.

- Subsystem Dump/Analysis Directives.

  Provide specially formatted dumps of subsystem control points and associated tables and buffers.

- Hardware Register Dump Directives.

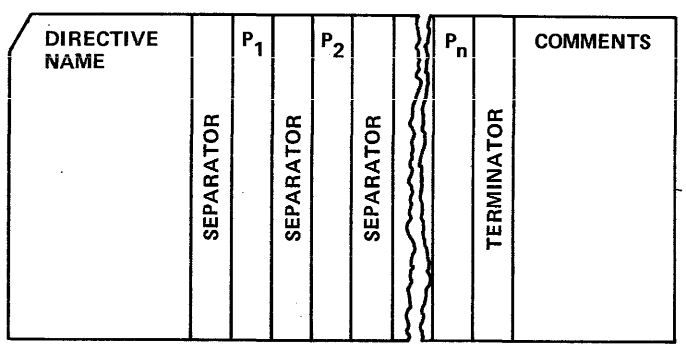
  Provide dumps of specified hardware registers.

Several of the DSDI input directives have interactive capabilities. The output produced by these directives is specially formatted for listing at an interactive terminal. Refer to Interactive Use of DSDI (later in this section) for information concerning directive entry and use of DSDI from an interactive terminal.

Printer Output Listing Examples contains examples of listings produced by several of the DSDI input directives.

DIRECTIVE FORMAT

A directive has the following format.†



Entry	Description
Directive Name	The directive name starts in column 1. It is terminated by a separator or terminator character.
Separator	Any character, including a space, other than the following. A-Z, 0-9, +, -, * A period is the directive terminator; therefore, it cannot be used as a separator.
P_i	Parameter option for the directive. Depending on the requirements of the directive, the directive may have no parameters or a number of parameters. Directives which require a fixed number of parameters will ignore everything beyond the separator for the last legal parameter.

†Although the directive format shown illustrates a directive as it would appear in a batch job deck, the same format is used when a directive is stored on a file or is entered from an interactive terminal. Refer to Interactive Use of DSDI for additional information concerning directive entry from an interactive terminal.

Entry	Description
Terminator	The explicit directive terminator is a period. Anything beyond the period is ignored. Any characters following the directive terminator are considered comments and are ignored by DSDI. However, the comments are included with the directive in the title line of each page of the output listing (combined total of 50 characters appear in the listing).

LIST CONTROL DIRECTIVES

The list control directives provide the capability to specify print density and page eject options, and to add comments in the subtitle line of each page listed.

EJ — Force Page Eject

The EJ directive forces DSDI to issue a page eject function before listing the output produced by the next directive processed. The EJ directive can also force a page eject upon reaching a specified point on the page being printed. The page eject function is performed automatically unless disabled by the EJOFF directive.

Format:

```
EJ,nn.
```

Parameter	Description
nn	Force page eject only if less than nn decimal lines remain on the current page. If nn is omitted, page eject is forced before listing the output from the next directive processed.

EJOFF — Turn Off Auto Page Eject

The EJOFF directive disables auto page eject. Until this directive is processed, DSDI automatically issues a page eject function before listing the output produced by each new directive.

Format:

```
EJOFF.
```

EJON — Turn On Auto Page Eject

The EJON directive enables auto page eject (default condition). DSDI automatically issues a page eject function before listing the output produced by each new directive processed. This directive has no effect unless auto page eject has been disabled by the EJOFF directive.

Format:

```
EJON.
```

PD — Reset Print Line Density

The PD directive resets the print line density to a value other than that specified on the DSDI command.

Format:

```
PD,n.
```

Parameter	Description
n	New print line density in number of lpi (3, 4, 6, or 8). If n is omitted or an incorrect value is specified, a diagnostic message is issued.

*. — Comment in Subtitle Line

The *. directive specifies a comment that appears in the subtitle line of each page listed.

Format:

```
*.ccc...ccc
```

Parameter	Description
ccc...ccc	Comment (up to 36 characters are printed).

FILE MANIPULATION AND CONTROL DIRECTIVES

File manipulation and control directives provide the capability to specify alternate files for DSDI input directives and listing output.

DISPOSE — Dispose Alternate List File to Print Queue

The DISPOSE directive causes the alternate list file specified by the OUTPUT directive to be disposed to the print queue. DSDI listing output then resumes on the original output file. This directive has no effect unless output has previously been assigned to an alternate list file (refer to OUTPUT directive). Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

```
DISPOSE,username.
```

Parameter	Description
username	User name under which the remote batch terminal to receive the listing is logged in. If username is omitted, the listing is printed at a central site line printer.

OUTPUT – Assign Output to Alternate List File

The OUTPUT directive temporarily assigns DSDI listing output to a file other than that specified on the DSDI command. When the alternate file is disposed to the print queue (refer to DISPOSE directive), output resumes on the original output file. If the alternate file is not disposed, both the original and the alternate output files remain at the job control point as local files. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

```
OUTPUT,filename.
```

Parameter	Description
filename	Name of alternate list file (one to seven characters). Only one alternate output file may be active at a time; filename cannot be the same name as the normal output file. If filename is omitted, the system assumes file name ALTRNT.

READ – Read Alternate Directives File

The READ directive causes DSDI to temporarily stop reading the current directives file and begin reading directives from the specified record on the named alternate file or from the current position if the record name is omitted. DSDI reads from the specified alternate directives file until an end of record is encountered (end of file or empty record if * is specified) and then resumes with the next directive on the original input directives file.

Format:

```
READ,filename,rec,*.
```

Parameter	Description
filename	Name of alternate directives file (local file).
rec	Optional record name. If rec is specified, file filename is searched for record rec from the current position to end of file or an empty record. If rec is not found, DSDI issues an error message. If rec is not specified, DSDI reads directives from the current position to end of record. Records must be in text format where the first word of the record is the record name, unless the file is assigned to an interactive terminal; then, directives may be entered directly.
*	Optional character which specifies that DSDI is to read directives from all records until an end of file or an empty record is encountered.

REWIND – Rewind File

The REWIND directive repositions the specified file to beginning-of-information.

Format:

```
REWIND,filename.
```

Parameter	Description
filename	Name of file to be rewound.

CENTRAL MEMORY/EXTENDED MEMORY DUMP DIRECTIVES

The central memory/extended memory dump directives provide the capability to dump any portion of central memory or extended memory in instruction parcel, byte, or word format. 6-bit display code character equivalents are included with each format. Either absolute or relative memory locations may be dumped. Refer to CMR Dump Directives for directives used to dump specific portions of NOS central memory resident (CMR).

Dump Control Directives

Dump control directives select the type of memory to be dumped (central memory or extended memory) and the addressing mode to be used (absolute or relative).

ALLMEM - Extend Central Memory Dumps

The ALLMEM directive enables central memory dumps to extend past the central memory boundary on machines with central memory extension.

Format:

```
ALLMEM.
```

CM - Set Memory Type to Central Memory

The CM directive specifies that subsequent C, D, and E directives dump central memory locations. Unless the EC or UEC directive is specified, central memory locations are dumped by default.

Format:

```
CM.
```

EC - Set Memory Type to Extended Memory

The EC directive specifies that subsequent C, D, and E directives dump extended memory or unified extended memory (UEM) locations. Unless the EC or UEC directive is specified, central memory locations are dumped by default. The second format is for models 815, 825, 835, 845, 855, 865, and 875 only.

Format:

EC.	Subsequent C, D, and E directives dump extended memory.
EC,fwa.	Subsequent C, D, and E directives dump UEM.

Parameter	Description
fwa	First word address (fwa) divided by 1000_8. fwa is added to the fwa and last word address (lwa) parameters in subsequent C, D, and E directives. If fwa is omitted, DSDI determines the beginning of unified extended memory from the pointer in CMR and adds it to the fwa and lwa parameters of the C, D, and E directives. This parameter is ignored on any machine other than models 815, 825, 835, 845, 855, 865, and 875.

RA - Reset Reference Address

The RA directive specifies that subsequent C, D, and E directives dump memory locations relative to a specified reference address. Unless the RA or RAC directive is entered, absolute memory locations are dumped by default.

Format:

RA,nnnnnnn.

Parameter	Description
nnnnnnn	Reference address; addresses specified on subsequent C, D, and E directives are relative to this address.

Clearing the reference address specified on the most recent RA or RAC directive reenables absolute addressing. This is done by entering the RA directive in the following format.

RA,0.

RAC - Reset Reference Address to RA of Control Point

The RAC directive specifies that subsequent C, D, and E directives dump memory locations relative to the reference address of a specified control point. Unless the RA or RAC directive is entered, absolute memory locations are dumped by default.

Format:

RAC,nn.

Parameter	Description
nn	Control point number; addresses specified on subsequent C, D, and E directives are relative to the reference address of this control point.

Refer to the description of the RA directive to reenable absolute addressing.

UEC - Set Memory Type to User-Access Extended Memory

The UEC directive specifies that subsequent C, D, and E directives dump user-access extended memory locations. Unless the EC or UEC directive is specified, central memory locations are dumped by default.

Format:

UEC,fwa.

Parameter	Description
fwa	First word address divided by 1000_8 for user-access extended memory. fwa is added to the fwa and lwa parameters in subsequent C, D, and E directives. If fwa is omitted, DSDI determines the beginning of user-access extended memory from the pointer in CMR and adds it to the fwa and lwa parameters of the C, D, and E directives.

Memory Dump Directives

Memory dump directives specify the area of memory to be dumped and determine the format of the output listing (refer to Printer Output Listing Examples for sample output listing). The CM and EC or UEC directives determine the type of memory to be dumped (default is central memory). Absolute memory locations are dumped unless relative addressing has been enabled (refer to RA and RAC directives).

C - Dump Memory in Instruction Parcel Format

The C directive causes the specified locations of central memory or extended memory to be dumped in four groups of five octal digits (three words per line) with 6-bit display code character equivalents. Repetitive data is suppressed.

Format:

C,fwa,lwa.

Parameter	Description
fwa	First word address to be dumped (mandatory).
lwa	Last word address, plus one location, to be dumped. If lwa is omitted, fwa+1 is assumed by default.

The output listing is read from top to bottom by column rather than across the page. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

D - Dump Memory in Byte Format

The D directive causes the specified locations of central memory or extended memory to be dumped in five groups of four octal digits (three words per line) with 6-bit display code character equivalents. Repetitive data is suppressed.

Format:

```
D,fwa,lwa.
```

Parameter	Description
fwa	First word address to be dumped (mandatory).
lwa	Last word address, plus one location, to be dumped. If lwa is omitted, fwa+1 is assumed by default.

The output listing is read from top to bottom by column rather than across the page. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

E - Dump Memory in Word Format

The E directive causes the specified locations in central memory or extended memory to be dumped in word format (four words per line) with 6-bit display code character equivalents.

Format:

```
E,fwa,lwa.
```

Parameter	Description
fwa	First word address to be dumped (mandatory).
lwa	Last word address, plus one location, to be dumped. If lwa is omitted, fwa+1 is assumed by default.

I - Dump 64-Bit Memory in Instruction Parcel Format

The I directive is valid on models 815, 825, 835, 845, and 855 only. It prints the specified locations of central memory in four groups of four hexadecimal digits (three words per line) with 7-bit ASCII code character equivalents.

Format:

```
I,fba,lba,ei.
```

Parameter	Description
fba	First byte address (fba), hexadecimal, to be printed (mandatory).
lba	Last byte address (lba), plus one location, to be printed. If lba is omitted, fba+8 is assumed by default.
ei	If ei is 1, fba and lba specify byte addresses relative to byte 0 of the environment interface. If ei is omitted, fba and lba specify absolute byte addresses.

The output listing is read from top to bottom by column rather than across the page.

W - Dump 64-Bit Memory in Word Format

The W directive is valid on models 815, 825, 835, 845, and 855 only. It prints the specified locations of 64-bit memory in hexadecimal (4 words of 16 digits per line) with 7-bit ASCII code character equivalents.

Format:

```
W,fba,lba,ei.
```

Parameter	Description
fba	First byte address, hexadecimal, to be printed (mandatory).
lba	Last byte address, plus one location, to be printed. If lba is omitted, fba+8 is assumed by default.
ei	If ei is 1, fba and lba specify byte address relative to byte 0 of the environment interface. If ei is omitted, fba and lba specify absolute byte addresses.

PP DUMP DIRECTIVES

PP dump directives provide the capability to obtain a memory dump of all or selected PPs. Two dump formats are available, block format and line format.

AP — Dump Analysis of PP and PP Memory in Octal Line Format

The AP directive causes PP memory to be dumped in line format with 6-bit display code character equivalents (same format as Q directive). Repetitive lines are suppressed and zero bytes are represented by hyphens (----). An analysis of the PP is printed before the memory dump. Analysis data includes the associated PP communications area, resident entry point call addresses, and read-only variables in directive cells. Certain direct cell variables are verified and those in error are indicated.

NOTE

Correct operation of this directive requires that the PP communication area on the EDD file be intact.

Format:

AP,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be dumped or a program name. If a program name is specified, all PPs executing that program are dumped. A warning message is issued if an incorrect number is specified or the program name is not found in any PP. If n_i is omitted, all active PPs are dumped.

Refer to Printer Output Listing Examples for a sample of the printer output listing produced by this directive.

MPP – Move PP

The MPP directive causes the correct logical PP to be dumped if the logical position of PP00 has been changed prior to the full dump to tape. If the PPS-0/PPS-1 toggle switch has been toggled, the n parameter should not be specified. If PP00 has to be moved to another PP via a deadstart panel program, the n parameter should be specified.

Format:

MPP,n.

Parameter	Description
n	Number of PP to which PP00 was moved. n cannot equal 0. If n is omitted, 10 is assumed (CYBER 170 and CYBER 70 Computer Systems with 20 PPs).

P – Dump PP Memory in Octal Block Format

The P directive causes PP memory to be dumped in block format where each block represents 64 words of memory. The blocks are read by column (top to bottom), where each column contains eight 12-bit words in octal format numbered 0 through 7. There are eight columns in each block, numbered 0 through 7. Repetitive data is not suppressed and zero words are represented by hyphens (----). For models 865 and 875, bytes 7776_8 and 7777_8 contain the PP's R register.

Format:

P,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be dumped. If omitted, all PPs are dumped.

PF – Dump FLPP† Memory in Octal Block Format

The PF directive causes first-level peripheral processor (FLPP) memory to be dumped in block format where each block represents 64 words of memory. The blocks are read by column (top to bottom), where each column contains eight 12-bit words in octal format numbered 0 through 7. There are eight columns in each block, numbered 0 through 7. Repetitive data is not suppressed and zero words are represented by hyphens (----).

Format:

PF,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of FLPP to be dumped. If omitted, all FLPPs are dumped.

PMS – Read PP Select Switches

The PMS directive causes the dump of the S/C register (maintenance register for models 865 and 875) to be read to determine the current value of the PP memory select switches and the correct logical PP to be dumped, if the logical position of PP00 has been changed prior to the full dump to tape. If the PP memory select switches have been changed, this directive should be specified with the binary value of the switches prior to the change. This directive is meaningful only on a CYBER 170 Computer System with the exception of models 815, 825, 835, 845, and 855.

Format:

PMS,n.

Parameter	Description
n	Previous select switch setting; 0 through 11_8. If n is the same value as that read from the S/C register, this directive is not meaningful.

†Hardware manuals define peripheral processors making up a peripheral processor subsystem (PPS) as PPs and the first-level peripheral processors as peripheral processing units (PPUs). In this manual, first-level peripheral processors are referred to as FLPPs. FLPPs are available only on model 176.

PO – Dump 16-Bit PP Memory in Octal Block Format

The PO directive is valid on models 815, 825, 835, 845, and 855 only. It prints PP memory in block format where each block represents 64 words of memory. DSDI represents each 16-bit word by 6 octal digits. Words whose upper 4 bits are zero are represented by 4 octal digits. Blocks are read by columns (top to bottom), where each column contains eight 16-bit words numbered 0 through 7. There are eight columns in each block, numbered 0 through 7. Repetitive data is not suppressed and zero words are represented by hyphens (----). The PP's R register is displayed preceding the first line of the dump.

Format:

PO,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be dumped. If omitted, all PPs are printed.

PX – Dump 16-Bit PP Memory in Hexadecimal Block Format

The PX directive is valid on models 815, 825, 835, 845, and 855 only. It prints 16-bit memory in block format where each block represents 256 words of memory. Each 16-bit word is represented by 4 hexadecimal digits. Blocks are read by columns (top to bottom), where each column contains sixteen 16-bit words in hexadecimal format numbered 0 through F. There are 16 columns in each block, numbered 0 through F. Repetitive data is not suppressed and zero words are represented by hyphens (----). The PP's R register is displayed preceding the first line of the dump.

Format:

PX,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be printed. If omitted, all PPs are printed.

Q – Dump PP Memory in Octal Line Format

The Q directive causes PP memory to be dumped in line format with 6-bit display code character equivalents. Each line contains 16 bytes (PP words) printed in two sets of eight bytes in octal format. Each set consists of an address, eight bytes, and display code character equivalents. Repetitive lines are suppressed and zero bytes are represented by hyphens (----). Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

Q,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be dumped. If omitted, all PPs are dumped.

QF – Dump FLPP† Memory in Octal Line Format

The QF directive causes FLPP memory to be dumped in line format with 6-bit display code character equivalents. Each line contains 16 bytes printed in two sets of 8 bytes in octal format. Each set consists of an address, 8 data bytes, and 6-bit display code character equivalents. Repetitive lines are suppressed and zero bytes are represented by hyphens (----).

Format:

QF,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of FLPP to be dumped. If omitted, all FLPPs are dumped.

QOA – Dump 16-Bit PP Memory in Octal/ASCII Line Format

The QOA directive is valid on models 815, 825, 835, 845, and 855 only. It prints PP memory in line format with 7-bit ASCII code character representation. Each line contains 16 words printed in two sets of eight. Each set consists of an octal address, eight words (six digits per word if the upper 4 bits are nonzero, four digits otherwise), and 7-bit ASCII code character equivalents. Repetitive lines are suppressed and zero words are represented by hyphens (----). The PP's R register is displayed preceding the first line of the dump. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

QOA,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be printed. If omitted, all PPs are printed.

QOD – Dump 16-Bit PP Memory in Octal/Display Line Format

The QOD directive is valid on models 815, 825, 835, 845, and 855 only. It prints PP memory in line format with 6-bit display code character representation. Each line contains 16 words printed in two sets of eight. Each set consists of an octal address, eight words (six digits per word if the upper 4 bits are nonzero, four digits otherwise), and 6-bit display code character equivalents. Repetitive lines are suppressed and zero words are represented by hyphens (----). The PP's R register is displayed preceding the first line of the dump. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

QOD,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be printed. If omitted, all PPs are printed.

†Hardware manuals define peripheral processors making up a peripheral processor subsystem (PPS) as PPs and the first-level peripheral processors as peripheral processing units (PPUs). In this manual, first-level peripheral processors are referred to as FLPPs. FLPPs are available only on model 176.

QXA – Dump 16-Bit PP Memory in Hexadecimal/ASCII Line Format

The QXA directive is valid on models 815, 825, 835, 845, and 855 only. It prints PP memory in line format with 7-bit ASCII code character representation. Each line contains 16 words printed in two sets of eight. Each set consists of a hexadecimal address, eight words (four hexadecimal digits per word), and 7-bit ASCII code character equivalents. Repetitive lines are suppressed and zero words are represented by hyphens (----). The PP's R register is displayed preceding the first line of the dump. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

QXA,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be printed. If omitted, all PPs are printed.

QXD – Dump 16-Bit PP Memory in Hexadecimal/Display Line Format

The QXD directive is valid on models 815, 825, 835, 845, and 855 only. It prints PP memory in line format with 6-bit display code character representation. Each line contains 16 words printed in two sets of eight. Each set consists of a hexadecimal address, eight words (four hexadecimal digits per word), and 6-bit display code character equivalents. Repetitive lines are suppressed and zero words are represented by hyphens (----). The PP's R register is displayed preceding the first line of the dump. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

QXD,n_1,n_2,...,n_m.

Parameter	Description
n_i	Number of PP to be printed. If omitted, all PPs are printed.

CMR DUMP DIRECTIVES

The CMR dump directives provide the capability to selectively dump specified areas of central memory resident. Refer to the NOS 2 Systems Programmer's Instant for detailed illustrations of central memory resident.

Successful use of the CMR dump directives is dependent upon the integrity of central memory at the time EDD was performed. Most important is the integrity of the CMR pointers on the EDD file. If these pointers are not intact, the dump produced by DSDI may prove meaningless. Thus, if it is suspected that the CMR pointers are not intact, specifying the P keyword on the DSDI command allows DSDI to use the CMR pointers from the running system. This option should only be used when the configuration of the running system is the same as the system in use at the time the EDD file was created. If the CMR pointers on the EDD file are not intact, the integrity of the other areas of central memory is also questionable. In this case, the output produced by the CMR dump directives may be unpredictable.

ACCOUNT – Dump Account Dayfile Buffer

The ACCOUNT directive causes the account dayfile pointers and buffer to be dumped in word format (four words per line) with 6-bit display code character equivalents. This format is the same format as that for the E memory dump directive. This directive also dumps the buffer in a line-by-line format, as on the DSD A display.

Format:

```
ACCOUNT.
```

CBT – Dump Control Buffer Table

The CBT directive causes all control buffer table entries to be dumped unless ordinal numbers are specified, then only the specified control buffer table entries are dumped. The dump is formatted to reflect the appropriate parameter fields for each word. Control buffer table entries that are output to a printer are listed in two columns. The format is the same format as that for the MST directive. The control buffer table entries can also be output to a terminal, but only when ordinal numbers are specified. Control buffer table entries that are output to a terminal are listed in a single column format.

Format:

$CBT,n_1,n_2,\ldots,n_m.$

Parameter	Description
n_i	Ordinal number of the control buffer table entry to be dumped. If n_i is omitted, all control buffer table entries are dumped.

CCT – Dump Channel Control Table

The CCT directive causes all nonzero channel control table entries to be dumped unless ordinal numbers are specified, then only the specified channel control table entries are dumped. The dump is formatted to reflect the appropriate parameter fields for each word. Channel control table entries that are output to a printer are listed in two columns. The format is the same format as that for the MST directive. The channel control table entries can also be output to a terminal, but only when ordinal numbers are specified. Channel control table entries that are output to a terminal are listed in a single column format.

Format:

$CCT,n_1,n_2,\ldots,n_m.$

Parameter	Description
n_i	Ordinal number of the channel control table entry to be dumped. If n_i is omitted, all nonzero channel control table entries are dumped.

CP – Dump Active Control Point Areas

The CP directive causes all active control point areas, or a selected subset, to be dumped. List options provide the ability to dump only desired portions of the control point area and other control point related data. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

CP,n_1/ops$_1$,n_2/ops$_2$,...,n_m/ops$_m$.

Parameter	Description
n_i	Control point number.
ops$_i$	List options; a string of up to 10 characters indicating the portion of the control point area, or control point related data, to be dumped. If list options are specified, they apply only to the control point number with which they are associated. Valid options are as follows:

ops$_i$	Description
X	Dumps exchange package, parameter summary, control point's entry in the executing job table, and contents of the memory locations indicated by the values in each exchange package register. These register values are treated as relative addresses within the field length; invalid addresses are represented with contents of zero. The current command and special entry point parameters are not printed for the system control point. Refer to Printer Output Listing Examples for a sample of the printer output listing produced.
T	Provides detailed dump of control point area with description of each parameter field and NOSTEXT symbol for each word.
A†	Dumps job dayfile pointers and buffer in word format with 6-bit display code character equivalents. This format is the same format as the E memory dump directive. This option also dumps the buffer in a line-by-line format, as on the DSD A display.
F†	Provides dump of the three-word FNT entry, EST, and mass storage track chain, if one exists, for all files attached to the specified control point.
C†	Dumps field length of specified control point in instruction parcel format with 6-bit display code character equivalents. This format is the same format as the C memory dump directive. Repetitive data is suppressed.

†This option does not dump information for the system control point.

Parameter	Description

ops_i	Description
D†	Dumps field length of specified control point in byte format with 6-bit display code character equivalents. This format is the same format as the D memory dump directive. Repetitive data is suppressed.
E†	Dumps field length of specified control point in word format with 6-bit display code character equivalents. This format is the same format as the E memory dump directive.
G	Dumps control point area in instruction parcel format with 6-bit display code character equivalents. This format is the same format as the C memory dump directive.
H	Dumps control point area in byte format with 6-bit display code character equivalents. This format is the same format as the D memory dump directive.
I	Dumps control point area in word format with 6-bit display code character equivalents. This format is the same format as the E memory dump directive.
M†	Dumps user-access extended memory of specified control point in byte format with 6-bit display code character equivalents. This format is the same format as the D memory dump directive.
N†	Dumps negative field length of specified control point. This format is the same format as the D memory dump directive.
P	Provides dump and analysis of all active PPs associated with control point n.
default	If n is specified with no corresponding list options, options XTAF are selected automatically. Refer to Printer Output Listing Examples for a sample of the printer output listing produced. The default options selected can be changed with the CPO directive.

All of the list options specified for a particular control point area (up to 10) are processed. For example, if the C and D options are both specified, the control point field length is dumped twice, once in instruction parcel (C) format and again in byte (D) format.

†This option does not dump information for the system control point.

CPO – Reset Default List Options

The CPO directive selects a new string of default list options for the CP directive.

Format:

```
CPO,ops.
```

Parameter	Description
ops	New default list options for CP directive, a continuous string of up to 10 characters. Refer to description of CP directive for list of valid option characters.

CT – Dump Channel Tables

The CT directive causes the channel status table, EJT assignment table, and channel controlware table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
CT.
```

DAYFILE – Dump System Dayfile Buffer

The DAYFILE directive causes the system dayfile pointers and buffer to be dumped in word format (four words per line) with 6-bit display code character equivalents. This format is the same format as that for the E memory dump directive. This directive also dumps the buffer in a line-by-line format, as on the DSD A display.

Format:

```
DAYFILE.
```

DB – Dump Disk Buffers

The DB directive causes all disk buffers, or a selected subset, to be dumped to a printer in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

$DB,id,n_1,n_2,\ldots,n_m.$

Parameter	Description
id	Specifies the machine identifier of the mainframe from which to dump the disk buffers. If id is omitted, the default machine identifier is taken from CMR of the mainframe that is dumping the disk buffers.
n_i	Number assigned to a disk buffer to be dumped. If n_i is omitted, all active disk buffers are dumped.

DBW—Dump Buffered Device/Buffer Statistics/PP—I/O Buffer Link Tables

The DBW directive causes the list control words from the buffered device table, the buffer statistics table, and the PP - I/O buffer link table to be dumped. The dump is formatted to reflect the appropriate parameter fields for each word. Output to a printer is listed in two columns. Output to a terminal is listed in one column. The format is the same format as that for the MST directive.

Format:

```
DBW.
```

DDB—Dump Dayfile Dump Buffer

The DDB directive causes the dayfile dump buffer to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
DDB.
```

DP—Dump Dayfile Buffer Pointers

The DP directive causes the dayfile buffer pointers to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
DP.
```

EJT—Dump Executing Job Table

The EJT directive causes the executing job table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
EJT.
```

EPB—Dump Extended Memory/PP Buffer

The EPB directive causes the extended memory/PP buffer to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
EPB.
```

ERRLOG – Dump Error Log Dayfile Buffer

The ERRLOG directive causes the error log dayfile pointers and buffer to be dumped in word format (four words per line) with 6-bit display code character equivalents. This format is the same format as that for the E memory dump directive. This directive also dumps the buffer in a line-by-line format, as on the DSD A display.

Format:

```
ERRLOG.
```

EST — Dump Equipment Status Table

The EST directive causes the equipment status table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
EST.
```

FNT – Dump System File Name/File Status Table

The FNT directive causes the system file name/file status table (FNT/FST) to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
FNT.
```

FOT – Dump Family Ordinal Table

The FOT directive causes the family ordinal table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
FOT.
```

HAT— Dump Hash Table

The HAT directive causes all nonzero hash table entries to be dumped unless ordinal numbers are specified, in which case only the specified hash table entries are dumped. The dump is formatted to reflect the appropriate parameter fields for each word. Hash table entries that are output to a printer are listed in two columns. The format is the same format as that for the MST directive. The hash table entries can also be output to a terminal, but only when ordinal numbers are specified. Hash table entries that are output to a terminal are listed in a single column format.

Format:

HAT,n_1,n_2,...,n_m.

Parameter	Description
n_i	Ordinal number of the hash table entry to be dumped. If n_i is omitted, all nonzero hash table entries are dumped.

JC — Dump Job Control Area for Each Service Class

The JC directive causes the job control area for each job service class to be dumped. The dump is formatted to reflect the appropriate parameter fields and NOSTEXT symbol for each word. This directive also dumps the service class control table (SCT) in a line-by-line format.

Format:

JC.

LC — Dump Low Central Memory

The LC directive causes DSDI to dump the contents of low central memory (that is, central memory locations 0 through 177_8). Each word is divided into the appropriate parameter fields. Each field is listed on a separate line with a description of the parameter. The absolute address and 6-bit display code character equivalents are also listed for each word.

Format:

LC.

LDIS - Dump L Display Buffer

The LDIS directive causes the L display buffer to be dumped in instruction parcel format with 6-bit display code character equivalents. This format is the same format as that for the C memory dump directive.

Format:

LDIS.

LIDT — Dump Logical Identifier Table

The LIDT directive causes the logical identifier table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
LIDT.
```

MAINLOG — Dump Binary Maintenance Log Dayfile Buffer

The MAINLOG directive dumps the binary maintenance log dayfile pointers and buffer in word format, four words per line, with 6-bit display code character equivalents.

Format:

```
MAINLOG.
```

MST — Dump Mass Storage/Track Reservation Tables

The MST directive causes all mass storage and track reservation tables to be dumped unless EST ordinals are specified, in which case only the specified MSTs are dumped. The dump format for the mass storage tables reflects the appropriate parameter fields and NOSTEXT symbol of each word. The portion of the dump describing the track reservation tables is presented in byte format with 6-bit display code character equivalents. The track link byte ordinal and status bits (three groups of four bits) are indicated for each word. Refer to Printer Output Listing Examples for a sample of the printer output listing produced by this directive.

Format:

MST,est_1,est_2,...,est_n.

Parameter	Description
est_i	EST ordinal of equipment whose mass storage table is to be dumped. If est_i is omitted, all mass storage and track reservation tables are dumped.

MTR — Dump CPU Monitor

The MTR directive causes the CPU monitor to be dumped. Exchange packages are dumped in exchange package format while the program area is dumped, using relative addressing, in instruction parcel format with 6-bit display code character equivalents. This format is the same format as that for the C memory dump directive.

Format:

```
MTR.
```

MTRQUEUE — Dump CPUMTR Request and Recall Queues

The MTRQUEUE directive causes all CPUMTR request and recall queues, or a selected subset, to be dumped.

Format:

```
MTRQUEUE,idents.
```

Parameter	Description
idents	A string of up to four characters indicating the queues to be dumped. The queue identifiers can be specified in any order and are dumped in the order specified. Default is to dump all four queues. Valid queue identifiers are as follows:

idents	Queue Name
C	CPUCIO Request.
P	PP Request.
R	Recall.
W	CPU Request.

ODIS — Dump Operator Display Buffer

The ODIS directive causes the operator display buffer (used for communication between an operator and a remote diagnostic user) to be dumped in instruction parcel format with 6-bit display code character equivalents. This format is the same format as that for the C memory dump directive.

Format:

```
ODIS.
```

PLD — Dump Peripheral Library Directory

The PLD directive causes the PP library directory to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
PLD.
```

PP – Dump PP Communication Areas

The PP directive causes the contents of all PP communication areas to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive. The control point assignment, channel assignment, and monitor function are listed with each communication area. Refer to Printer Output Listing Examples for a sample of the printer output listing produced by this directive. Refer to Interactive Use of DSDI for additional information concerning use of this directive from an interactive terminal.

Format:

    PP.

PROBE – Dump PROBE Data Tables

The PROBE directive causes the PROBE data tables to be dumped in byte format with 6-bit display code character equivalents.

Format:

    PROBE.

PST – Dump Program Status Table and Entry Point Directory

The PST directive causes the program status table and the entry point directory to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

    PST.

PUT—Dump Physical Unit Table

The PUT directive causes all nonzero physical unit table entries to be dumped unless ordinal numbers are specified, then only the specified physical unit table entries are dumped. The dump is formatted to reflect the appropriate parameter fields for each word. Physical unit table entries that are output to a printer are listed in two columns. The format is the same format as that for the MST directive. The physical unit table entries can also be output to a terminal, but only when ordinal numbers are specified. Physical unit table entries that are output to a terminal are listed in a single column format.

Format:

PUT,$n_1,n_2,\ldots,n_m$.

Parameter	Description
n_i	Ordinal number of the physical unit table entry to be dumped. If n_i is omitted, all nonzero physical unit table entries are dumped.

QFT — Dump Queued File Table

The QFT directive causes the queued file table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
QFT.
```

RCL — Dump Resident Central Library

The RCL directive causes the resident central library to be dumped in instruction parcel format with 6-bit display code character equivalents. This format is the same format as that for the C memory dump directive. A warning is printed if the resident central library is empty.

Format:

```
RCL.
```

RPL — Dump Resident Peripheral Library

The RPL directive causes the resident PP library to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive. A header line for each PP program dumped indicates the name of the program and its length in bytes. Each succeeding line contains 10 bytes (two central memory words) of the PP program. The PP address of the first byte in each line, relative to address zero of the PP, is also listed.

Format:

```
RPL.
```

SDX — Dump Extended Statistical Data Area

The SDX directive causes the extended statistical data area to be dumped. Each word is divided into the appropriate parameter fields and is listed with a description of the parameter. The absolute address and 6-bit display code character equivalents are also listed for each word.

Format:

```
SDX.
```

SECDED – Dump SECDED Identifier Table

The SECDED directive causes the single error correction double error detection (SECDED) identifier table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
SECDED.
```

SST – Dump Subsystem Control Point/Subsystem Assignment Tables

The SST directive causes the subsystem control point table and subsystem assignment table to be dumped in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

Format:

```
SST.
```

SUBSYSTEM DUMP/ANALYSIS DIRECTIVES

The subsystem dump/analysis directives provide the capability to selectively dump portions of central and/or PP memory associated with a specific subsystem (BIO, MAG, and IAF). Although many other directives previously described in this section can be used to dump the same areas of memory, these directives dump those areas most frequently analyzed when subsystem related malfunctions occur. In addition, many of the dumps are specially formatted to provide a detailed description of the area being dumped. If the specified subsystem was not active at the time the EDD file was created, an error message is issued.

BATCHIO/BIO – Dump Associated Memory for Analysis

The BATCHIO directive causes areas of central and/or PP memory that are most frequently analyzed when BATCHIO malfunctions are indicated to be dumped. The areas and type of memory dumped are determined by the list options specified.

Format:

```
BATCHIO,ops.
    or
BIO,ops.
```

Parameter	Description
ops	List options; a string of characters indicating the areas of memory to be dumped. If no options are specified, all three options (PBN) are selected by default and are processed in order as listed.

Parameter	Description

ops	Description
P	Provides analysis and full memory dump of PPs having resident copies of 1CD, 1IO, QAP, QAC, or DSP. The output listing generated is the same (in format and content) as that produced by entering the AP directive in the following format. AP,1CD,1IO,QAP,QAC, DSP. Refer to the description of the AP directive, PP Dump Directives, for additional information.
B	Provides specially formatted dumps of each active BATCHIO buffer point. Included with the dump of each buffer point is the associated equipment type and FET, as well as EST and FNT/FST entries.
N	Provides a dump of the negative field length associated with the BATCHIO control point in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.

IAF—Dump Associated Memory for Analysis

The IAF directive causes areas of central and/or PP memory that are most frequently analyzed when IAF malfunctions are to be dumped. The areas and type of memory are determined by the list options specified. The IAF current entry word (SSPA) is always printed at the beginning of the listing, in byte format, regardless of which list options are specified.

Format:

```
IAF,ops.
```

Parameter	Description
ops	List options; a string of up to five characters indicating the areas of memory to be dumped. If no options are specified, four options (ETLP) are selected by default and processed in order as listed.

ops	Description
C	Provides analysis of the IAF command table.
E	Dumps IAF reentry table in byte format (two words per line) with 6-bit display code character equivalents. The first word in each line is preceded by its ordinal within the table.

Parameter	Description

ops	Description
T	Provides specially formatted dump of the IAF terminal table in which each word reflects the appropriate parameter fields. The message status table entry is included when dumping network terminal tables. In addition, each word is preceded by a description of the parameter fields and its COMSREM symbol. Terminal table entries that are empty, except for having status bit 0 in word 3 (VROT entry) set, are not printed.
L	Provides dump of pot link table and all pots. The pot link table is dumped in byte format with pot link byte ordinals indicated for each word, but no 6-bit display code character equivalents. Repetitive pot link table entries are suppressed. The pots are dumped in word format, three lines per pot, with the first line containing only the pot number.
P	Provides analysis and full memory dump of all PPs having resident copies of TLX, 1TA, ITN, and 1TO. This option also provides an analysis and dump of all PPs having resident copies of 1RO and 1RI that are associated with control points of interactive origin. The output listing generated is the same (in format and content) as that produced by entering the AP directive in the following format. AP,TLX,1TA,1TN,1TO,1RO,1RI. The exception is that the AP directive also dumps all PPs having copies of 1RO and 1RI rather than only those associated with control points of interactive origin. Refer to the description of the AP directive, PP Dump Directives, for additional information.

MAGNET/MAG – Dump Associated Memory for Analysis

The MAGNET directive causes areas of central and/or PP memory that are most frequently analyzed when a malfunction within the magnetic tape subsystem is indicated to be dumped. The areas and type of memory dumped are determined by the list options specified.

Format:

```
MAGNET,ops.
    or
MAG,ops.
```

Parameter	Description
ops	List options; a string of characters indicating the areas of memory to be dumped. If no options are specified, all three options (UQP) are selected by default and are processed in order as listed.

Parameter	Description

ops	Description
U	Provides specially formatted dump of the magnetic tape subsystem unit descriptor tables with associated FET, EST, and FNT/FST. Each word of a unit descriptor table is formatted to reflect appropriate parameter fields. In addition, each word is preceded by a description of the parameter fields and its COMSMTX symbol. If extended labels are present, they appear with the FET in the output listing. The FET also indicates the address and control point number of the user.
Q	Provides dump of the magnetic tape subsystem queue table in byte format (two words per line) with 6-bit display code character equivalents. The first word in each line is preceded by its ordinal within the table.
P	Provides analysis and full memory dump of all PPs having resident copies of 1MT. The output listing generated is the same (in format and content) as that produced by entering the AP directive in the following format. AP,1MT. Refer to the description of the AP directive, PP Dump Directives, for additional information.

RHF — Dump Associated Memory for Analysis

The RHF directive causes areas of central and/or PP memory that are most frequently analyzed when RHF malfunctions are indicated to be dumped. The areas and type of memory dumped are determined by the list options specified.

Format:

```
RHF,ops.
```

Parameter	Description
ops	List options; a string of characters indicating the areas of memory to be dumped. If no options are specified, all three options (ACP) are selected by default and are processed in order as listed.

ops	Description
A	Provides a dump of the RHF dayfile buffer in word format with 6-bit display code character equivalents. This format is the same format as that for the E memory dump directive. This option also dumps a standard dayfile.
C	Provides a dump of the RHF field length in byte format with 6-bit display code character equivalents. This format is the same format as that for the D memory dump directive.
P	Provides analysis and full memory dump of all active PPs associated with the control point.

HARDWARE REGISTER DUMP DIRECTIVES

The hardware register dump directives provide a capability to dump specified hardware registers.

FMFREG — Dump PP Registers

The FMFREG directive is valid on models 815, 825, 835, 845, and 855 only. For each PP register (P,Q,K,A) stored while processing a fatal mainframe error, DSDI prints the PP register contents.

Format:

```
FMFREG.
```

IOUMR – Dump IOU Maintenance Registers

The IOUMR directive is valid on models 815, 825, 835, 845, and 855 only. For each input-output unit (IOU) maintenance register specified, DSDI prints the hexadecimal register number, the register contents, and the register description. For registers containing error indicators, DSDI prints a description of each error.

Format:

```
IOUMR,first,last.
```

Parameter	Description
first	First register (hexadecimal) to be printed. If omitted, printing begins with register 00.
last	Last register +1 (hexadecimal) to be printed. If omitted, printing ends with register first+1.

If no parameters are specified, DSDI prints all maintenance registers.

MEMMR – Dump Memory Maintenance Registers

The MEMMR directive is valid on models 815, 825, 835, 845, and 855 only. For each memory maintenance register specified, DSDI prints the hexadecimal register number, the register contents, and the register description. For registers containing error indicators, DSDI prints a description of each error.

Format:

```
MEMMR,first,last.
```

Parameter	Description
first	First register (hexadecimal) to be printed. If omitted, printing begins with register 00.
last	Last register+1 (hexadecimal) to be printed. If omitted, printing ends with register first+1.

If no parameters are specified, DSDI prints all maintenance registers.

PROCW — Dump Processor Controlware Part Number and Revision Level

The PROCW directive is valid on models 815, 825, 835, 845, and 855 only. It prints the processor controlware part number and the revision level.

Format:

```
PROCW.
```

PROMR — Dump Processor Maintenance Registers

The PROMR directive is valid on models 815, 825, 835, 845, and 855 only. For each processor maintenance register specified, DSDI prints the hexadecimal register number, the register contents, and the register description. For registers containing error indicators, descriptions of each error are printed.

Format:

```
PROMR,first,last.
```

Parameter	Description
first	First register (hexadecimal) to be printed. If omitted, printing begins with register 00.
last	Last register+1 (hexadecimal) to be printed. If omitted, printing ends with register first+1.

If no parameters are specified, all maintenance registers are printed.

PRORF — Dump Processor Register File

The PRORF directive is valid on models 815, 825, 835, 845, and 855 only. It prints the maintenance channel interface port number followed by the hexadecimal register number and contents of each processor register specified.

Format:

```
PRORF,first,last.
```

Parameter	Description
first	First register to be printed. If omitted, printing begins with register 00.
last	Last register+1 to be printed. If omitted, printing ends with register first+1.

If no parameters are specified, the entire register file is printed.

PROXP — Dump Processor Exchange Package

The PROXP directive is valid on models 815, 825, 835, 845, and 855 only. It prints the maintenance channel interface port number followed by the hexadecimal register number, the contents of each processor register, and (for most registers) a description of the register's contents.

Format:

```
PROXP.
```

SC — Dump S/C Register

The SC directive is valid only on CYBER 170 Computer Systems with the exception of models 815, 825, 835, 845, and 855 and causes the S/C registers (maintenance registers for models 865 and 875) to be dumped.

Format:

```
SC.
```

XP — Dump Deadstart Exchange Package

The XP directive causes the CPU exchange package executing at the time of deadstart to be dumped. If there are two CPUs in the system, both exchange packages in execution at the time of deadstart are dumped.

Format:

```
XP.
```

BUFFER CONTROLLER DIRECTIVE

The buffer controller directive provides the capability to dump specified buffer controllers. The BCDUMP directive causes the selected buffer controllers to be dumped.

Format:

BCDUMP,cc_1/ops_1,cc_2/ops_2,...,cc_n/ops_n.

Parameter	Description
cc_i	Channel number of buffer controller to be dumped. If no channels are specified, all buffer controllers are dumped with the default options HD.
ops_i	List options; two characters indicating the line format and interpretation of the selected buffer controllers to be dumped. If no options are specified, options H and D are selected by default.

Parameter		Description
	ops_i	Line Format
	H	Hexadecimal line format (default).
	O	Octal line format.
	ops_i	Interpretation
	A	7-bit ASCII code interpretation.
	D	6-bit display code interpretation (default).

INTERACTIVE USE OF DSDI

Incorporated within DSDI is an interactive facility which allows several of the directives previously described in this section to be entered interactively from a terminal. This interactive facility is designed to provide the following additional capabilities.

- Allows preliminary examination of the EDD file to determine which areas should be listed in detail at a line printer.
- Allows examination of certain areas of the EDD file not listed during normal operational procedures following a system malfunction. Typically, predefined portions of the EDD file are listed following a system malfunction.
- Allows on-line examination of the EDD file from a remote location.

Refer to Example of DSDI Terminal Use for an example showing interactive use of DSDI.

When the DSDI command is entered from an interactive terminal (batch subsystem or X command only), a delay will be experienced before input directives can be entered. During this time (10 to 60 seconds), DSDI is copying the EDD file to a random mass storage file. The length of the delay is dependent upon device speed and current system activity. When DSDI is able to accept input directives, it will issue the following prompt to the terminal.

```
ENTER DIRECTIVES- -
?
```

Directives are entered following the question mark prompt. Only one directive can be entered at a time, and is restricted to one line. The format is the same as described for batch input (refer to Directive Format).

Generally, any of the DSDI input directives can be entered at an interactive terminal. However, the output produced by many of the directives is formatted for listing only at a line printer (136 columns) and cannot be listed at the terminal (72 columns). The L parameter on the DSDI command initially determines the disposition of the list output. If a file name is not specified, list output is assigned to file OUTPUT by default (that is, the terminal). In this case, entry of directives which produce output that cannot be listed at the terminal results in the message:

```
DIRECTIVE RESTRICTED TO PRINTER OUTPUT.
```

If a list output file name is specified on the DSDI command, all input directives can be entered at the terminal. All list output (including error messages) is written to the specified file.

Two input directives are provided to further control the disposition of list output.

Directive	Description
OUTPUT,filename.	Assigns output to alternate file filename (file name OUTPUT is not allowed; that is, alternate list output cannot be assigned to the terminal). If filename is omitted, the system assumes file name ALTRNT. While this directive is active, all input directives can be entered at the terminal. All list output (except error messages) is written to file filename and is formatted for transmission to a line printer. Error messages are written directly to the terminal.
DISPOSE.	Disposes the alternate list file (specified in OUTPUT directive) to the print queue. Output will be printed at the central site line printer. All subsequent list output resumes on the original output file specified on the DSDI command.

Refer to File Manipulation and Control Directives for additional information concerning use of these directives.

TERMINAL OUTPUT DIRECTIVES

The following directives produce output formatted for listing at an interactive terminal.

C—Dump Memory in Instruction Parcel Format

The C directive causes the specified locations of central memory or extended memory to be dumped in four groups of five octal digits (one word per line) with 6-bit display code character equivalents. No pagination is processed for terminal output. The CM, EC, and UEC directives (refer to Central Memory/Extended Memory Dump Directives) determine the type of memory to be dumped; default is central memory. The RA or RAC directive (refer to Central Memory/Extended Memory Dump Directives) must be entered to dump relative addresses; default is absolute addressing.

Format:

```
C,fwa,lwa.
```

Parameter	Description
fwa	First word address to be dumped (mandatory).
lwa	Last word address, plus one location, to be dumped. If omitted, fwa+1 is assumed by default.

Example of terminal output:

```
? C,6230,6240.
0006230 34240 10100 00012 50036 1TAA   AU 3
0006231 00764 70000 00000 10113   *     AAK
0006232 04154 70000 00000 10113 DM*     AAK
0006233 00004 67446 74000 10005    - -  A E
0006234 05153 05700 00000 00000 EMX.
0006235 00000 00000 00000 00000
0006236 00000 00000 00000 00000
0006237 00000 00005 05111 14422      EEII9R
```

CP—Dump Active Control Point Areas

The CP directive causes the job sequence name and control point area address for each control point to be dumped.

Format:

```
CP.
```

Example of terminal output:

```
CP 01    CP 02    CP 03    CP 04    CP 05    CP 06    CP 07    CP 10
IAF      AALT     NAM               AAKW     AAAG     AAAF     AAAE
0200     0400     0600     1000     1200     1400     1600     2000

CP 11    CP 12    CP 13    CP 14    CP 15    CP 16    CP 17    CP 20
AAAD     AAAC     AAAB     AALN              AALU
2200     2400     2600     3000     3200     3400     3600     4000

CP 21    CP 22    CP 23    CP 24    CP 25    CP 26    CP 27    CP 30
                                                               RBF
4200     4400     4600     5000     5200     5400     5600     6000

CP 31    CP 32    CP 33    CP 34<——Control Point Number
MAG      BIO               SYS<———Job Sequence Name at Control Point
6200     6400     6600     7000<——Control Point Area Address
```

D—Dump Memory in Byte Format

The D directive causes specified locations of central memory or extended memory to be dumped in five groups of four octal digits (one word per line) with 6-bit display code character equivalents. No pagination is processed for terminal output. The CM, EC, and UEC directives (refer to Central Memory/Extended Memory Dump Directives) determine the type of memory to be dumped; default is central memory. The RA or RAC directive (refer to Central Memory/Extended Memory Dump Directives) must be entered to dump relative addresses; default is absolute addressing.

Format:

```
D,fwa,lwa.
```

Parameter	Description
fwa	First word address to be dumped (mandatory).
lwa	Last word address, plus one location, to be dumped. If omitted, fwa+1 is assumed by default.

Example of terminal output:

```
? D,6230,6240.
0006230 3424 0101 0000 0125 0036 1TAA   AU 3
0006231 0076 4700 0000 0001 0113   *     AAK
0006232 0415 4700 0000 0001 0113 DM*     AAK
0006233 0000 4674 4674 0001 0005  - -    A E
0006234 0515 3057 0000 0000 0000 EMX.
0006235 0000 0000 0000 0000 0000
0006236 0000 0000 0000 0000 0000
0006237 0000 0000 0505 1111 4422      EEII9R
```

PP – Dump PP Communication Areas

The PP directive causes the PP number, executing program name, control point assignment, and input register address for each PP communication area to be dumped.

Format:

PP.

Example of terminal output:

```
                                   PP Number
              Program in Execution          Control Point Assignment

PP00   PP01   PP02   PP03   PP04   PP05   PP06   PP07   PP10   PP11
MTR-34 DSD-34 QAC-16 ----   ----   1RO-05 1SJ-34 1MT-31 ----   QAC-14
7200   7210   7220   7230   7240   7250   7260   7270   7300   7310

PP20   PP21   PP22   PP23   PP24   PP25   PP26   PP27   PP30   PP31
PIP-03 CPD-34 QAC-02 ----   1IO-32 ----   ----   ----   1MA-01 ----
7320   7330   7340   7350   7360   7370   7400   7410   7420   7430

PP00                                   Input Register Address
----
7440
```

Q – Dump PP Memory in Line Format

The Q directive causes the specified locations of PP memory to be dumped in line format. Each line contains eight bytes (PP words) with 6-bit display code character equivalents. Repetitive lines are suppressed and zero bytes are represented by hyphens (----).

Format:

Q,n,fwa,lwa.

Parameter	Description
n	Number of PP to be dumped.
fwa	First word address to be dumped.
lwa	Last word address, plus one location, to be dumped.

NOTE

> fwa and lwa are automatically adjusted so that the dump limits fall within a multiple of 10_8 words.

This format is valid only for terminal output. If attempted from a batch origin job or while an alternate list file is active, the fwa and lwa parameters will be interpreted as PP numbers.

Example of terminal output:

```
? Q,5,0,100.
0000  0003  2020  3340  ----  0614  ----  4334  0117    CPP05   FL   81A0
0010  0064  0001  7772  0100  0006  1073  1401  6072      A   A   FH LA
0020  2250  3225  ----  0027  0012  4402  5747  5751    R/ZU    W  J93.*.(
0030  0011  7646  ----  0001  0141  0600  ----  ----     I -    AA6F
0040  1501  1116  2014  0074  0203  ----  ----  ----    MAINPL   BC
0050  3404  2330  0035  6213  1707  ----  4000  6675    1DSX 2  KOG  5
0060  ----  4521  ----  6101  0001  0153  0001  0532      +Q    A AAS AEZ
0070  0001  0100  1000  0003  6000  6250  6251  6252     AA H   C   / ( )
```

QOA, QOD, QXA, QXD — Dump 16-Bit PP Memory in Line Format

These four directives are valid on models 815, 825, 835, 845, and 855 only. Each directive prints specified locations of 16-bit PP memory in line format. Each line contains eight PP words in octal or hexadecimal with 6-bit display code or 7-bit ASCII code character representations. Repetitive lines are suppressed and zero bytes appear as hyphens (----).

Directive Format	Numeric Representation	Character Representation
QOA,n,fwa,lwa,R.	Octal	7-bit ASCII code
QOD,n,fwa,lwa,R.	Octal	6-bit display code
QXA,n,fwa,lwa,R.	Hexadecimal	7-bit ASCII code
QXD,n,fwa,lwa,R.	Hexadecimal	6-bit display code

Parameter	Description
n	Number of PP to be printed.
fwa	First word address to be printed.
lwa	Last word address, plus one location, to be printed.
R	If specified, the R register is printed.

This directive format is valid only for terminal output. If it is used in a batch origin job or while an alternate list file is active, DSDI interprets the fwa and lwa parameters as PP numbers.

EXAMPLE OF DSDI TERMINAL USE

This example illustrates how DSDI might be used, following a system malfunction, to analyze portions of the EDD file from an interactive terminal. It is assumed that an EDD file was created during normal system recovery procedures. Vertical spacing has been expanded to permit commentary. The example begins after the login sequence has been completed.

batch RFL,0.	Enter batch subsystem.
/label,dump,vsn=dump,lb=ku,f=s,mt,d=800	The LABEL command is entered to assign the EDD dump tape to this job. Use of the vsn parameter allows the job to be rolled out while the tape is mounted and assigned.
/get,altdir	Retrieve alternate directives file ALTDIR (refer to example in figure 10-1).
/dsdi.	Calls DSDI which copies EDD tape to a random mass storage file.
ENTER DIRECTIVES - - . . .	Enter terminal output directives (refer to Terminal Output Directives) to list any portion of the EDD file at the terminal. DSDI issues the prompt (?) when it is ready to accept a new directive.
? output,altout. . . .	List output produced by subsequent directives is written to local file ALTOUT. This allows entry of directives which produce line printer formatted output.
? read,altdir. . . .	All input directives in alternate directives file ALTDIR are read and processed. List output is written to local file ALTOUT. DSDI does not request terminal input until last directive on ALTDIR is processed.
? dispose.	Dispose local file ALTOUT to the print queue for listing at the central site line printer. Output produced by subsequent directives is listed at the terminal.
EXPRESS DUMP COMPLTE (FL USED xxxxxxB) /	DSDI is terminated by pressing carriage return in response to the ? prompt.

In summary, the following operations were performed by DSDI. First, small areas of the dump file were listed at the terminal for preliminary examination. This was done both to analyze the cause and effect of the system failure, as well as determine the extent of line printer listings required. An appropriate comment may be placed in the list file subtitle at this time via the *.ccc...ccc directive.

Next, directives were entered to generate the necessary line printer listings. These listings are generally extensive, or contain specially formatted output that cannot be listed at the terminal. Thus, output was written to an alternate list file named ALTOUT.

After all necessary directives had been entered from the terminal, an alternate directives file (ALTDIR) was read. ALTDIR is a permanent file containing input directives necessary to obtain a printer listing of specific areas in the dump file that are frequently examined following a system failure (for example, CMR tables and buffers, PP memory, and so forth). Figure 10-1 illustrates a typical alternate directives file. Comments describing areas of the dump file to be listed appear, with the directive, in the title line of the output listing.

When DSDI finished processing the last directive in file ALTDIR, it again issued the ? prompt to the terminal requesting further directive input from the keyboard. At this time, the DISPOSE directive was entered causing file ALTOUT to be printed at the central site line printer. Refer to Printer Output Listing Examples for examples of printer output listings.

```
DUMP†
LC.             LOW CENTRAL MEMORY POINTERS
PP.             PP COMMUNICATION AREA
CPO,H.
EJOFF.
EJ.
CP.             CONTROL POINT AREAS
CPO,XTAF.
DP.             DAYFILE BUFFER POINTERS
EJ.
EST.            EQUIPMENT STATUS TABLE
FNT.            SYSTEM FILE NAME TABLE
EJ.
MST.            MASS STORAGE TABLES
JC.             JOB CONTROL PARAMETERS
CP,30/T.        SYSTEM CONTROL POINT AREA
ACCOUNT.        ACCOUNT FILE BUFFER
ERRLOG.         ERROR LOG BUFFER
EJON.
AP.             ACTIVE PPS
```

†All records in an alternate directives file must be in text format; the first word in each record contains only the record name.

Figure 10-1. Sample Alternate Directives File

PRINTER OUTPUT LISTING EXAMPLES

The listings illustrated in this section are samples of the line printer output listings produced by several of the input directives described in the Input Directives section.

Each page of output listings begins with two header lines: a title line and a subtitle line. The header lines are formatted as follows:

```
RA =     current input directive                              DUMP nn  DSDI     yy/mm/dd. hh.mm.ss.   PAGE   n
0000000  dump type  hh.mm.ss. yy/mm/dd. CDC NETWORK OPERATING SYSTEM.  NOS 2  comments
```

RA=0000000

Indicates absolute addressing is in effect. If relative addresses were being dumped (RA or RAC directive entered), a nonzero reference address would appear in this field.

current input directive

Input directive currently being processed, including comments (50-character field).

DUMP nn

Reflects the EDD tape number currently being used (nn is a two-digit dump identifier assigned during EDD).

yy/mm/dd. hh.mm.ss.

This field reflects the date and time when DSDI was executed.

dump type

Indicates type of memory currently being dumped (central memory, extended memory, or a PP number). If the AP directive is processed, the PP number is followed by the name of the program currently being dumped.

hh.mm.ss. yy/mm/dd. CDC NETWORK OPERATING SYSTEM NOS 2

Time of day, date, system title line, and system version name taken from CMR.

comments

Up to 36 characters of comments specified on a *.ccc...ccc input directive.

Example 1:

The following sample illustrates the printer output listing produced by the PP directive (dump PP communication areas).

```
RA =     PP.                                              DUMP 01     DSDI             82/01/20. 16.22.05.      PAGE      1
0000000  CM        16.52.11. 82/01/06. CDC NETWORK OPERATING SYSTEM.        NOS 2

      PP00   MTR    1524 2234 0000 0000 0000  MTR1               PP01   DSD    0423 0434 0000 0000 0000  DSD1
                    0000 0001 0000 0003 5570    A   C                          0000 0000 0000 0000 0000
             CP34   0101 1501 0000 0000 0007  AAMA      G               CP34   3404 1434 0010 0044 0142  1DL1 H 9A7
                    0000 0000 0000 0004 0565        DE                  CH10   0000 0000 0000 0000 0000
                    0000 0000 0000 0000 0000  Program in Execution             0000 0000 1401 0613 5400     LAFK=
                    0000 0000 0000 0000 0000  Control Point Assignment         5534 3457 3737 5733 3357   11.44.00.
                    0000 0000 0000 0000 0000  Channel Assignment               5543 3550 3334 5033 4157   82/01/06.
                    0000 0000 0000 0000 0000                                   0040 0000 0000 0000 0000  5

      PP02   QAC    2101 0356 0000 0000 0123  QAC,     AS        PP03          0000 0000 0000 0000 7430            X
             UTEM   1077 0000 0000 0003 3734  H        C41                     0000 0000 0000 0000 0000
             CP16   0006 0001 4600 0001 0000   F A-   A                 CP00   0000 0000 0000 0000 0000
                    0000 0002 0300 0000 0000      BC                           0000 0002 0235 0022 0001     BB2 R A
                    0000 0000 0000 0000 0000                                   0000 0000 0000 0000 0000
                    0013 0000 1765 0000 2265   K  O     R                      0004 0000 3314 0000 7325   D  OL    U
                    0301 6400 0000 0000 0000  CA                               0724 0000 2127 1031 1200  GT  QWHYJ
                    0330 0000 0000 0000 0125  CX       AU                      0000 0000 0002 1030 1020        BHXHP

      PP04          0000 0000 0000 0000 7350             /       PP05   1RO    3422 1705 0000 0000 0000  1ROE
                    0000 0000 0000 0000 0000  Monitor Function          PIOM   2043 0400 0000 0001 5400  P8D     A=
             CP00   0000 0000 0000 0000 0000                            CP05   0154 0011 4440 0000 0400  A= I95  D
                    0000 0000 0235 0022 0001      B2 R A                       4000 0000 0504 2600 0000  5   EDV
                    0000 0000 0000 0000 0000                                   0000 0000 0000 0000 0000
                    4002 0000 5502 0002 1500  5B    B BM                       0003 0000 1776 0000 2777   C  O    W
                    0301 6400 0000 0000 0000  CA                               0301 6400 0000 0000 0000  CA
                    0330 0000 0000 0000 0333  CX       CO                      0000 0000 1401 0620 3735     LAFP42

      PP06   1SJ    3423 1234 0003 0000 0000  1SJ1 C             PP07   1MT    3415 2431 3170 0000 0000  1MTYY
             LDAM   1055 0001 4472 0305 1073  H  A9 CEH                 LDAM   1055 0001 4472 0230 1073  H  A9 BXH
             CP34   0000 0001 4472 0305 0000     A9 CE                  CP31   0000 0001 4472 0230 0000     A9 BX
                    0000 0002 0237 0005 0007     BB4 E G                       0020 0000 0000 0000 0000   P
                    0000 0000 0000 0000 0000                                   0000 0000 0000 0000 0000
                    0214 4400 0000 0000 0000  BL9                              3441 4033 3635 5655 1116  165032, IN
                    0301 6400 0000 0000 0000  CA                               5700 0000 2100 3645 0100  .   Q 3+A
                    0330 0000 0000 0000 0333  CX       CO                      3547 3400 2000 3345 5415  2*1 P 0+=M

      PP10          0000 0000 0000 0000 7370                     PP11   QAC    2101 0354 0000 0000 0216  QAC=     BN
                    0000 0000 0000 0000 0000                            UTEM   1077 0000 0003 0003 3734  H     C C41
             CP00   0000 0000 0000 0000 0000                            CP14   0004 0002 4476 0152 0000   D B9 A)
                    0000 0002 0235 0004 0014     BB2 D L                       0000 0000 0237 0004 0010       B4 D H
                    0000 0000 0000 0000 0000                                   0000 0000 0000 0000 0000
                    4011 0005 5031 0005 5432  5I E/Y E=Z                       0013 0000 4126 0000 4426   K  6V  9V
                    0724 0000 2127 1031 1200  GT  QWHYJ                        0724 0000 2127 1031 1200  GT  QWHYJ
                    0000 0000 0002 1030 1020        BHXHP                      0000 0000 0002 1030 1020        BHXHP

      PP20   PIP    2011 2003 0000 0000 0136  PIPC     A3        PP21   CPD    0320 0434 0000 0000 0225  CPD1     BU
                    0000 0000 0000 0000 0000                            LDAM   1055 0000 0000 0000 0000  H
             CP03   0311 1703 0000 0002 0331  CIOC    BCY               CP34   0000 0004 6123 0131 0000     D SAY
             CH05   0000 0000 0000 0000 0000                                   0000 0005 0424 0021 0022     EDT Q R
                    1130 6700 6017 1701 0574  IX    OOAE                       0000 0000 0000 0000 0000
                    0100 6202 0200 6155 0363  A  BB    C                       0777 1777 3777 0100 7100  G 0 4 A
                    0100 6022 3004 1201 3101  A  RXDJAYA                       2000 0045 6001 3003 1013  P  + AXCHK
                    3406 1411 3204 0502 1412  1FLIZDEBLJ                       0770 1401 3411 3412 3077  G LA1I1JX
```

Example 2:

The following sample illustrates the printer output listing produced by the AP directive (dump analysis of PP and PP memory in line format).

```
RA =     AP,3.                                                   DUMP 01      DSDI            82/01/20. 16.22.09.      PAGE      3
0000000  PP03       16.52.11. 82/01/06. CDC NETWORK OPERATING SYSTEM.         NOS 2


       ANALYSIS OF PP03

     PP03          0000 0000 0000 0000 7430          X          LAST MAIN PROGRAM LOADED -
                   0000 0000 0000 0000 0000                     LAST OVERLAY LOADED      - 3ME
          CP00     0000 0000 0000 0000 0000                     LAST MASS STORAGE DRIVER - 6DI
                   0000 0002 0235 0022 0001      BB2 R A
                   0000 0000 0000 0000 0000
                   0004 0000 3314 0000 7325    D  OL   U
                   0724 0000 2127 1031 1200   GT  QWHYJ
                   0000 0000 0002 1030 1020       BHXHP

      RESIDENT ENTRY POINTS            LOW MEMORY CONSTANTS
         NAME  LOC CALLER           NAME LOC    ACTUAL EXPECTED

          FTN  0163  2205             RA  55     4004  ----
          DFM  0432  2341             FL  56     0021  ----
          EXR  0471  1477             ON  70     0001  0001
          SMS  0506  0355             HN  71     0100  0100
          RDS  0553  0370             TH  72     1000  1000
          WDS  0556  1740             TR  73     0003  0003
          EMS  0561  0415             CP  74     6200  ----
                                      IA  75     7230  ----
                                      OA  76     7231  ----
                                      MA  77     7232  ----
                                      R-REG      00010000  00000000     *** WARNING ***

         PPU MEMORY

0000  0216 2210 2175 2616 0006 0001 4473 0315   BNRHQ VN F A9 CM    0010  ---- ---- ---- ---- ---- 2120 ---- ----             QP
0020  0065 0030 0027 ---- 4000 ---- ---- ----      X W  5           0030  ---- 4000 ---- ---- ---- ---- 0301 ----      5          CA
0040  ---- 0002 5504 ---- 0203 0053 3101 0006      B D  BC $YA F    0050  ---- ---- ---- ---- 7430 4004 0021 0312             X5D QCJ
0060  ---- 3314 ---- ---- ---- ---- ---- ----     OL                0070  0001 0100 1000 0003 6200 7230 7231 7232      AA H  C   X Y Z
0100  ---- ---- ---- ---- 0002 ---- 0343 0411             B  C8DI   0110  ---- 0004 2711 ---- ---- 1006 0621 1002        DWI    HFFQHB
0120  0704 2000 1701 0576 3010 2200 0177 0336   GDP OAE XHR A C3    0130  1457 6010 3010 3374 0513 1425 0327 2000      L. HXHO EKLUCWP
0140  1720 0676 3076 6010 3010 1301 0546 3074   OPF X  HXHKAE-X     0150  1625 6010 2411 3013 3455 3014 3456 3076      NU HTIXK1 XL1,X
0160  6010 1400 0100 2205 0443 3410 3076 6210    HL A RED81HX  H    0170  1427 3210 0644 0312 0711 3011 1277 5100      LWZHF9CJGIXIJ (
0200  0510 6010 3010 1015 0731 2005 1455 6010   EH HXHHMGYPEL  H    0210  3010 3111 0572 2005 1447 6370 0111 2005      XHYIE PEL*  AIPE
0220  1447 2610 6010 3014 0445 1720 0676 1502   L*VH HXLD+OPF MB    0230  3500 0665 1476 6210 0356 2001 2551 6173      2 F L  HC,PAU(
0240  7762 ---- ---- ---- ---- ---- ---- ----                       0250  2000 1704 0576 3075 6050 3050 0471 3077      P ODE X  /X/D X
0260  6173 0020 3051 1340 1006 3474 3574 3374      PX(K5HF1 2 0     0270  3350 1006 0200 0321 0115 0005 2000 0036      O/HFB CQAM EP  3
0300  3412 2000 1505 3413 1473 0200 0163 0326   1JP ME1KL B A CV    0310  3311 1014 3112 6113 2120 1400 0200 0163      OIHLYJ KQPL B A
0320  0100 0474 5400 0302 1063 5400 0277 3076   A D = CBH = B X     0330  6010 3710 0543 3076 6210 3014 0502 3015       H4HE8X  HXLEBXM
0340  3415 5400 0314 3011 1377 0542 3015 1702   1M= CLXIK E7XMOB    0350  3403 3076 6004 0200 0506 1440 5500 0110      1CX  DB EFL5  AH
0360  4003 3416 5003 0001 3417 3003 0200 0553   5C1N/C A1OXCB E$    0370  0727 3607 5300 0106 0504 3407 4003 3406      GW3G$ AFED1G5C1F
0400  3016 4403 3017 5403 0001 2000 0500 3503   XN9CXO=C AP E 2C    0410  5715 0003 0545 0200 0561 0100 0315 2000      .M CE+B E A CMP
0420  2725 0302 3071 2342 0420 3401 1453 6173   WUCBX S7DP1AL$      0430  7762 0100 2341 5400 0457 1701 3402 1063        A S6= D.OA1BH
0440  3412 1217 1111 0410 3602 4002 0575 3602   1JJOIIDH3B5BE 3B    0450  5200 0457 3411 1406 3401 3077 6301 2572      ) D.1ILF1AX  AU
0460  1452 0200 0163 3014 0444 2001 2225 6173   L)B A XLD9PARU      0470  7764 1477 0200 0321 5000 0471 5415 0006        L B CQ/ D =M F
0500  0115 0007 1466 6170 0100 0100 0355 2000   AM GL   A A C P     0510  7464 3105 6010 3014 1003 1606 6170 0102        YE HXLHCNF  AB
0520  5000 0110 1237 0556 5000 0104 5200 0107   / AHJ4E,/ AD) AG    0530  0420 5500 0107 3413 1441 3412 1473 0200      DP  AG1KL61JL B
0540  0163 3011 1014 3112 6113 0551 0340 ----   A XIHLYJ KE(C5      0550  0100 1056 0100 0370 0314 0100 1740 0334      A H,A C CLA O5C1
0560  0100 0415 1400 3413 4471 0200 0773 0370   A DML 1K9 B G C     0570  5400 0606 4771 0705 3107 5300 0624 0403      = FF* GEYG$ FTDC
0600  0200 0663 1404 0200 0746 7106 2116 0532   B F LDB G- FQNEZ    0610  5000 0553 0335 5400 0640 1063 5400 0633      / E$C2= F5H = FO
0620  4771 0705 3107 2300 0342 0403 0200 0663   * GEYGS C7DCB F     0630  4071 0403 2000 ---- 1135 0200 0746 7306      5 DCP   I2B G- F
0640  1131 0515 5000 0556 6606 0644 7546 3410   IYEM/ E, FF9 -1H    0650  1412 0200 0746 1401 7106 0013 0525 3013      LJB G-LA F KEUXK
0660  0524 0110 ---- 0602 3076 6010 3010 0574   ETAH  FBX  HXHE     0670  3077 6204 1455 0200 0163 3714 4471 3107      X  DL B A 4L9 YG
```

Example 3:

The following sample illustrates the printer output listing produced by the CP directive (dump active control points). The default list options (XTAF) are used to dump the control point. This example consists of six pages. Also, observe that the columns cross page boundaries; that is, the left column is read continuously, from the top of the second page to the middle of the fourth page. The sequence then continues at the top of the right column on the second page.

```
RA =     CP,2.                                               DUMP 00      DSDI             83/06/02. 22.36.17.      PAGE     1
0000000  CM          22.15.04. 83/06/02. CDC NETWORK OPERATING SYSTEM.          NOS 2


0400 - CONTROL POINT 02

        CP02 EXCHANGE PACKAGE

 P      33357  A0  22577  B0      0  (A0)=0000 0000 0000 0002 2575        BU   (B0)=0000 0000 0000 0000 0000
 RA    120300  A1      1  B1      3  (A1)=0000 0000 0000 0000 0000             (B1)=3444 4400 0000 0000 0000 199
 FL     46600  A2  26250  B2  31053  (A2)=0000 0000 0000 0000 0024         T   (B2)=0400 0320 2500 0000 0000 D CPU
 EM  70070000  A3  14424  B3      0  (A3)=0000 0000 0000 0004 3521        D2Q  (B3)=0000 0000 0000 0000 0000
 RAE        0  A4  33070  B4     43  (A4)=0000 0000 0000 0003 3244        CZ9  (B4)=0000 0000 0000 0000 0000
 FLE        0  A5  33072  B5  31367  (A5)=0000 0000 0000 0003 3273        CZ   (B5)=0400 0320 5100 0000 0000 D CP(
 MA       400  A6      1  B6  33646  (A6)=0000 0000 0000 0000 0000             (B6)=5110 0336 3001 0003 3274 (HC3XA CZ
            0  A7  33070  B7  43515  (A7)=0000 0000 0000 0003 3244        CZ9  (B7)=0000 0004 0435 0204 3715     DD2BD4M

 X0  7777 7777 7700 0000 0000              (X0)=0000 0000 0000 0000 0000
 X1  0000 0000 0000 0000 0000              (X1)=0000 0000 0000 0000 0000
 X2  0000 0000 0000 0000 0024          T   (X2)=0000 0000 0000 0000 0000
 X3  0000 0000 0000 0004 3521        D2Q   (X3)=1000 0150 0000 0000 0000 H A/
 X4  0000 0000 0000 0003 3243        CZ8   (X4)=0400 0321 6630 2205 0301 D CQ XRECA
 X5  0000 0000 0000 0003 3273        CZ    (X5)=0000 0000 0000 0000 0000
 X6  2203 1400 0000 0000 0000 RCL          (X6)=0000 0000 0000 0000 0000
 X7  0000 0000 0000 0003 3244        CZ9   (X7)=0400 0320 1130 0530 0503 D CPIXEXEC

        PARAMETER SUMMARY

 USER NAME           NETOPS   SENSE SWITCHES            00
 PRIMARY FILE                 CCL R1                000000

 ORIGIN TYPE           SYOT   CCL R2                000000
 TIME USED       0000000022   CCL R3                000000
 TIME REMAINING  1014223327   CCL EF                    00
 SUBSYSTEM ID          7770   CPU PRIORITY            0077
 CPU STATUS               X   SERVICE CLASS xxxx      SSSC

 MESSAGE 1                - NP/SN102   22.05.09.LLINK  L003103,EN,RL=3,H-N,S
 MESSAGE 2                - $REQUEST *K* DISPLAY

 CURRENT COMMAND          - NIP(NIN=199,ISTP=YES,FSTP=YES,MC=500)

 LAST DAYFILE MESSAGE     -  22.05.09.NP/SN102   22.05.09.LLINK  L003103,EN,RL=3,H-N,SN102  /103,SN102  /003

 SPECIAL ENTRY POINTS     -


        EJT ENTRY

025000 1601 1555 0137 7777 0002   NAM A4   B
025001 0000 0000 4000 0002 7776        5  B
025002 0000 0000 0000 0000 0000
025003 0700 0000 0000 0000 0036   G        3
```

X List Option

Beginning of T List Option

```
        CONTROL POINT AREA

CPU STATUS                STSW 000420 5                      /A        A
CPU SUB-CP ACTIVE                      0
NUMBER PPS ASSIGNED                    01
ERROR FLAGS                               0000
RESERVED                                      0
SUSPEND ON ROLLOUT FLAG                        0
ROLLOUT CONTROL                                 00
RESERVED                                          0000
RECALL CONTROL                                        0001
CPU PRIORITY/RECALL       JCIW 000421 0176                   A        JQ
RESERVED                               000
CPU SELECTION                             0
SUBSYSTEM ID                               7770
JOB CONTROL/*DIS* FLAGS                        0
USER PRIVACY, PRESERVE ECS                      0
*WQ* LINKAGE                                      001221
CPU RECALL CRITERION      CRCW 000422 00030000033713026422  C  C4KB R
JOB TERMINATION OPTION EOJW 000423 0
QUEUE FILE DISPOSITION                 0
RESERVED                                00000
RSVD/1 STATEMENT FLAG                        0
CHARGE REQ OP/CCL LEVEL                       0000
JOB ORIGIN TYPE           JOTW                    0000
OPER ASSIGNED EQUIP       OAEW                        0000
NEGATIVE FL/100B          FLSW 000424 0004                   D      JCD
*SET* RECOVERY NFL                     0000
RA/100B                                    00001203
FL/100B                                            0466
ZERO                           000425 0000                        I 5DD
RA/100B - NFL/100B                     00001177
4000B + NFL/100B                               4004
FL/100B                                            0466
ZERO                      ECSW 000426 0000                          BU
RESERVED                               0000
ECS RA/1000B                               00000225
ECS FL/1000B                                       0000
PUNCH MODE/OVERRIDE       SNSW 000427 0
RESERVED                              0000000
RESERVED-INSTALLATION                      0000
PP PAUSE FLAGS                                 0000
SENSE SWITCHES                                     00
RESERVED                                           00
MESSAGE 1 AREA            MS1W 000430 16205023163433355555 NP/SN102
                               000431 55353557334057334457  22.05.09.
                               000432 14141116130055143333 LLINK  L00
                               000433 36343336560516562214 3103,EN,RL
                               000434 54365610461656230000 =3,H-N,S
MESSAGE 2 AREA            MS2W 000435 53220521250523245547 $REQUEST *
                               000436 13475504112320140131 K* DISPLAY
                         •     000437 00000000000000000000
INSTALLATION WORD 0       IN0W 000440 00000000000000000000
INSTALLATION WORD 1       IN1W 000441 00000000000000000000
INSTALLATION WORD 2       IN2W 000442 00000000000000000000
INSTALLATION WORD 3       IN3W 000443 00000000000000000000

RESERVED                       RFCW 000475 00000000
CONTROL STATEMENT ADDRESS                         000000
DEMAND FILE RANDOM INDEX                                 000000
RESERVED                       ALMW 000476 0077
MAX MAGNETIC TAPES                           7
MAX REMOVABLE PACKS                           7
MAX DEFER BATCH JOBS                           7
RESERVED                                        0
MAX TIME LIMIT                                   77
MAX SRU LIMIT                                      77
MAX FIELD LENGTH                                     77
MAX ECS FIELD LENGTH                                   77
MAX LINES PRINTED                                        77
MAX CARDS PUNCHED                                          77
RESERVED                       ACLW 000477 0000
DAYFILE MESSAGES COUNT                     7777
CONTROL STATEMENTS CNT                          7777
RESERVED                                            77
MS PRUS COUNT                                        777777
ACCOUNT ACCESS WORD      AACW 000500 00000000000003777777        C
MAP III MULT.            MPMW 000501 0000002                   P
RESERVED                                    000000
MAP III ACCUMULATOR      MPAW                     0000000
AUC1/2/3 ACCUMULATORS    AU1W 000502 00000000000000000000
AUC4/5 ACCUMULATORS      AU2W 000503 00000000000000
RESERVED                                           000000
LENGTH BUFFER 0          ICAW 000504 0000
ADDRESS BUFFER 0                          000000
LENGTH BUFFER 1                                 0000
ADDRESS BUFFER 1                                     000000
SPEC ENTRY POINT FLAG  SEPW 000505 0
RSVD/LDR=/CLB= EN PT FLAGS          0
ARG=/DMP=/SDM= EN PT FLAGS           0
SSJ=/VAL=/SSM= EN PT FLAGS            0
RESERVED                               0000
RESTART/SUPPRESS DMP= FLAGS                0
DM* FILE FLAGS                              0
DMP= FL/100 (0 = ENTIRE FL)                  0000
SSJ= PARAMETER BLK ADDRESS                        000000
SYSTEM PROC CALL WORD  SPCW 000506 00000000000000000000
CCL - EFF                JCDW 000507 00                             A
CCL - R1G                                 000000
CCL - DATA                                      0001
RESERVED                                            00000000
CCL - EF                 JCRW 000510 00
CCL - R3                                  000000
CCL - R2                                        000000
CCL - R1                                             000000
SEC MEM/K DIS FLAGS      DBAW 000511 0                           A58A5=A5=
ECS AND CM CMM MODE FLAGS           0
INPUT BUFFER ADDRESS                   014043
RIGHT SCREEN BFR ADD                         014054
LEFT SCREEN BFR ADD                               014054
MAP OPTIONS/LIB FLAG     LB1W 000512 00
```

```
INSTALLATION WORD 4      IN4W 000444 00000000000000000000
INSTALLATION WORD 5      IN5W 000445 00000000000000000000
INSTALLATION WORD 6      IN6W 000446 00000000000000000000
INSTALLATION WORD 7      IN7W 000447 00000000000000000000
LIMIT FLAGS              ACTW 000450 00                              N(WOR
OVERFLOW FLAGS           SRUW           0000
SRU ACCUMULATOR/OVERFLOW                     00001651271722
CP ACCUM (NANOUNITS/4) CPTW 000451 00000001074053556000      AG5$
IO ACCUMULATORS          IOAW 000452 00314540000000000416  Y+5      DN
M13 = M1 * M3            MP1W 000453 000036                  3  3     B
M14 = M1 * M4                        000036
RESERVED                                   0
ADDER ACCUMULATOR        ADAW                     0000002
M1 * 1000                MP2W 000454 023420                B1P 0/
M12 = M1 * M2                            001750
RESERVED                                         00000000
DISABLE SRU ACCUM, CPM MP3W 000455 0000025700            B.       7X
IOM                                            0000004230
SRU ACCOUNT BLOCK LMT  STLW 000456 777777
COMPUTED SRU JOB STEP LIMIT                 77777777777777
RESERVED                 SRJW 000457 0000                          DCD
SRU JOB STEP LIMIT                    777777
SRU ACCUM AT JOB STEP START                    0000040304
RESERVED                 CPJW 000460 0000                             N
CP TIME JOB STEP LIMIT                777777
CP ACCUM AT JOB STEP START                     0000000016
CHARGE/ACCOUNTING FLGS FPFW 000461 00
RESERVED                              00
SRU VALIDATION LIMIT                  7777
FNT ORDINAL OF PROFILE FILE                0000
LEVEL-3 BLOCK TRACK                             0000
LEVEL-3 BLOCK SECTOR                                0000
RESERVED                      000462 00000000000000000000
MAX FL FOR JOB STEP      FLCW 000463 3765                   4 F 4
LAST CARD FL (NFL)                    0600
MAXIMUM FL FOR ENTIRE JOB                 3765
RESERVED                                         00000000
JOB STEP MAX ECS FL      ELCW 000464 0200                   B   B
LAST CARD ECS FL (NFL)                0000
JOB MAX ECS FL                            0200
RESERVED                                         00000000
EQUIP ASSIGNED COUNT     EACW 000465 0001                      A
RESERVED                 FLIW           000
SCHEDULER STATUS                           0
NEGATIVE FL FOR ROLLIN                    0000
ECS FL REQUEST                                  0000
CM FL REQUEST                                       0000
TXOT SUBSYSTEM           TXSW 000466 00
RESERVED                              00
TERMINAL NUMBER          TTNW           0000
TERMINAL INT ADDR        TIAW                000000
OUTPUT POINTER           TIOW                        000000
RESERVED                 PFCW 000467 000000000000                H
EST ORD OF FAMILY DEVICE                         0010
LIMIT FOR SIZE OF DAF                              7
LIMIT FOR NUMBER OF PF                              7
LIMIT CUMM SIZE IAPF                                 7
```

```
REDUCE/LOADER FLAGS                        00
RESERVED FOR LOADER                          0000
INTERACTIVE DEBUG CONTROL                        0000
GLOBAL LIB INDICATORS                                00000000
SECOND LIB/GLOBAL IND    LB2W 000513 00000000000000000000
FIRST LIB/GLOBAL IND     LB3W 000514 00000000000000000000
FNT ADDR LAST FIL EXEC EOCW 000515 0000
ECS FL FOR DMP= CALL     PPDW             0000
FL FOR DMP= CALL                              0000
DUMP WORD COUNT                                   00
FWA OF DUMP                                         000000
RESERVED                      000516 0000000000000000                Q
OUTSTANDING CONNECT COUNT                             0021
ROLLOUT ALLOWABLE        SSCW 000517 0000
CONNECTION/WAIT RESPONSES                0000000000000000
COMPUTED CP TIME LIMIT CPLW 000520 37777777777777000000 4
LIST OF FILES INDEX      LOFW 000521 0000                      B3
RESERVED                                   00
LIST OF FILES ADDRESS                         023655
RESERVED                                            000000
APPL ACCESS LEVEL        AALW                            00
CM RESIDENCE TIME LMT  TSCW 000522 00400323                 5CS     P
RESERVED                                        0
INIT TIME SLICE OCCUR FLAG                       0
CPU TIME SLICE LIMIT                                0000002000
ADMIN/DIAG/USER PW EXP JSCW 000523 0
PF PW EXP/LOWER JAL/FAL                0
WRITE DOWN/UNLABELED TAPES              0
RESERVED                                 0
JOB ACCESS LEVEL                          0
USER ACCESS LEV VALIDATION                 000
JOB ACCESS LEVEL LIMIT                         0
USER ACCESS CATEGORY SET                         00000000000
DEFAULT PACK NAME        PKNW 000524 00000000000000
DEFAULT PACK TYPE                                      000000
RESERVED                      000525 00000000000000000000
RECALL CRITERION         RCCW 000526 00000000000000000002          B
RECALL CRITERION              000527 00000000000000000003          C
RECALL CRITERION              000530 00000000000000000004          D
RECALL CRITERION              000531 00000000000000000005          E
RECALL CRITERION              000532 00000000000000000006          F
RECALL CRITERION              000533 00000000000000000007          G
RECALL CRITERION              000534 00000000000000000010          H
RECALL CRITERION              000535 00000000000000000011          I
RECALL CRITERION              000536 00000000000000000012          J
RECALL CRITERION              000537 00000000000000000013          K
RECALL CRITERION              000540 00000000000000000014          L
RECALL CRITERION              000541 00000000000000000015          M
RECALL CRITERION              000542 00000000000000000016          N
RECALL CRITERION              000543 00000000000000000000
RECALL REQUESTS IR-S     RECW 000544 00000000000000000000
RECALL REQUESTS IR-S          000545 00000000000000000000
RECALL REQUESTS IR-S          000546 00000000000000000000
RECALL REQUESTS IR-S          000547 00000000000000000000
RECALL REQUESTS IR-S          000550 00000000000000000000
RECALL REQUESTS IR-S          000551 00000000000000000000
RECALL REQUESTS IR-S          000552 00000000000000000000
```

```
RA =      CP,2.                                           DUMP 00       DSDI          83/06/02. 22.36.17.      PAGE      4
0000000  CM         22.15.04. 83/06/02. CDC NETWORK OPERATING SYSTEM          NOS 2

LIMIT FOR SIZE OF IAPF                                 7        | RECALL REQUESTS IR-S          000553 00000000000000000000
USER NAME                  UIDW 000470 16052417202300     NETOPS 4  | RECALL REQUESTS IR-S          000554 00000000000000000000
CHARGE FLAG, USER INDEX                              377772     | RECALL REQUESTS IR-S          000555 00000000000000000000
NO EXIT FLAG               EECW 000471 2                  P     B5H | RECALL REQUESTS IR-S          000556 00000000000000000000
RESERVED                                  000                   | RECALL REQUESTS IR-S          000557 00000000000000000000
REPRIEVE DATA                               0077                | RECALL REQUESTS IR-S          000560 00000000000000000000
TERMINAL INPUT POINTER TINW                     000000          | RECALL REQUESTS IR-S          000561 00000000000000000000
REPRIEVE DATA                                        024010     | RECALL REQUESTS MB-S     REPW 000562 00000000000000000000
EJT ORDINAL OF JOB         TFSW 000472 0017                  0  | RECALL REQUESTS MB-S          000563 00000000000000000000
PRIMARY FILE FNT OFFSET                      0000               | RECALL REQUESTS MB-S          000564 00000000000000000000
RESERVED                                       00               | RECALL REQUESTS MB-S          000565 00000000000000000000
ROLLOUT TIME               TERW                 000             | RECALL REQUESTS MB-S          000566 00000000000000000000
EVENT DESCRIPTOR                                    0000000     | RECALL REQUESTS MB-S          000567 00000000000000000000
RESERVED                   CSPW 000473 00                 B   IA1 | RECALL REQUESTS MB-S          000570 00000000000000000000
LOGOUT EPILOG, EPILOG REQ              0                        | RECALL REQUESTS MB-S          000571 00000000000000000000
PR CHARGE/USER/INHIBIT DEC              2                       | RECALL REQUESTS MB-S          000572 00000000000000000000
EOR FLAG/CS COUNT                        00000011               | RECALL REQUESTS MB-S          000573 00000000000000000000
NEXT STATEMENT INDEX                              0134          | RECALL REQUESTS MB-S          000574 00000000000000000000
LIMIT INDEX                                           0065      | RECALL REQUESTS MB-S          000575 00000000000000000000
INPUT/SKIP FLAGS           CSSW 000474 0                  F7A7A B | RECALL REQUESTS MB-S          000576 00000000000000000000
EST ORDINAL                               006                   | RECALL REQUESTS MB-S          000577 00000000000000000000
FIRST TRACK                                 4201                |
CURRENT TRACK                                    4201           | T List Option resumes at top of
CURRENT SECTOR                                       0002       | right column on sheet 2 of 6.
OVERLAP WORD COUNT                                       0000   |
-----------------------------------------------------------------
        DAYFILE POINTERS AND BUFFER <------ A List Option

00120275 0011 7777 0000 0000 0046  I       -
00120276 0000 0000 0114 0000 0104     AL  AD
00120277 0007 4200 4200 0010 0003  G7 7  H C

00117777 55353557334057334157 55232520052226112311 17165507011116050400 00000000000000000000  22.05.06. SUPERVISION GAINED
00120003 55353557334057334157 16205023163433355555 55353557334057334157 55030320552605222311  22.05.06.NP/SN102   22.05.06. CCP VERSI
00120007 17160055553636565514 05260514005540443756 55260122110116240055 40443700000000000000 ON   33, LEVEL  594, VARIANT  594
00120013 55353557334057334157 16205023163433355555 55353557334057334157 55202205261117252355  22.05.06.NP/SN102   22.05.06. PREVIOUS
00120017 03235516170405005533 33335655202205261117 25235516235516170405 00553333330000000000 CS NODE  000, PREVIOUS NS NODE  000
00120023 55353557334057334457 16205023163433355555 55353557334057334457 14141116130055143333  22.05.09.NP/SN102   22.05.09.LLINK  L00
00120027 36343336560516562214 54365610461656231634 33355555503333365623 16343335555550343336 3103,EN,RL=3,H-N,SN102  /003,SN102  /103
00120033 00000000000000000000 55353557334057334457 16205023163433355555 55353557334057334457              22.05.09.NP/SN102   22.05.09.
00120037 14141116130055143333 36343336560516562214 54365610461656231634 33355555503433365623 LLINK  L003103,EN,RL=3,H-N,SN102  /103,S
00120043 16343335555550333336 00000000000000000000 16235055555555555555 55353557333757373657 N102  /003            NS/          22.04.43.
00120047 23163433355555565504 25152055162033333444 44550317152014052405 04570000000000000000 SN102  , DUMP NP00199 COMPLETED.
00120053 55353557333757373657 16235055555555555555 55353557333757373657 23163433355555565514  22.04.43.NS/         22.04.43.SN102   , L
00120057 17010411160755511511 03555555525755000000 55353557333757374157 16235055555555555555 OADING (MIC   ).     22.04.46.NS/
00120063 55353557333757374157 23163433355555565514 17010411160755510211 07141555525755000000  22.04.46.SN102   , LOADING (BIGLM ).
00120067 55353557333757404157 16235055555555555555 55353557333757404157 23163433355555565514  22.04.56.NS/         22.04.56.SN102   , L
00120073 17010411160755511603 02555555525755000000 55353557333757404257 16235055555555555555 OADING (NCB   ).     22.04.57.NS/
00120077 55353557333757404257 23163433355555565514 17010455031715201405 24050457000000000000  22.04.57.SN102   , LOAD COMPLETED.
00120103 55353557334057334157 16205023163433355555 55353557334057334157 16202500552316343335  22.05.06.NP/SN102   22.05.06.NPU  SN102
00120107 55555601035634333600 00000000000000000000 55353557334057334157 16205023163433355555   ,AC,103             22.05.06.NP/SN102

        DAYFILE LINES IN BUFFER

NS/         22.04.43.SN102   , DUMP NP00199 COMPLETED.
 22.04.43.NS/          22.04.43.SN102   , LOADING (MIC   ).
 22.04.46.NS/          22.04.46.SN102   , LOADING (BIGLM ).
```

```
 22.04.56.NS/          22.04.56.SN102   , LOADING (NCB   ).
 22.04.57.NS/          22.04.57.SN102   , LOAD COMPLETED.
 22.05.06.NP/SN102     22.05.06.NPU  SN102  ,AC,103
 22.05.06.NP/SN102     22.05.06. SUPERVISION GAINED
 22.05.06.NP/SN102     22.05.06. CCP VERSION   33, LEVEL  594, VARIANT  594
 22.05.06.NP/SN102     22.05.06. PREVIOUS CS NODE  000, PREVIOUS NS NODE  000
 22.05.09.NP/SN102     22.05.09.LLINK  L003103,EN,RL=3,H-N,SN102  /003,SN102  /103
 22.05.09.NP/SN102     22.05.09.LLINK  L003103,EN,RL=3,H-N,SN102  /103,SN102  /003

       ATTACHED FILES <-------- F List Option

   0304  INPUT    IN     FNT - 1116 2025 2400 0001 1700 INPUT  AO          FUT  0000 0000 0000 0000 0000
                         FST - 0006 4175 4175 0002 0005  F6 6  B E         EST  7700  6210 0013 1377 0421 1277  H KK DQJ
                         TRACK CHAIN -
                         4175 0002

   0312  NAM      LO     FNT - 1601 1500 0000 0000 1500 NAM     M          FUT  0000 0000 0000 0000 0000
                         FST - 0006 4176 4176 0004 0005  F6 6  D E         EST  7700  6210 0013 1377 0421 1277  H KK DQJ
                         TRACK CHAIN -
                         4176 0005

   0315  OUTFIL   LO     FNT - 1725 2406 1114 0000 1500 OUTFIL  M          FUT  0000 0000 0000 0000 0000
                         FST - 0007 4205 4205 0001 0105  G7E7E AAE         EST  7702  6210 0013 1377 0421 1302  H KK DQKB
                         TRACK CHAIN -
                         4205 0003

   0320  ZZZZZCO  LI     FNT - 3232 3232 3203 3301 1007 ZZZZZCOAHG         FUT  0000 0000 0000 0000 0000
                         FST - 0006 4175 4175 0001 0005  F6 6  A E         EST  7700  6210 0013 1377 0421 1277  H KK DQJ
                         TRACK CHAIN -
                         4175 0002

   0323  ZZZZZC2  LO     FNT - 3232 3232 3203 3500 1507 ZZZZZC2 MG         FUT  0000 0000 0000 0000 0000
                         FST - 0006 4177 4177 0002 0307  F6 6  BCG         EST  7700  6210 0013 1377 0421 1277  H KK DQJ
                         TRACK CHAIN -
                         4177 0002

   0326  OUTPUT   PM     FNT - 1725 2420 2524 0000 1200 OUTPUT  J          FUT  0000 0000 0700 0000 0000      G
                         FST - 0010 6742 6742 0001 0005  H 7 7 A E         EST  7704  4210 3226 1377 0412 1305 7HZVK DJKE
                         TRACK CHAIN -
                         6742 0001

   0331  NRF1     LO     FNT - 1622 0634 0000 0000 1500 NRF1    M          FUT  0000 0000 0000 0000 0000
                         FST - 0007 4210 4210 0002 0705  G7H7H BGE         EST  7702  6210 0013 1377 0421 1302  H KK DQKB
                         TRACK CHAIN -
                         4210 0003

   0334  NRF2     LO     FNT - 1622 0635 0000 0000 1500 NRF2    M          FUT  0000 0000 0000 0000 0000
                         FST - 0006 4200 4200 0001 0705  F7 7  AGE         EST  7700  6210 0013 1377 0421 1277  H KK DQJ
                         TRACK CHAIN -
                         4200 0003

   0337  LIST     PM     FNT - 1411 2324 0000 0000 1200 LIST    J          FUT  0000 0000 0700 0000 0000      G
                         FST - 0010 7052 7052 0001 0005  H ) ) A E         EST  7704  4210 3226 1377 0412 1305 7HZVK DJKE
                         TRACK CHAIN -
                         7052 0001

   0342  ZZZZZPP  PM     FNT - 3232 3232 3220 2000 1200 ZZZZZPP J          FUT  0000 0000 0700 0000 0000      G
```

```
                       FST - 0010 7053 7053 0001 0005  H $ $ A E          EST  7704  4210 3226 1377 0412 1305 7HZVK DJKE
                       TRACK CHAIN -
                       7053 0001

   0345  ZZZZDMB  PM   FNT - 3232 3232 0415 0200 1200 ZZZZDMB J           FUT  0000 0000 0700 0000 0000      G
                       FST - 0010 7054 7054 0001 0005  H = = A E          EST  7704  4210 3226 1377 0412 1305 7HZVK DJKE
                       TRACK CHAIN -
                       7054 0001

   0350  ZZZZZDN  LO   FNT - 3232 3232 3204 1600 1500 ZZZZZDN M           FUT  0000 0000 0000 0000 0000
                       FST - 0007 4216 4216 0022 0703  G7N7N RGC          EST  7702  6210 0013 1377 0421 1302  H KK DQKB
                       TRACK CHAIN -
                       4216 0022
```

Example 4:

The following sample illustrates the printer output listing produced by the MST directive (dump mass storage/track reservation table). The MST is listed in two columns. The left column is read from top to bottom, perhaps across page boundaries, and continues at the top of the right column. The track reservation table is listed in single column following the MST.

```
RA =     MST.                                                DUMP 00     DSDI          83/06/02. 22.36.18.      PAGE     7
0000000  CM         22.15.04. 83/06/02. CDC NETWORK OPERATING SYSTEM          NOS 2

EQUIPMENT 006 - MASS STORAGE TABLE

NUMBER OF TRACKS        TDGL 012770 3222                       ZR   F+58XB
PF INTERLOCK / COUNTS                   0000
LENGTH OF TRT                                0645
FIRST AVAIL TRACK PTR                             4043
NUM AVAILABLE TRACKS                                   3002
CTI/DS FILE/CT TRK OVF  ACGL 012771 0                              H6 A
RESERVED                             0
GLOBAL DOWN STATUS (RMV DV)           0
RESERVED                               0
DA ECS CHAIN FIRST TRACK                0000
DIRECT ACCESS FILE CNT                       0010
FIRST TRACK IQFT                                  4170
REDEFINITION STATUSES                                  01
ALL MF UNLOADED/ERROR IDLE                               0
RESERVED                                                  0
FLAG/MST LINK DEV ADDR  SDGL 012772 00000000
MST/TRT UPDATE COUNT                         0000000000
MF INDEX/CPUMTR INTERLOCKS                                00
FIRST TRACK IAPF        ALGL 012773 0000                     5
LABEL TRACK                             4000
FIRST TRACK PERMITS                          0000
NUMBER CATALOG TRACKS                             0000
FIRST TRACK DAT                                        0000
FAMILY OR PACK NAME     PFGL 012774 23312324413700         SYST64 B
DEVICE NUMBER                                        02
DEVICE AL LIMIT LOWER/UPPER                            00
REL UNIT MULTIUNIT DEV                                   0
NUM UNIT MULTIUNIT DEV                                    0
USER NAM PRIVATE PACK   PUGL 012775 00000000000000
CONT LBL TRK/DEV RES MASKS                             000000
FLAGS AND DAT INDEX     MDGL 012776 1000                   H J DI   J
FT-HT FLAG */* SECTOR LIMIT             1200
DRIVER NAME                                  0411
DEFAULT USER ERR PROCESSING                       0000
SECTOR LIMIT                                           1200
RESERVED                NVGL 012777 00000000000000000
RESERVED UNIT FLAGS                                     000
GLOBAL INSTAL AREA      ISGL 013000 00000000000000000000
                        I2GL 013001 00000000000000000000
ACTIVITY COUNT          DALL 013002 0000                      6(    K
UNIT INTERLOCKS                         0000
CURRENT POSITION                             4151
NEXT BEST POSITION                                7777
CHANNEL 2                                              00
CHANNEL 1                                                 13

ALLOCATION FLAGS        DILL 013003 4001                             5A $      F
CH 2 ACCESS  7154 FLAG                  00
CH 1 ACCESS  7154 FLAG                    53
*PUT* ORD OF FIRST UNIT                      0000
DEVICE FLAGS                                     0
MEMORY TYPE   - 3 BIT VALUE                       0
CPU TYPE      - 3 BIT VALUE                        0
PP PATH TYPE - 3 BIT VALUE                          0
RESERVED                                             00
ALGORITHM INDEX                                        06
UNIT RESERVE COUNT      DULL 013004 00                                  6.
CUMUL TOT UNIT RES COUNTS             00
PF INTERLOCK / COUNTS                   0000
RESERVED                                    00
MACHINE INDEX - 1                             00
SYSTEM TABLE TRACK                               4157
FAMILY IDLE STAT/ACT COUNT                           0000
LOCAL STATUS FLAGS      STLL 013005 000000                            64   A
ERROR STATUS                           00
MACHINE ID                                4137
CURRENT USER COUNT DAF                        0000
NEXT EST ORDINAL IN CHAIN                         000
LOCAL STATUS                                          1
REDEF IN PROG/NULL EQ   DDLL 013006 0                                      5
RESERVED                             0
ORIGINAL NO. OF UNITS - 1             0
CURRENT NO. OF UNITS - 1               0
EQUIPMENT UNIT LIST                     0000000000000040
LOCAL INSTAL AREA       ISLL 013007 00000000000000000000
RESERVED                TRLL 013010 00000000000000                        A2
FWA OF TRT                                            013576
RESERVED                     013011 00000000000000000000
                             013012 00000000000000000000
                             013013 00000000000000000000
                             013014 00000000000000000000
                             013015 00000000000000000000
                             013016 00000000000000000000
                             013017 00000000000000000000
```

```
          TRACK RESERVATION TABLE

013576 +0000   0010 0051 0035 0003 7417   1111 ---- 1111    H ( 2 C 0
013577 +0004   0001 4006 4007 4010 4017   1--- ---- 1111    A5F5G5H50
013600 +0010   4011 4012 4013 4014 0017   ---- ---- 1111   5I5J5K5L 0
013601 +0014   4015 4016 4017 4020 0017   ---- ---- 1111   5M5N505P 0
013602 +0020   4021 4022 4023 4024 0017   ---- ---- 1111   5Q5R5S5T 0
013603 +0024   4025 4026 4027 4030 0017   ---- ---- 1111   5U5V5W5X 0
013604 +0030   4031 4032 4033 4034 0017   ---- ---- 1111   5Y5Z5051 0
013605 +0034   4035 4036 4037 4040 0017   ---- ---- 1111   52535455 0
013606 +0040   4041 4042 4043 4044 0017   ---- ---- 1111   56575859 0
```

Track Link Byte Ordinal

Status Bits

Example 5:

The following sample illustrates the printer output listing produced by the C, D, and E memory dump directives (instruction parcel, byte, and word format, respectively). The same portions of central memory are dumped in each format. Auto page eject has been disabled via the EJOFF directive to allow listing the output from all three memory dump directives on one page.

```
RA =      C,50,110.    C - FORMAT DUMP.                        DUMP 01       DSDI             82/01/20. 16.22.27.       PAGE     17
0000000  CM          16.52.11. 82/01/06. CDC NETWORK OPERATING SYSTEM.          NOS 2

0000050 00000 00000 00000 00000              0000061 77770 00000 00000 00000             0000072 74647 56475 12000 00000      J
-----------------------------------------    0000062 00000 00000 01065 34137      AF$64  0000073 00033 36401 00007 30005  CO A    E
0000052 00000 00000 00000 07240          5   0000063 00000 00000 00000 00000             0000074 00033 56404 00035 00025  C2 D C/ U
0000053 30766 01030 10057 43001 X  HXHE XA   0000064 00000 00000 00000 51426        ELV  0000075 00035 56406 00057 50002  C  F E  B
0000054 34131 44234 12147 30200 1KL71JL B    0000065 00042 71100 00000 00000  DWI        0000076 00000 00000 00000 00000
0000055 01633 01401 00034 17761 A XLA C6     0000066 00000 00000 00000 00000             0000077 00007 75400 00400 07200    =  5
0000056 00000 00000 00000 07164              ------------------------------------------  0000100 00000 00000 00000 00000
0000057 77775 12230 00320 00000   (RX Z      0000070 00000 03300 24040 40000    0 TDD    -----------------------------------------
0000060 00751 10000 00000 00000   I          0000071 74500 00122 25000 07421  / ARU   Q  0000107 00054 13700 01065 34117  E64 AF$60

        CM        D,50,110.    D - FORMAT DUMP.

0000050 0000 0000 0000 0000 0000                0000061 7777 0000 0000 0000 0000              0000072 7464 7564 7512 0000 0000      J
------------------------------------------      0000062 0000 0000 0001 0653 4137       AF$64  0000073 0003 3364 0100 0073 0005  CO A    E
0000052 0000 0000 0000 0000 7240           5    0000063 0000 0000 0000 0000 0000              0000074 0003 3564 0400 0350 0025  C2 D C/ U
0000053 3076 6010 3010 0574 3001 X  HXHE XA     0000064 0000 0000 0000 0005 1426         ELV  0000075 0003 5564 0600 0575 0002  C  F E  B
0000054 3413 1442 3412 1473 0200 1KL71JL B      0000065 0004 2711 0000 0000 0000  DWI         0000076 0000 0000 0000 0000 0000
0000055 0163 3014 0100 0341 7761 A XLA C6       0000066 0000 0000 0000 0000 0000              0000077 0000 7754 0000 4000 7200    =  5
0000056 0000 0000 0000 0000 7164                -------------------------------------------   0000100 0000 0000 0000 0000 0000
0000057 7777 5122 3000 3200 0000   (RX Z        0000070 0000 0033 0024 0404 0000    0 TDD     ------------------------------------------
0000060 0075 1100 0000 0000 0000   I            0000071 7450 0001 2225 0000 7421  / ARU   Q   0000107 0005 4137 0001 0653 4117  E64 AF$60

        CM        E,50,110.    E - FORMAT DUMP.

0000050 00000000000000000000 00000000000000000000 00000000000000007240 30766010301005743001                          5X  HXHE XA
0000054 34131442341214730200 01633014010003417761 00000000000000007164 77775122300032000000 1KL71JL B A XLA C6         (RX Z
0000060 00751100000000000000 77770000000000000000 00000000001065341137 00000000000000000000  I                  AF$64
0000064 00000000000000051426 00042711000000000000 00000000000000000000 00000000000000000000      ELV DWI
0000070 00000033002404040000 74500001222500007421 74647564751200000000 00033364010000730005   0 TDD    / ARU   Q      J     CO A    E
0000074 00033564040003500025 00035564060005750002 00000000000000000000 00007754000040007200  C2 D C/ U C  F E  B           =  5
0000100 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000
0000104 00000000000000000000 00000000000000000000 00000000000000000000 00054137000106534117                          E64 AF$60
```

Example 6:

The following sample illustrates the printer output listing of the system file name table produced by the FNT CMR dump directive. This table is printed in the same format as that produced by the D memory dump option (refer to example 5).

```
RA =     FNT.                                         DUMP 00     DSDI              83/06/12. 12.33.11.     PAGE     1
0000000  CM        12.31.31. 83/06/12. CDC NETWORK OPERATING SYSTEM          NOS 2


         SYSTEM FILENAME TABLE

00024706 2331 2324 0515 0000 1000 SYSTEM  H  00024723 0000 0000 0000 0000 0000      00024740 0000 0000 0000 0000 0016      N
00024707 0006 4005 0000 0000 0000  F5E       00024724 0000 0000 0000 0000 0010    H 00024741 0000 0000 0000 0000 0000
00024710 2223 3004 4137 0000 1300 RSXD64  K  00024725 0000 0000 0000 0000 0000      00024742 0000 0000 0000 0000 0017      O
00024711 0010 4463 0000 0000 0000  H9        00024726 0000 0000 0000 0000 0011    I 00024743 0000 0000 0000 0000 0000
00024712 2223 3026 4137 0000 1300 RSXV64  K  00024727 0000 0000 0000 0000 0000      00024744 0000 0000 0000 0000 0020      P
00024713 0010 4201 0000 0000 0000  H7A       00024730 0000 0000 0000 0000 0012    J 00024745 0000 0000 0000 0000 0000
00024714 2022 1706 1114 0300 1300 PROFILC K  00024731 0000 0000 0000 0000 0000      00024746 0000 0000 0000 0000 0021      Q
00024715 0010 5410 0000 0000 0000  H=H       00024732 0000 0000 0000 0000 0013    K 00024747 0000 0000 0000 0000 0000
00024716 2601 1411 0425 2300 1300 VALIDUS K  00024733 0000 0000 0000 0000 0000      00024750 0000 0000 0000 0000 0022      R
00024717 0010 6504 0000 0000 0000  H D       00024734 0000 0000 0000 0000 0014    L 00024751 0000 0000 0000 0000 0000
00024720 2601 1411 0425 2300 1300 VALIDUS K  00024735 0000 0000 0000 0000 0000      -------------------------------------------
00024721 0005 4215 0000 0000 0000  E7M       00024736 0000 0000 0000 0000 0015    M
00024722 0000 0000 0000 0000 0007          G 00024737 0000 0000 0000 0000 0000
```

STATUS/CONTROL REGISTER SIMULATOR 11

Error logging on a CYBER 170 Computer System enables the occurrence of channel parity, memory parity, and other errors identified in the status/control (S/C) register to be detected and logged. The status/control register simulator (SCRSIM) allows the user to set S/C register bits in order to aid in the testing of error logging and error recovery procedures.

SCRSIM does not run on models 815, 825, 835, 845, and 855. Models 865 and 875 use maintenance registers instead of S/C registers. Throughout this section all references to S/C registers also apply to the model 865 and 875 maintenance registers.

SCRSIM runs on CYBER 170 Computer System machines using the S/C register on channel 16 and if more than 10 PPs are available on the machine, the S/C register on channel 36. On CYBER 70 Computer System machines, SCRSIM uses the interlock register on channel 15.

With the aid of a K display, the user can specify commands to set and clear bits, set bytes, and set lines and areas in holding registers. This allows both S/C registers to be set up completely. The contents of the holding register can then be transferred to the S/C registers (64 or 128 bits are transferred to the interlock register of a CYBER 70 Computer System).

The bits set through this simulator are logged in the error log if an error bit is set, thus aiding in testing and software checkout. (Refer to the hardware reference manual for a complete description of the significance of each S/C register bit.) The simulator job dayfile lists all simulator commands entered. This error logging does not occur in a CYBER 70 Computer System, however, unless an ENABLE,SCRSIM IPRDECK entry has been made.

NOTE

Be careful when using the simulator. Improper use may result in serious system malfunctions.

Refer to appendix A for descriptions of messages produced by SCRSIM.

USING THE SIMULATOR

Error logging is always enabled on a CYBER 170 Computer System except models 815, 825, 835, 845, and 855. Error logging is enabled on a CYBER 70 Computer System only if the ENABLE,SCRSIM IPRDECK entry is present (refer to the NOS 2 Installation Handbook).

CONSOLE OPERATION

The simulator is called from the console by entering:

```
X.SCRSIM.
```

The simulator left K display (refer to figure 11-1) appears on the left screen after entering:

```
K,jsn.
```

where jsn is the job sequence name of SCRSIM noted on the B display. This K display shows the contents of the temporary holding registers, as well as a central memory buffer. This buffer contains the following.

- A history of all error status bits since the last level 0 deadstart. If an error status bit has been set in the S/C register, it remains set in the buffer, even though it may have been cleared in the actual S/C register. This history may be useful in diagnosing system malfunctions.

- All other bits in the buffer reflect actual values in the S/C register at the time the last error bit was set. Each time an error bit is set, the entire buffer is updated.

Unless the simulator is running on a CYBER 170 Computer System with more than 10 PPs, the message:

```
CHANNEL 36 NOT AVAILABLE
```

also appears. This indicates that no channel 36 S/C register is present on the machine, and thus, no simulation need be done for it.

By entering:

```
KK.
```

the simulator right K display (refer to figure 11-2) appears on the right screen. This display gives a brief description of the commands available.

Commands can be entered on the K display by entering:

```
K.command.
```

where command is one of the commands shown in figure 11-2.

BATCH INPUT

The simulator may also be called from batch input by the SCRSIM command. The input file must have a record containing the commands to be processed, one command per card. The system must be in debug mode and the user must be validated for system origin privileges.

```
              TEMPORARY HOLDING REGISTER CONTENTS

        CHANNEL 16 REGISTER - LINES 0-3


BITS  59-  0                                                   BYTE 00
000000000000 000000000000 000000000000 000000000000 000000000000
    0000         0000         0000         0000         0000


BITS 119- 60                                                   BYTE 05
000000000000 000000000000 000000000000 000000000000 000000000000
    0000         0000         0000         0000         0000


BITS 179-120                                                   BYTE 10
000000000000 000000000000 000000000000 000000000000 000000000000
    0000         0000         0000         0000         0000


BITS 203-180                                                   BYTE 15
                                        000000000000 000000000000
                                           0000         0000

                    CHANNEL 36 NOT AVAILABLE



                  ACTUAL S/C REGISTER ERROR BUFFER

        CHANNEL 16 REGISTER - WORDS 113-116
000000000000 000000000000 000000000000 000000000000 000000000000
000000000000 000000000000 000000000000 000000000000 000000000000
000000000000 000000000000 000000000000 000000000000 000000000000
                                        000000000000 000000000000
```

Figure 11-1. Simulator Left K Display

SIMULATOR COMMANDS

COMMAND	DESCRIPTION
AREA,A,M,Y.	SET M BITS FROM A TO OCTAL VALUE Y
BYTE,XX,YYYY.	SET BYTE XX TO OCTAL VALUE YYYY
CLEAR,A,B,...,Z.	CLEAR BITS A,B,...,Z
CYCLE,X,T,R.	SET BIT X EVERY 16*T MS. R TIMES
END.	END CYCLE COMMAND BEFORE R REACHED
LINE,X,Y.	SET LINE X TO OCTAL VALUE Y
READ.	READ S/C REGISTER INTO HOLDING REGISTER
SET,A,B,...,Z.	SET BITS A,B,...,Z
+	CHANGE REGISTER BEING USED AND K DISPLAY
GO.	ENTER HOLDING REGISTERS IN S/C REGISTERS
STOP.	END THE SIMULATOR

ALL BIT, BYTE, AND LINE NUMBERS ASSUMED DECIMAL.
TIME VALUES ASSUMED DECIMAL
Y AND YYYY VALUES MUST BE OCTAL.

Figure 11-2. Simulator Right K Display

SIMULATOR COMMANDS

This section lists the commands available to the simulator user. The entire command keyword must be entered, and only one command may be entered at a time. Each command, except +, must end with a terminator. In all cases, a null argument is assumed to be zero.

HOLDING REGISTER COMMANDS

The following commands, except GO., affect only the holding register currently displayed on the left screen. These commands are used to set up the entire 204 bits in the holding registers. GO. transfers the holding register contents to the actual S/C register. (On a CYBER 70 Computer System, the channel 16 S/C register is simulated by the interlock register. GO. transfers the first 64 of 128 bits of the holding register to the interlock register.) The current contents of the holding register is displayed in binary and octal on the left screen (refer to figure 11-1). The contents of the actual S/C register are also displayed in binary on the left screen.

Command	Description
AREA,a,m,y.	Set m bits in the holding register, from bit a to bit a+m-1, to the octal value y.

Parameter	Description
a	Starting bit number, which may range from 0 to 203. a is assumed to be decimal, but a postradix of D or B may also be included.
m	Number of bits to be set. m is assumed to be decimal, but a postradix of D or B may also be included.
y	Value to which the bits are to be set. y may be up to m bits of octal value.

Command	Description
BYTE,xx,yyyy.	Set byte xx in the holding register to the octal value yyyy.

Parameter	Description
xx	Byte number which may range from 0 to 16. xx is assumed to be decimal, but a postradix of D or B may be included.
yyyy	Value to which byte xx is to be set. yyyy may be up to 12 bits of octal value.

Command	Description
CLEAR,a_1,a_2,...,a_n.	Clear bits a_1,a_2,...,a_n in the holding register. If more than 30 bit numbers are entered, only the first 30 are processed. All others are ignored.

Parameter	Description
a_i	Bit number, from 0 to 203, to be cleared. A decimal value is assumed, but a postradix of D or B may be included.

Command	Description
LINE,x,y.	Set line x of the holding register to the octal value y.

Parameter	Description
x	Line number, ranging from 0 to 3, of the holding register shown on the left display screen (refer to figure 11-1). Line 0 is positioned at the top and line 3 is positioned at the bottom.
y	Value to which line x is to be set. y may be up to 60 bits of octal value.

READ.	Transfer the contents of the actual S/C register to the holding register.
SET,a_1,a_2,...,a_n.	Set bits a_1,a_2,...,a_n in the holding register. If more than 30 bit numbers are entered, only the first 30 are processed. All others are ignored.

Parameter	Description
a_i	Bit number, from 0 to 203, to be set. A decimal value is assumed, but a postradix of D or B may be included.

GO.	Transfer the contents of the holding register to the actual S/C register or to the interlock register of a CYBER 70 Computer System. No bits in the holding register are changed by this command.

CYCLE COMMANDS

Command	Description
CYCLE,x,t,r.	Set bit x every t periods of time, a total of r times. This command assumes control of the simulator for the total time period specified. During this time, no command is accepted except END. Bit x is set in the holding register by this command.

Parameter	Description
x	Bit number, from 0 to 203, to be set.
t	Number of periods of time for each cycle, one period being 16 milliseconds. t=32 is approximately 0.5 second.
r	Number of times to set bit x. r may not exceed 4095.

END.	End CYCLE command processing before r is reached. Control of the simulator is returned to the operator.

+ AND STOP. COMMANDS

Command	Description
+	Toggle the K display between the channel 16 and channel 36 register displays and also change the register currently being worked on, if the simulator is being operated on a CYBER 170 Computer System with two S/C registers. If two S/C registers are not present on the machine, no action is taken. The channel 16 register is assumed when the simulator begins. The only holding register which is affected by the holding register and cycle commands is the one currently displayed.
STOP.	End simulator processing.

INSTALL 12

NOS allows multiple copies of the running system to reside on several mass storage devices of the same type. The system deadstart file (SDF) is defined to be a copy of the deadstart tape that resides on a rotating mass storage (RMS) deadstart device. When the system is deadstarted from disk, this file is read to generate copies of the running system.

The INSTALL command installs a copy of the running system, or alternately a user-specified deadstart file, from mass storage to a rotating mass storage deadstart device. The device selected must be on, available, a single unit device such as an 844 or 885-11/12,† and must have common test and initialization (CTI) installed. (For more information about CTI, refer to the NOS 2 Operator/Analyst Handbook.) If the deadstart device is a shared (MMF) device, a full INITIALIZE must have been previously done. The calling job must be system origin or the user must be validated for system origin privileges and the system must be in debug mode.

The format of the command is:

```
INSTALL,filename,EQest.
```

Parameter	Description
filename	Mass storage file (assigned to the job) to be installed as an SDF. Default is SYSTEM, which must be assigned to the job. SDF is a reserved file name and cannot be specified for filename. If the deadstart file to be installed is on tape, it must first be copied to mass storage before INSTALL can be used.
est	One- or three-digit EST ordinal of the RMS device on which filename is to be installed.

†SDF cannot be installed to an 819 or 885-42 device.

881/883 PACK REFORMATTING UTILITY 13

Each 881 disk pack used in the 844 disk storage subsystem contains factory-recorded flawing information on cylinder 632_8 (410), track 0, sectors 0, 1, and 2. Each 883 pack contains this information on cylinder 1466_8 (822), track 0, sectors 0, 1, and 2. The following information is included on the cylinders.

- Cylinder 632_8 (or 1466_8 for 883 packs), track 0, sector 0 contains the factory-recorded manufacturing data. This data consists of the pack serial number and the manufacturing date.
- Cylinder 632_8 (or 1466_8), track 0, sector 1 contains the factory map. This map contains a list of all factory-detected flaws, both correctable and uncorrectable.
- Cylinder 632_8 (or 1466_8), track 0, sector 2 contains the utility map. This map originally contains all factory-detected uncorrectable flaws. This map is updated by the reformatting utility.

FORMAT is a CPU program which operates in conjunction with FDP, a PP program, to maintain and reformat 881/883 disk packs. It is used to perform the following functions.

- Factory-recorded manufacturing data, factory-recorded flaw data, and utility flaw data can be retrieved from a factory-formatted disk pack.
- Sector and track flaws can be set or cleared on a factory-formatted disk pack.
- Address fields of a previously factory-formatted disk pack can be restored. (This function is used only in the event that addresses on the pack are lost.)

In order to function, FORMAT requires that the factory-recorded data [sectors 0 and 1 of cylinder 632_8 (or 1466_8)] be correct and readable. The pack cannot be processed if this data is unreadable. If packs are available which do not contain this factory-recorded information, consult a customer engineer to have this information placed on the packs. Also, the correct level of controlware must be present in order for FORMAT to function. To determine the controlware level and for procedures to install this controlware, refer to the NOS 2 Installation Handbook. Since the operating system requires that the utility map contain the physical flaw information in order for automatic logical flawing to be performed, it is important that the utility map be properly maintained.

The operating system automatically sets logical flaws when initializing 844 equipment. This is done by reading the utility map of the 844 units involved, and mapping this physical flaw information into the corresponding logical track addresses. Logical track flaw reservations are then made in the TRT for the 844 equipment being installed. For example, if the 844 equipment being initialized consists of two physical units (such as a DI-2 configuration), the logical flaws set in the TRT are obtained from the physical flaw information recorded in the utility maps of both units making up the DI-2 configuration. This automatic flawing occurs when an equipment is initialized, regardless of whether the initialization is done during deadstart, on-line, or is the result of running FORMAT. Automatic flawing also occurs when an X.FLAW request is made from the console.

The operating system allows for the manual setting and clearing of flaw information. The STK APRDECK entry manually sets or clears logical track reservations in the TRT of the equipment. (Refer to the NOS 2 Installation Handbook for information concerning these entries.) If the device is then checkpointed, this flaw information is preserved in the TRT portion of the device label. The STK entry can be made during deadstart, during on-line initialization, or by using the FLAW utility (as described in the NOS 2 Operator/Analyst Handbook). In any case, the flawing done via these entries is only logical; the flaw information remains only in the TRT and is discarded on subsequent deadstart initialization unless manually reentered. This information is also lost during on-line initializations if it was not possible to recover the equipment. The use of STK does not cause any additional information to be recorded in the utility map; only FORMAT is capable of updating the utility map data. Caution should be used if attempts are made to cancel a logical flaw that was made during automatic flawing, since the physical disk sector is still marked as flawed and attempts to access that sector yield error conditions.

The following sections describe the use of the FORMAT utility for maintaining and reformatting 881/883 disk packs.

FORMAT COMMAND

Processing of maintenance operations on an 881/883 type disk pack is initiated by the FORMAT command. This program interfaces with the operator as required. The format of this command is:

FORMAT,p_1,p_2,...,p_n.

where each p_i is a keyword or a keyword equated to a value.

p_i	Description
G=m	Relative unit of a multispindle device. This value is checked for validity within the device. For example, if the device is a DI-2 and G=2 is specified, an error results.
I=infile	File on which input directives and data are written.
I	Same as I=INPUT.
L=outfile	Output file on which the information extracted from the disk pack is to be written. (Refer to following paragraphs.)
L	Same as L=OUTPUT.
MODE=mode	Operational mode for FORMAT.

mode	Description
ALTER	The input file contains directives to control the set or clear flaw operations (refer to Input Formats).
FETCH	The information contained on the factory sectors cylinder 632_8 (or 1466_8), track 0, sectors 0, 1, and 2 is obtained and copied to the output file (and optional output file, if available).
RESTORE	The addresses, flawed sectors, and tracks are restored according to information given in the utility flaw map. If the utility flaw map is not intact, the program aborts.

Pi	Description
MODE	Same as MODE=FETCH.
O=filename	Optional output file to contain the output extracted from the disk pack.

NOTE

If output files other than OUTPUT or optional output files are specified, they should be created prior to the initiation of FORMAT. If they are not, they are destroyed upon completion of FORMAT processing.

P=serialnumber	Pack serial number in decimal of the pack to be processed. If serialnumber does not match the serial number recorded on the disk pack at the factory, processing does not occur.
P	Same as P=0.
U=est	EST ordinal of the 844 drive on which the disk pack is mounted. The unit is checked to ensure that it is available for formatting (refer to Accessing Mass Storage Devices later in this section).
V	Specifies that the utility is to verify the addresses recorded on the disk pack. This option is valid only if MODE=FETCH or MODE=RESTORE is specified.

If all default values are used, the following call is made.

```
FORMAT,I=INPUT,L=OUTPUT,MODE=FETCH,P=0.
```

At least the U and the P parameter must be correctly specified to initiate processing.

INPUT FORMATS

Input to FORMAT consists of control directives and data statements. Control directives indicate the type of operation to be performed. Data statements indicate locations on the pack where the operations are to be performed. A number of data statements may follow each control directive. Control directives and data statements are contained on the input file. This file is accessed only when MODE=ALTER has been specified on the FORMAT command. The input file (and therefore, control directives and data statements) has no significance when MODE=FETCH or MODE=RESTORE is specified.

CONTROL DIRECTIVES

Control directives begin in column 1. The format is:

directive

The following are acceptable directives.

Directive	Description
SET	Declares that the following data statements contain the addresses of flaws to be set and entered in the utility flaw map.
CLEAR	Declares that the following data statements contain the addresses of flaws to be cleared and deleted from the utility flaw map.
FINIS	Declares the end of the input. No information following this statement is processed. This directive is optional.

SET and CLEAR directives may be intermixed in the input file. However, all CLEAR operations are performed before any SET operation. Any attempt to alter the factory map or to set or clear sector flaws in a previously flawed track results in an error.

DATA STATEMENTS

Data statements begin in column 1. The format is:

x,cccc,tt,ss

Parameter	Description
x	Type of flaw to be set or cleared. Acceptable values are: **x** — **Description** S — Indicates that the SET or CLEAR directive is applied to a sector. T — Indicates that the SET or CLEAR directive is applied to a track.
cccc	Octal number specifying the cylinder; the range is from 0 to 632_8 (or 1466_8 for 883 packs).
tt	Octal number specifying the track; the range is from 0 to 22_8.
ss	Octal number specifying the sector; the range is from 0 to 27_8. This field is ignored for track flaws (x=T).

All input data is checked to ensure that the values are within range. Any errors in input result in the termination of the utility before the disk is accessed. Any attempt to alter the factory map, or to set or clear sector flaws in a previously flawed track results in an error.

A maximum of 157 data statements can appear in the input stream.

OUTPUT FORMATS

Output generated by FORMAT is always placed on the output file (L=filename on the FORMAT command). This file, for all modes of operation (ALTER, FETCH, and RESTORE), contains the following.

- A listing of the input stream, if any.
- The pack serial number and date of factory formatting from the manufacturing section (cylinder 632_8 or 1466_8), track 0, sector 0.
- A listing of the factory flaw map contained on cylinder 632_8 (or 1466_8), track 0, sector 1.
- A listing of the utility flaw map contained on cylinder 632_8 (or 1466_8), track 0, sector 2.
- A listing of the utility flaw map following any changes resulting from SET or CLEAR directives. This listing appears only when MODE=ALTER is specified on the FORMAT command.
- A listing of the flawed sectors and tracks as read from the disk during address verification. This listing appears only when MODE=FETCH or MODE=RESTORE, and the V option are specified on the FORMAT command.

The output generated by FORMAT can be directed to an optional output file (O=filename). This file can then be used as input to another program, or it can be punched or printed.

The following three examples of standard output illustrate a series of reformatting operations performed on the same pack.

Example 1:

A RESTORE operation is performed on an 881 pack. A command similar to the following was entered.

```
FORMAT,U=est,P=819545,MODE=RESTORE.
```

Figure 13-1 illustrates the resulting output.

Example 2:

The flaws noted in the factory flaw map from example 1 (refer to figure 13-1) are now set in the utility flaw map.

Input similar to the following was entered.

```
FORMAT,U=est,P=819545,MODE=ALTER.
--EOR--
SET
S,626,15,15
T,302,16,0
T,362,01,00
T,373,21,00
FINIS
--EOI--
```

Figure 13-2 illustrates the resulting output.

```
DISK PACK REFORMATTING UTILITY              -VERSION 1.1 -      82/01/25.
MODE = RESTORE

           DISK PACK SERIAL NUMBER
            819545

           DATE OF ORIGINAL FACTORY FORMATTING
            74/04/30

           FACTORY FLAW MAP
           (C=CORRECTABLE ERROR,S=SECTOR FLAW,T=TRACK FLAW)
           S,632, 00, 00
           S,632, 00, 01
           S,632, 00, 02
           T,302, 16, 00
           T,362, 01, 00
           T,373, 21, 00
           S,626, 15, 15

           UTILITY FLAW MAP
           (S=SECTOR FLAW,T=TRACK FLAW)
           MAP EMPTY

PACK FORMATTING COMPLETE, VERIFICATION FOLLOWS
           S,632, 00, 00
           S,632, 00, 02
           S,632, 00, 01

ADDRESS VERIFICATION COMPLETE
```

Figure 13-1. FORMAT Output, MODE=RESTORE

```
DISK PACK REFORMATTING UTILITY                    -VERSION 1.1 -      82/01/25.
MODE = ALTER

INPUT DATA
SET
S,626, 15, 15
T,302, 16, 00
T,362, 01, 00
T,373, 21, 00
FINIS

               DISK PACK SERIAL NUMBER
                819545

               DATE OF ORIGINAL FACTORY FORMATTING
                74/04/30

               FACTORY FLAW MAP
               (C=CORRECTABLE ERROR, S=SECTOR FLAW, T=TRACK FLAW)
               S,632, 00, 00
               S,632, 00, 01
               S,632, 00, 02
               T,302, 16, 00
               T,362, 01, 00
               T,373, 21, 00
               S,626, 15, 15

               UTILITY FLAW MAP
               (S=SECTOR FLAW, T=TRACK FLAW)
               MAP EMPTY

               UTILITY FLAW MAP    (ALTERED)
               (S=SECTOR FLAW, T=TRACK FLAW)
               S,626, 15, 15
               T,302, 16, 00
               T,362, 01, 00
               T,373, 21, 00
```

Figure 13-2. FORMAT Output, MODE=ALTER

Example 3:

A FETCH with verification operation is performed to ensure proper reformatting. A command similar to the following was entered.

```
FORMAT,U=est,P=819545,MODE=FETCH,V.
```

Figure 13-3 illustrates the resulting output.

```
DISK PACK REFORMATTING UTILITY              -VERSION 1.1 -      82/01/25.
MODE = FETCH

           DISK PACK SERIAL NUMBER
            819545

           DATE OF ORIGINAL FACTORY FORMATTING
            74/04/30

           FACTORY FLAW MAP
           (C=CORRECTABLE ERROR, S=SECTOR FLAW, T=TRACK FLAW)
           S,632, 00, 00
           S,632, 00, 01
           S,632, 00, 02
           T,302, 16, 00
           T,362, 01, 00
           T,373, 21, 00
           S,626, 15, 15

           UTILITY FLAW MAP
           (S=SECTOR FLAW,T=TRACK FLAW)
           S,626, 15, 15
           T,302, 16, 00
           T,362, 01, 00
           T,373, 21, 00


ADDRESS VERIFICATION FOLLOWS
           T,302, 16, 00
           T,362, 01, 00
           T,373, 21, 00
           S,626, 15, 15
           S,632, 00, 00
           S,632, 00, 02
           S,632, 00, 01


ADDRESS VERIFICATION COMPLETE
```

Figure 13-3. FORMAT Output, MODE=FETCH

ACCESSING MASS STORAGE DEVICES

Special procedures must be used to access the 844 drive used in the reformatting utility. Since certain FORMAT operations (ALTER and RESTORE) can change addresses on the pack, user access to the pack must be restricted.

FORMAT can operate on the pack in the following ways.

- A read operation (FETCH) obtains formatting information from the pack. The integrity of the pack is maintained.

- Read and write operations (ALTER and RESTORE) can set and clear flaws, and addresses can be rewritten. Users cannot place permanent files on the pack when these operations occur. The integrity of the data on the pack is lost, so a full initialization of the pack must occur before system usage occurs.

ACCESS FOR READ OPERATIONS

Accessing the pack for read operations requires that the U parameter be specified on the FORMAT command with the correct EST ordinal of the device containing the pack. In this case, the device must be a single-spindle device unless the G parameter is also specified. The P parameter must also be specified with the correct pack serial number.

In addition, FORMAT must be called from one of the following.

- A system origin job (from the console).
- A system privileged job (in this case, engineering mode must have been selected on the system console).

ACCESS FOR READ AND WRITE OPERATIONS

In addition to the information specified for read only operations, the following additional steps must be taken to access a device when write operations (ALTER and RESTORE) are to be performed. (Refer to the NOS 2 Operator/Analyst Handbook for a description of all DSD commands and for the mass storage status display and to the NOS 2 Installation Handbook for a description of all EQPDECK entries.)

1. The pack to be accessed should be mounted on a removable mass storage device.
2. One of the following conditions is required.
   a. The device should not be a shared device. (Refer to SHARE command in the NOS 2 Installation Handbook and Multimainframe Operation in section 8 of this manual.)
   b. If the device is shared, a global unload should be set. (Refer to section 8.)
3. The device must be declared logically off. Use the OFF,est. DSD command or the OFF parameter in the EQPDECK EQ entry.
4. The mass storage status (E,M.) display must show that the device is not in use.
5. One of the following conditions is required.
   a. The mass storage status (E,M.) display must show that the device is unavailable for permanent file access.
   b. The following conditions are required.
      1) The full initialize status and the format pending status must be set. Use the DSD command, INITIALIZE,FP,est.
      2) The direct access file user count should be equal to zero. The mass storage status (E,M.) display gives this information.

If all the necessary conditions are satisfied, FORMAT is able to access the pack for reformatting purposes. FORMAT repeatedly checks to ensure that these conditions are satisfied throughout the FORMAT operation.

CONTROLWARE LOADING UTILITY 14

The LOADBC command provides the capability of dynamically downloading disk or network access device (NAD) controlware to the associated controller.

DISK CONTROLWARE

The downloading of disk controlware can be initiated only with a console command. The disk controlware can be loaded from a channel that is either active or down and unassigned. The calling job must be system origin or the user must be validated for system origin privileges; and the system must be in engineering mode (refer to the NOS 2 Operator/Analyst Handbook). LOADBC will issue appropriate messages to indicate the success or failure of the disk controlware load attempt.

The format of the command is:

```
LOADBC,C=cc.
```

Parameter	Description
C=cc	cc is a two-digit octal number of the channel from which the disk controlware is to be loaded. The controlware can be loaded only if the channel status is UP, or if the channel status is DOWN and not assigned to a maintenance user. Disk controlware originates from the system file.

NAD CONTROLWARE

The LOADBC command can be used to load NAD controlware into local NADs (380-170) and remote NADs (380-170, 380-200, 380-370, and 380-110). Since the NAD controlware is not automatically loaded at deadstart, LOADBC must be used before a local NAD can be used by the operating system. NAD controlware may be automatically loaded by the Remote Host Facility (RHF) when RHF is initiated. Refer to the NOS 2 Operator/Analyst Handbook.

LOADBC can be called from the console or a batch job. When loading 380-170 controlware into a local NAD, the EST entry associated with the NAD's channel number must be OFF or the controlware-not-loaded flag must be set.

When loading a remote NAD, a local NAD that is not reserved for maintenance must be defined in the EST. The EST entry must be ON. Controlware must be loaded and running in the local NAD before loading the remote NAD.

Remote NAD loading operations can occur concurrently with RHF use of the local NAD. However, extreme care should be exercised when performing a remote NAD load to ensure that the correct remote NAD is being loaded and that the remote NAD is not being used by the mainframe to which it is connected. LOADBC will issue appropriate messages to indicate the success or failure of the NAD controlware load attempt.

The format of the command is:

LOADBC,p_1,p_2,...,p_n.

p_i	Description
C=cc	cc is a two-digit octal number of the channel from which the NAD controlware is to be loaded. This parameter is required.
F=filename	Name of the local file from which NAD controlware is to be loaded. If F=filename is specified, local file filename must contain a NAD controlware binary with an appropriate header (refer to NOS 2 Installation Handbook). If F=filename is not specified, the NAD controlware type specified by the TY parameter is read from the SYSTEM library.

The following parameters apply only when loading remote NAD controlware.

AC=aaaa — Four-digit hexadecimal number specifying the remote NAD's access code (refer to NOS 2 Operator/Analyst Handbook). The default is AC=0000.

LT=$t_0t_1t_2t_3$ — Four-digit binary bit pattern specifying the local trunk control units (TCUs) that are enabled. At least one TCU enable must be specified for remote NAD controlware loading. t_n=1 enables TCU_n.

For example, LT=1010 indicates that local TCUs 0 and 2 are enabled.

ND=nn — Two-digit hexadecimal number specifying the remote NAD's logical trunk address (refer to NOS 2 Operator/Analyst Handbook). This parameter is required for remote NAD loads.

TY=value — Type of controlware to be loaded.

value	Description
170	CYBER 170 controlware (380-170)
200	CYBER 200 controlware (380-200)
IBM	IBM controlware (380-370)
MIN	Minicomputer controlware (380-110)

The default value is TY=170.

Under certain conditions, a remote NAD loading operation will fail on the first attempt but a second loading attempt will succeed. This loading problem can be prevented by always preceding a remote NAD loading operation with a remote NAD dumping operation to ensure the remote NAD controlware is halted before loading is attempted.

For example, to load a remote NAD with NAD address 7F and access code F0F0 connected to TCU 0 of the local NAD on channel 5, enter the following commands.

```
X.DMPNAD(CH=05,ND=7F,AC=F0F0,LT=1000)
X.LOADBC(CH=05,ND=7F,AC=F0F0,LT=1000)
```

SYSTEM DATA GATHERING UTILITIES 15

The TRACER and PROBE utilities described in this section provide data for statistical analysis of the system. The data is used to determine areas where problems occur, where improvements in design might be made, and to perform system tuning. The TRACER utility monitors the system's activity and gathers data periodically. The PROBE utility traps and measures particular internal events in the system. Both utilities capture valuable data which may not be obtainable any other way.

TRACER UTILITY

The TRACER utility monitors the following conditions:

- Channel activity by channel.
- Channel reserved.
- Channel requested.
- Requests pending.
- Number of active PPs.
- Buffered input/output list parameters.
- Buffered input/output channel busy.
- CPU use (idle, system, subsystem, system-related activity, or user activity).
- Subsystem CPU use.
- Storage moves pending.
- PP saturation.
- Extended memory transfer in progress.
- MTR cycle time.
- CPU0 or CPU1 is or is not in monitor mode.
- Executive state count and time.
- Same storage move request is pending.
- Control points in automatic recall (I) status.
- Control points in periodic or automatic recall (X) status.

- Control points in waiting (W) status.
- Amount of available memory.
- Amount of memory at control points by service class.
- Amount of memory in queue by service class.
- Amount of memory at control points by subsystem.
- Page map hit rate.
- Segment map hit rate.
- Number of noninteractive jobs.
- Number of detached interactive jobs.
- Number of on-line jobs.
- Number of preinitial jobs by service class.
- Number of executing jobs by service class.
- Number of jobs rolled out by job scheduler for each service class.
- Number of jobs rolled in or out by system control point processing for each service class.
- Number of jobs in a timed/event rollout queue by service class.
- Number of jobs rolled out by interactive input-output processing for each service class.
- Number of disabled jobs rolled out by service class.
- Number of suspended jobs rolled out by service class.
- Number of jobs with rollout file errors by service class.
- Number of EST entries in use.
- Number of FNT entries in use.
- Number of EJT entries in use.
- Number of queued files assigned to jobs at control points.
- Number of input files by service class.
- Number of print and punch files by service class.
- Number of other queued files not assigned to jobs at control points.
- Number of QFT entries in use.
- Number of FOT entries in use.

- Number of control points in use.
- Number of IAF active users.
- Number of IAF pots available.
- Number of IAF pots in use.
- Number of tape drives in use.
- Number of tracks available by mass storage device.
- Number of page table reads.
- Number of segment table reads.
- Number of extended memory moves.
- Number of central memory moves.
- Number of rollouts.
- Number of sectors rolled.
- Number of rollouts/user limits.
- Number of time slices.
- Number of PP priority exchanges.
- Number of EJT scans.
- Number of schedulable jobs.
- Number of jobs preempted.
- Number of jobs scheduled.
- Number of jobs scheduled with no constraints.
- Number of insufficient CM scans.
- Number of insufficient EM scans.
- Number of no control point scans.

The TRACER utility includes the following programs:

Program	Description
ICPD	A CPU program which initiates system monitoring by CPD.
CPD	A PP program which monitors any of the system activities listed above. CPD is dedicated to a PP while it is monitoring system activity. Data is written to a direct access permanent file for future analysis.

Program	Description
ACPD	A postprocessor program which generates an output report from the direct access permanent file written by CPD.
ENDCPD	A CPU program that terminates system monitoring by CPD.

TRACER COMMANDS

TRACER commands are described in the following paragraphs.

ICPD Command

ICPD defines a mass storage file to which CPD will write statistical data and then initiates system monitoring by CPD.

Format:

ICPD,p_1,p_2,...p_n.

Pi	Description
FL=fl	Fast loop sampling frequency, in milliseconds, during which such items as PPs active and move request pending are sampled. Default is 5 milliseconds.
ML=ml	Medium loop sampling frequency, in milliseconds, during which such items as control points in I, X, and W status and field length available are sampled. Default is 100 milliseconds.
SL=sl	Slow loop sampling frequency, in milliseconds, during which such items as IAF users and tape drives in use are sampled. Default is 1000 milliseconds.
FW=fw	Snapshot loop sampling frequency, in seconds. Default is 5 seconds.
FN=filename	Name of sample data file. Default is SAMPLE. ICPD will attempt to attach a direct access file by this name. If no file exists, it will be defined. If a file is found, ICPD will skip to EOI and write an EOF. CPD will then start writing data after the EOF.
M=mode	Permanent file mode for sample data file. Default is M=WRITE. mode can have one of the following values.

mode	Description
WRITE or W	Sample data file attached in write mode.
APPEND or A	Sample data file attached in append mode.
MODIFY or M	Sample data file attached in modify mode.

NOTE

> If the sample data file is attached in write mode, the file cannot be accessed until ENDCPD is run. If the sample data file is to be accessed while data is being collected, append or modify mode must be specified. In this situation, the file may be attached in read/allow modify (RM) mode. (Attaching the file in write mode rather than in modify or append mode has the advantage of expending less overhead when interlocking and writing the data file.)
>
> If a loop time is set to zero, no samples for that loop will be taken. If the data block sample time is set to zero, the data file will be written only when the sampling interval terminates.
>
> All numeric data should lie within the range 0 through 4095 (0 through 7777_8).

ACPD Command

ACPD reads the sample data file produced by CPD and generates reports, in both user readable and machine readable formats, for further analysis. The sample data file must be attached before ACPD is called. If ICPD is called with the M=A or M=M parameters, the sample data file can be accessed while CPD is still active.

ACPD assumes a continuity of the sample data file. Therefore, the uncollected information during the time gap separating two consecutive files is assumed to be present, although the information is not reported. As a result, if the consecutive files on the sample data file are not in chronological order, ACPD terminates and issues an error message.

Format:

```
ACPD,p1,p2...pn.
```

Pi	Description
FN=datafile	Name of sample file. Default is SAMPLE. This file is not rewound before or after processing.
L=outfile	Name of output file generated by ACPD. Default is OUTPUT.
S=sumfile	Name of machine readable summary file generated by ACPD. If this parameter is omitted, no summary file is generated. If S is specified without sumfile, SUMMARY is assumed.
IN=nn	Time span of report interval, in minutes. Default value is 6 minutes. ACPD generates a report for each report interval.

Pi	Description
LO=Z	Report data items with zero values. Default is to suppress data items with zero values.
N=nn	Number of files on the sample data file to be analyzed and reported. Default is only one file processed. If N is not equivalenced, all files are processed until EOI is reached on the sample data file. The sample data file is not rewound before processing.
BT=hhmmss	Beginning time in the format hour minute second. If BT=hhmmss is specified, only data collected after this time on the date specified by BD=yymmdd is reported. If BT is omitted or no time is specified, BT=0 is assumed.
ET=hhmmss	Ending time in the format hour minute second. If ET=hhmmss is specified, only data collected before this time on the date specified by ED=yymmdd is reported. If ET is omitted or no time is specified, ET=0 is assumed.
BD=yymmdd	Beginning date in the format year month day. If BD=yymmdd is specified, only data collected on or after this date is reported. If BD is omitted or no date is specified, the beginning date is the date of the current file on the sample data file.
ED=yymmdd	Ending date in the format year month day. If ED=yymmdd is specified, only data collected on or before this date is reported. If ED is omitted or no date is specified, but ET=hhmmss is specified, the ending date is the same as the beginning date. If neither ED nor ET is specified, ACPD terminates when the number of files specified by the N parameter are processed, or end of information is encountered, whichever happens first.

ACPD begins by processing the command parameters. If the beginning time (BT) and beginning date (BD) are specified, ACPD first locates the correct file and then processing begins. Processing continues until the ending time (ET) and ending date (ED) are encountered, the number of files specified by the N parameter have been processed, or end-of-information is encountered, whichever happens first.

If the BT and BD parameters are not specified, ACPD starts at the current position of the sample data file. The sample data file is not rewound before processing starts.

ENDCPD Command

The ENDCPD command terminates all CPD data gathering.

Format:

```
ENDCPD.
```

OUTPUT FILE FORMAT

The first three pages of the output report produced by ACPD contain the header block information. Next the data items are reported for fast, medium, and slow loop samples. The report ends with the snapshot data items.

Figure 15-1 is an example showing the format of the output report. The example has been simplified and condensed to reduce the amount of output. Also, supporting text has been added to the example.

Data items monitored at successive time intervals are listed in the same row. For each data item, the average, standard deviation, and percentage are listed in successive rows. Up to ten intervals can be listed per page in successive vertical columns. If the output file contains more than ten columns per row, the output report lists the first ten columns for all rows of data items and then resumes listing subsequent intervals following the snapshot data items.

The SUBTOTAL column contains the values of the data items for the time spanned by the preceding intervals on the current page; that is the time spanned by the preceding intervals is considered as one interval. The TOTAL column appears after the last interval reported and contains the statistical values of the data items for the entire run. The SUBTOTAL column is not listed if the subtotal data and total data are identical and would appear on the same page. In this case, only the TOTAL column is listed. The SUBTOTAL and TOTAL columns are not reported for the snapshot data items. The *MAX* and *MIN* columns appear at the end of the report and contain the maximum and minimum interval values of the data items for the entire run. The maximum and minimum interval values on each page are indicated by brackets and parentheses, respectively.

The average is not reported for data items that have a weighting factor of 1, and the percentage is not reported for data items that have a weighting factor of 100, since this information is redundant.

Snapshot data items (statistical data from CMR) are reported in columns. Each snapshot data items is reported in five 12-bit bytes. The bytes are printed in successive rows under the interval in which the data was collected.

SUMMARY FILE FORMAT

The machine readable summary file has two types of records; the header block record and the data block record. An *EOR* separates consecutive records.

The header block record contains the header data in an unpacked format.

Each data block record is divided into two equal length parts. The first part contains the average values of the data items. The second part contains the corresponding standard deviations of the data items.

Total and subtotal data and interval percentage data does not appear on the summary file. The loop sample times and snapshot data items have 0 standard deviations to simplify the summary file format.

```
A C P D - VER  8.0          CDC NETWORK OPERATING SYSTEM.          NOS 2                   83/06/10. 14.06.15.  PAGE     1

        START DATE               83/05/25.           Start of sampling interval.
        START TIME               23.50.13.

        DATA FILE NAME             SAMPLE            ACPD command parameters (FN,IN).
        REPORT INTERVAL (MINS)          2

        CPD VERSION                          8.0
        FAST LOOP INTERVAL (MSECS)            10
        MEDIUM LOOP INTERVAL (MSECS)         100     ICPD command parameters (FL,ML,SL,FW).
        SLOW LOOP INTERVAL (MSECS)          1000
        SNAPSHOT LOOP INTERVAL (SECS)         60

        NUMBER OF CPUS                         1
        NUMBER OF PPUS                        20
        MEMORY SIZE / 100B                 7777B     Hardware configuration at beginning of sampling interval.
        USER EM / 1000B                     200B
        MAGNETIC TAPE UNITS                    6

        NUMBER OF EST ENTRIES                61B
        NUMBER OF FNT ENTRIES                23B
        NUMBER OF EJT ENTRIES              1100B
        NUMBER OF QFT ENTRIES               620B
        NUMBER OF FOT ENTRIES                10B
        NUMBER OF CONTROL POINTS             34B     Software configuration at beginning of sampling interval.
        CMRSIZE / 100B                      622B
        LIBDECK NUMBER                         1
        RECOVERY LEVEL                         0
        NUMBER OF IAF TERMINALS             200B
        MACHINE ID                            64

        CPU USAGE CATEGORIES (CTCUL)                5B
        CHANNEL TABLE LENGTH (CTALL)               36B
        LENGTH OF AN EST ENTRY (ESTE)               2B
        LENGTH OF AN FNT ENTRY (FNTE)               2B
        LENGTH OF AN EJT ENTRY (EJTE)               4B
        LENGTH OF A QFT ENTRY (QFTE)                4B
        NUMBER OF SERVICE CLASSES (MXSC)           17B     System statistics.  The symbols are assembly constants used in NOS.
        NUMBER OF JOB STATUSES (MXJS)              13B
        NUMBER OF CONNECTION STATUSES (MXCS)        3B
        NUMBER OF FILE TYPES (MXFT)                21B
        MAXIMUM ORIGIN TYPES (MXOT)                 6B
        NUMBER OF MASS STORAGE DEVICES             14B
        LENGTH OF MSAL TABLE (MXRS)                14B

        CPU RECALL DELAY                           30B
        PP AUTO RECALL DELAY                     1750B
        MAXIMUM JOB SWITCH DELAY                   20B     System delay parameters at beginning of sampling interval.
        MINIMUM JOB SWITCH DELAY                    4B
        INPUT FILE SCHEDULING INTERVAL              2B
        SCHEDULER CYCLE INTERVAL                    1B

        HIGH SPEED DISK BUFFERS                     0B     System buffers at beginning of sampling interval.
        EM/PP BUFFERS                               1B
```

Figure 15-1. Example of TRACER Output (Sheet 1 of 10)

A C P D - VER 8.0 CDC NETWORK OPERATING SYSTEM. NOS 2 83/06/10. 14.06.15. PAGE 2

EQUIPMENT STATUS TABLE

NO.	TYPE	STAT	EQ	UN	CHANNELS	EST ENTRY	TRACK	FILES
0	RD	ON	1	11	0	00000000000022041271 00000000000000000000		
1	DS	ON	7	0	10	00000010000004237000 00000000000000000000		
2	NE	ON	0	0	0	20000000000016050000 00000000000000070000		
3	TE	ON	0	0	0	20000000000024050000 00000000000000070000		
4	TT	ON	0	0	0	20000000000024240200 00000000000000070000		
5	DE	ON			0	40100000000004051274 00000000000000000000	770	-------------
6	DQ	ON			13	62100013137704211277 00000000000000000000	3222	XT----------N
7	DQ	ON			13	62100013137704211302 00000000000000000000	3222	XT----------N
10	DJ	ON			26 32	42103226137704121305 00000000000000000000	3150	-------------
11	DJ	ON		1	32 26	47002632137704121310 00000000000000000000	3150	-------------
12	DJ	ON		2	26 32	47003226137704121313 00000000000000000000	3150	------------- (1)
13	DI	ON		3	32 26	47002632137704111316 00000000000000000000	3140	-------------
14	DI	ON		4	26 32	47003226137704111321 00000000000000000000	3140	-------------
15	DI	ON		6	26 32	47003226137704111324 00000000000000000000	3140	-------------
16	DJ	ON		0	13	47000013137704121327 00000000000000000000	3150	-------------
17	DJ	ON		1	13	47000013137704121332 00000000000000000000	3150	-------------
20	DJ	ON		2	13	47000013137704121335 00000000000000000000	3150	-------------
21	CR	ON	4	0	12	00000012000003224000 00000000000000000000		
22	CP	ON	5	0	12	00000012000003205000 00000000000000000014		
23	LT	ON	7	0	12	02000012000014247100 00000000000000000000		
24	LT	ON	6	0	12	00000012000014246000 00000000000000000000		
30	TT	OFF	6	10	6	20000006000064246310 00000000000000000000		
31	TT	OFF	6	6	6	20000006000064246226 00000000000000000000		
32	NP	ON	7	3	3	00000003000016207103 00000000000000000006		
34	NP	OFF	7	1	1	00000001000056207101 00000000000000000000		
35	NP	OFF	7	7	2	00000002000056207107 00000000000000000000		
36	NP	OFF	7	4	7	00000007000056207104 00000000000000000000		
43	CS	ON	0	6	0	00000000440003230106 00000000000000000000		
44	CT	ON	0	0	0	00000000440003240000 00000000000000000000		
45	CT	ON	0	2	0	00000000440203240202 00000000000000000000		
50	MT	ON	0	0	31 33	02003331000015240000 00000000000000000000		
51	NT	ON	0	1	31 33	02003331000016240001 00000000000000000000		
52	NT	ON	0	2	31 33	02003331000016240002 00000000000000000000		
53	NT	ON	0	3	31 33	02203331000016240003 00000000000000000030		
54	NT	ON	0	4	31 33	02203331000016240004 00000000000000000000		
55	NT	ON	0	5	31 33	02203331000016240005 00000000000000000000		
60	NC	ON	0	5	6	20000006000016030045 00000000000000000000		

Track capacity for mass storage devices.

ON/OFF status

Octal representation of EST entry at beginning of sampling interval.

Equipment type

Equipment numbers for mass storage devices and unit numbers for nonremovable mass storage devices are not listed.

EST ordinal

(1) The letters are order dependent and indicate file types that can reside on a given device. The order is XTIORDPLBSRRN.

Letter	File Type	Letter	File Type
X	System	L	Local
T	Temporary	B	LGO
I	Input	S	Secondary rollout
O	Output	R	Reserved for CDC
R	Rollout	R	Reserved for CDC
D	Dayfile	N	Temporary on nonshared device
P	Primary		

Figure 15-1. Example of TRACER Output (Sheet 2 of 10)

A C P D - VER 8.0 CDC NETWORK OPERATING SYSTEM. NOS 2 83/06/10. 14.06.15. PAGE 3

SYSTEM CONTROL INFORMATION

SERVICE CLASS	QUEUE	PRIORITIES IL	LP	UP	WF	IP	SERVICE LIMITS PR FL EC	CP AM EM	CM DS	NJ TP FC	CS	TD FS
SY	IN		7770	7776	0		30	100	20	7777		341
	EX	4000	2000	7000	0	7000	3777	77777		4004		
	OT		7000	7776	0		3777	7777	0	0	0	0
BC	IN		10	4000	0		30	400	200	7777		341
	EX	2000	1000	4004	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
RB	IN		10	4000	0		30	400	200	7777		341
	EX	2000	1000	4004	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
TS	IN		7000	7770	0		30	40	10	7777		341
	EX	3770	3700	7000	0	4000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
DI	IN		10	4000	0		30	100	20	7777		341
	EX	2000	1000	4000	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
NS	IN		7770	7776	0		74	400	200	7777		341
	EX	7772	7770	7776	0	7772	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
SS	IN		7770	7776	0		70	100	20	7777		341
	EX	7772	7770	7776	0	7772	3777	77777		4004		
	OT		7400	7776	0		3777	7777	0	0	0	0
MA	IN		1	10	0		2	100	20	7777		341
	EX	4	1	10	0	10	3777	77777		4004		
	OT		7000	7776	0		3777	7777	0	0	0	0
CT	IN		7770	7776	0		30	400	200	7777		341
	EX	4004	4000	7000	0	7000	3777	77777		4004		
	OT		7000	7776	0		3777	7777	0	0	0	0
I0	IN		10	4000	0		30	400	200	7777		341
	EX	2000	1000	4004	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
I1	IN		10	4000	0		30	400	200	7777		341
	EX	2000	1000	4004	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
I2	IN		10	4000	0		30	400	200	7777		341
	EX	2000	1000	4004	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0
I3	IN		10	4000	0		30	400	200	7777		341
	EX	2000	1000	4004	0	2000	3777	77777		4004		
	OT		1	7000	0		3777	7777	0	0	0	0

This page shows the status of the job control area at the beginning of the sampling interval. The values are set either by the IPRDECK entries QUEUE and SERVICE or by the DSD commands QUEUE and SERVICE.

Figure 15-1. Example of TRACER Output (Sheet 3 of 10)

A C P D - VER 8.0 CDC NETWORK OPERATING SYSTEM. NOS 2 83/06/10. 14.06.15. PAGE 4

2 MINS INTERVAL		(2) 23.52.13 INTERVAL	23.54.13 INTERVAL	23.56.13 INTERVAL	23.58.12 INTERVAL	00.00.12 INTERVAL	00.02.13 INTERVAL	00.04.12 INTERVAL	00.06.13 INTERVAL	00.08.13 INTERVAL	00:18 HR SUBTOTAL (5) (6)
(3) FAST LOOP SAMPLES		10480	10519	10525	10517	10528	10524	10516	10507	10517	94633
PPUS ACTIVE	AV	(4.236)	6.272	4.987	7.186	[7.708]	4.552	4.504	4.250	6.154	5.539
(4)	SD	(0.014)	0.139	0.118	0.151	[0.363]	0.238	0.034	0.021	0.143	1.261
	PC	(21.180)	31.359	24.933	35.931	[38.538]	22.760	22.519	21.250	30.770	27.693
MOVE REQUEST PENDING	SD	(0.000)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	[0.001]	0.001
	PC	(0.000)	0.010	0.067	0.000	[0.124]	0.048	0.000	0.000	0.067	0.035
NO PPU AVAILABLE	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EM TRANSFER IN PROG	SD	0.000	0.000	0.000	0.000	0.001	0.000	[0.001]	(0.000)	0.000	0.001
	PC	(0.048)	0.152	0.105	0.095	0.209	0.162	[0.209]	0.086	0.057	0.125
MTR CYCLE TIME	AV	0.371	0.393	0.372	[0.436]	0.412	0.372	0.370	(0.364)	0.433	0.392
	SD	0.010	0.007	0.008	(0.000)	0.013	0.007	0.001	0.004	[0.023]	0.029
MONITOR MODE - CPU 0	SD	[0.013] (7)	0.002	0.012	0.009	0.003	(0.002)	0.010	0.002	0.005	0.020
	PC	(7.887)	12.358	8.608	[13.605]	10.961	8.200	9.870	8.376	9.186	9.895
MONITOR MODE - CPU 1	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SCHEDULER ACTIVE	SD	(0.001) (8)	0.001	0.006	0.041	0.022	0.019	0.001	0.001	[0.069]	0.057
	PC	5.114	(5.067)	7.335	15.915	[19.136]	7.051	5.696	5.805	12.110	9.248
CHANNEL RESERVED											
CH 12	SD	0.000	0.000	(0.000)	0.000	0.036	0.000	0.001	0.000	[0.068]	0.034
	PC	0.105	0.076	0.076	0.095	3.776	0.095	0.095	(0.038)	[6.898]	1.250
CH 13	SD	0.010	0.262	0.012	(0.003)	0.033	0.059	0.016	0.005	[0.275]	0.168
	PC	7.781	[39.808]	11.135	16.810	12.914	19.718	25.217	(7.434)	33.625	19.383

(2) The interval ending time is shown at the top of each report column. The report interval is specified by the IN parameter of the ACPD command.

(3) The sampling frequency for fast loop items is specified by the FL parameter of the ICPD command. Refer to table 15-1 for all fast loop items that TRACER reports. Fast loop items are described following the table.

(4) The statistics reported for each data item are the average (AV), standard deviation (SD), and percentage (PC) for the report interval.

(5) The SUBTOTAL column contains a summation of all data gathered from all intervals of each page. This column is not listed if the subtotal data and the total data are identical and would appear on the same page.

(6) This example has 13 columns of information for each row of data items. However, only 10 columns can be shown per page, so the remaining columns are listed at the end of the report.

(7) The values enclosed in brackets are the maximum interval values for each row of data items on each page. Refer to note (14).

(8) The values enclosed in parentheses are the minimum interval values for each row of data items on each page. Refer to note (15).

Figure 15-1. Example of TRACER Output (Sheet 4 of 10)

****

(9) MEDIUM LOOP SAMPLES		1170	1175	1175	1173	1175	1175	1175	1173	1175	10566
CPS IN W STATUS	AV	(0.225)	0.339	0.889	1.868	[2.494]	1.699	2.085	1.282	1.278	1.351
	SD	0.043	0.144	[0.320]	0.113	0.293	(0.002)	0.122	0.134	0.137	0.747
	PC	(0.805)	1.209	3.175	6.671	[8.907]	6.067	7.446	4.579	4.566	4.825
CPS IN X STATUS	AV	(5.787)	6.452	5.894	[6.802]	6.078	5.906	6.080	5.827	6.079	6.101
	SD	0.020	0.014	(0.003)	0.044	0.101	0.009	0.162	[0.190]	0.159	0.328
	PC	(20.669)	23.043	21.052	[24.293]	21.705	21.091	21.714	20.811	21.712	21.788
CPS IN I STATUS	AV	(0.067)	0.130	0.083	[0.185]	0.177	0.091	0.095	0.075	0.141	0.116
	SD	(0.001)	0.016	0.015	0.004	0.005	0.011	0.008	0.002	[0.075]	0.049
	PC	(0.238)	0.465	0.295	[0.661]	0.632	0.325	0.340	0.268	0.505	0.414
SAME MOVE REQUEST	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FL AVAILABLE	AV	[4347B]	4236B	3363B	2675B	2471B	3017B	(2412B)	3375B	3140B	3250B
	SD	(1.227)	7.470	22.167	82.904	[126.210]	5.241	60.961	9.916	117.505	337.642
	PC	[61.730]	59.740	48.185	39.794	36.213	42.016	(34.957)	48.459	44.193	46.143
USER EM AVAILABLE	AV	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NON INTERACTIVE JOBS	AV	(1.022)	2.096	2.668	4.243	[6.591]	2.603	2.351	2.191	3.598	3.040
	SD	0.136	(0.023)	0.456	[0.619]	0.139	0.462	0.258	0.033	0.178	1.556
	PC	(0.177)	0.364	0.463	0.737	[1.144]	0.452	0.408	0.380	0.625	0.528
DETACHED JOBS	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ON-LINE JOBS	AV	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.174	0.174	0.174	0.174	0.174	0.174	0.174	0.174	0.174	0.174
PRE-INITIAL JOB STEP											
SY	AV	(1.000)	1.000	1.001	1.029	1.000	1.000	1.000	1.001	[1.344]	1.042
	SD	(0.000)	0.000	0.001	0.029	0.000	0.000	0.000	0.001	[0.344]	0.157
	PC	(0.174)	0.174	0.174	0.179	0.174	0.174	0.174	0.174	[0.233]	0.181
BC	AV	(0.025)	1.000	0.684	1.166	[1.665]	0.094	0.236	0.092	0.462	0.603
	SD	0.025	(0.000)	0.125	0.166	0.335	0.094	0.236	0.029	[0.462]	0.582
	PC	(0.004)	0.174	0.119	0.202	[0.289]	0.016	0.041	0.016	0.080	0.105
RB	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TS	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(9) The sampling frequency for medium loop items is specified by the ML parameter of the ICPD command. Refer to table 15-1 for all medium loop items that TRACER reports. Medium loop items are described following the table.

Figure 15-1. Example of TRACER Output (Sheet 5 of 10)

**********************											
(10) SLOW LOOP SAMPLES		119	119	119	119	119	119	119	119	119	1071
IAF USERS	AV	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781
IAF POTS ALLOCATED	AV	455.000	455.000	455.000	455.000	455.000	455.000	455.000	455.000	455.000	455.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
IAF POTS IN USE	AV	(193.000)	193.000	193.017	193.008	193.017	[197.297]	193.000	193.000	193.000	193.482
	SD	(0.000)	0.000	0.000	0.008	0.017	[4.297]	0.000	0.000	0.000	1.967
	PC	(42.418)	42.418	42.421	42.419	42.421	[43.362]	42.418	42.418	42.418	42.524
QUEUE FILES ASSIGNED	AV	(0.000)	0.008	0.000	0.008	0.050	0.000	0.000	0.000	[0.092]	0.018
	SD	(0.000)	0.008	0.000	0.008	0.050	0.000	0.000	0.000	[0.092]	0.046
	PC	(0.000)	0.002	0.000	0.002	0.012	0.000	0.000	0.000	[0.023]	0.004
INPUT FILES											
SY	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BC	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RB	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TS	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PRINT FILES											
SY	AV	(0.000)	0.000	0.000	0.000	[0.008]	0.000	0.000	0.000	0.000	0.001
	SD	(0.000)	0.000	0.000	0.000	[0.008]	0.000	0.000	0.000	0.000	0.004
	PC	(0.000)	0.000	0.000	0.000	[0.002]	0.000	0.000	0.000	0.000	0.000
BC	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RB	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TS	AV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	PC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(10) The sampling frequency for slow loop items is specified by the SL parameter of the ICPD command. Refer to table 15-1 for all slow loop items that TRACER reports. Slow loop items are described following the table.

Figure 15-1. Example of TRACER Output (Sheet 6 of 10)

```
    ***********************
(11) SNAP SHOT OF INSL
           (IN0L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0200  0200  0200  0200  0200  0200  0200  0200  0200
           (IN1L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
           (IN2L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
           (IN3L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000   Installation area
           (IN4L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000   from CMR.
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
           (IN5L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
           (IN6L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
           (IN7L) =        0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
                           0000  0000  0000  0000  0000  0000  0000  0000  0000
```

(11) The sampling frequency for snapshot loop items is specified by the FW parameter of the ICPD command.

Figure 15-1. Example of TRACER Output (Sheet 7 of 10)

SNAP SHOT OF SDAL									
(SD0L) =	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	1347	1347	1347	1347	1347	1347	1347	1347	1347
	0006	0006	0006	0006	0006	0006	0006	0006	0006
	0000	0000	0000	0000	0000	0001	0001	0000	0000
(SD1L) =	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0363	0363	0424	0424	0473	0530	0530	0530	0571
(SD2L) =	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0066	0070	0106	0112	0115	0125	0132	0140	0141
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0001	0001	0001	0001	0001	0002	0002	0002	0002
	3636	3724	6000	6110	7147	1236	3455	3607	3642
(SD3L) =	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0001	0001	0003	0003	0003
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0024	0026	0050	0055	0056	0061	0063	0063	0064
(SD4L) =	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
(SD5L) =	4000	4000	4000	4000	4000	4000	4000	4000	4000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0764	0764	0764	0764	0764	0764	0764	0764	0764
	0006	0006	0006	0006	0006	0006	0006	0006	0006
	1121	1121	1121	1121	1121	1121	1121	1121	1122
(SD6L) =	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000
(SD7L) =	0010	0010	0010	0010	0010	0010	0010	0010	0010
	6316	6316	6316	6316	6316	6316	6316	6316	6316
	6323	6323	6323	6323	6323	6323	6323	6323	6323
	0173	0201	0207	0215	0223	0231	0237	0245	0253
	0306	0306	0306	0306	0306	0306	0306	0306	0306
MTR MXN TIME	743	743	743	743	743	743	743	743	743
WORST CASE MTR CYCLE TIME	6	6	6	6	6	6	6	6	6
EM MOVES	0	0	0	0	0	0	0	0	0
CM MOVES	243	243	276	276	315	344	344	344	377
ROLLOUTS	54	56	70	74	77	85	90	96	97
SECTORS ROLLED	6046	6100	7168	7240	7783	8862	10029	10119	10146
ROLLOUTS/USER LIMITS	0	0	0	0	1	1	3	3	3
TIME SLICES	20	22	40	45	46	49	51	51	52
PP PRIORITY EXCHANGES	0	0	0	0	0	0	0	0	0
EJT SCANS	112	114	190	334	714	781	786	797	846
SCHEDULABLE JOBS	1024	1171	1357	1498	1633	1795	1946	2101	2238
JOBS PREEMPTED	0	0	0	0	0	0	0	0	0
JOBS SCHEDULED	72	74	98	104	106	115	120	127	130
SCHEDULED NO CONSTRAINTS	0	0	0	0	0	0	0	0	0
INSUFFICIENT CM SCANS	0	0	0	0	0	0	0	0	0
INSUFFICIENT EM SCANS	0	0	0	0	0	0	0	0	0
NO CONTROL POINT SCANS	0	0	0	0	0	0	0	0	0

Statistical data area from CMR.

Figure 15-1. Example of TRACER Output (Sheet 8 of 10)

SNAP SHOT OF MTR										
	1524	1524	1524	1524	1524	1524	1524	1524	1524	
	2235	2235	2235	2235	2235	2232	2235	2235	2235	PP monitor area
	0000	0000	0000	0000	0000	0000	0000	0000	0000	from CMR.
	0000	0000	0000	0000	0000	0000	0000	0000	0000	
	0000	0000	0000	0000	0000	0000	0000	0000	0000	
SNAP SHOT OF CPTW - CP0										
	0000	0000	0000	0000	0000	0000	0000	0000	0000	
	0104	0104	0104	0104	0104	0104	0104	0104	0104	
	7475	7475	7475	7475	7475	7475	7475	7475	7475	
	0005	0005	0005	0005	0005	0005	0005	0005	0005	
	7750	7750	7750	7750	7750	7750	7750	7750	7750	CP accumulator area
SNAP SHOT OF CPTW - CPN										from CMR.
	0000	0000	0000	0000	0000	0000	0000	0000	0000	
	0000	0000	0000	0000	0000	0000	0000	0000	0000	
	1141	1342	1406	1616	1672	1752	2072	2120	2163	
	5056	1115	6704	4124	5014	4315	7132	4576	5100	
	2400	4000	1000	1400	2000	2400	7000	0400	6000	
SNAP SHOT OF RTCL										
	0040	0040	0040	0040	0040	0040	0040	0040	0040	
	1551	1741	2131	2321	2511	2701	3071	3261	3451	Real time clock area
	0000	0000	0000	0000	0000	0000	0000	0000	0000	from CMR.
	0325	0362	0417	0455	0512	0547	0605	0642	0677	
	3020	5320	7620	2120	4420	6721	1220	3520	6020	
SNAP SHOT OF PDTL										
	0000	0000	0000	0000	0000	0000	0000	0000	0000	
	0000	0000	0000	0000	0000	0000	0000	0000	0000	Packed date/time
	1505	1505	1505	1505	1505	1505	1505	1505	1505	area from CMR.
	3127	3127	3127	3127	3200	3200	3200	3200	3200	
	6415	6615	7015	7214	0014	0215	0414	0615	1015	

Figure 15-1. Example of TRACER Output (Sheet 9 of 10)

```
    A C P D - VER  8.0          CDC NETWORK OPERATING SYSTEM.          NOS 2                        83/06/10. 14.06.15.  PAGE    30

    2  MINS  INTERVAL            00:18 HR    83/05/25  TO  83/05/26
                                (13) TOTAL  (14) *MAX*  (15) *MIN*

(12) FAST LOOP SAMPLES              94633
     PPUS ACTIVE            AV      5.539      7.708      4.236
                            SD      1.261      0.363      0.014
                            PC     27.693     38.538     21.180
     MOVE REQUEST PENDING   SD      0.001      0.001      0.000
                            PC      0.035      0.124      0.000
     NO PPU AVAILABLE       SD      0.000      0.000      0.000
                            PC      0.000      0.000      0.000
     EM TRANSFER IN PROG    SD      0.001      0.001      0.000
                            PC      0.125      0.209      0.048
     MTR CYCLE TIME         AV      0.392      0.436      0.364
                            SD      0.029      0.023      0.000
     MONITOR MODE - CPU 0   SD      0.020      0.013      0.002
                            PC      9.895     13.605      7.887
     MONITOR MODE - CPU 1   SD      0.000      0.000      0.000
                            PC      0.000      0.000      0.000
     SCHEDULER ACTIVE       SD      0.057      0.069      0.001
                            PC      9.248     19.136      5.067
     CHANNEL RESERVED
                 CH 12      SD      0.034      0.068      0.000
                            PC      1.250      6.898      0.038
                 CH 13      SD      0.168      0.275      0.003
                            PC     19.383     39.808      7.434
```

(12) These fast loop items are the remaining columns from sheet 4 of the example. Refer to note (6).

(13) The TOTAL column contains the total samples, average, standard deviation, and percentage for the entire ACPD run.

(14) The *MAX* column contains the maximum interval value for each row of preceding intervals for the entire ACPD run. Refer to note (7).

(15) The *MIN* column contains the minimum interval value for each row of preceding intervals for the entire ACPD run. Refer to note (8).

Figure 15-1. Example of TRACER Output (Sheet 10 of 10)

DATA ITEMS REPORTED BY TRACER

The data items reported by TRACER are described in the following paragraphs and are summarized in table 15-1. TRACER increments each item's counter when the item is in a given state, and periodically writes the contents of the counters to the data file for future processing by ACPD. When and how the counter for a given item is incremented is also discussed.

Table 15-1. Data Items (Sheet 1 of 2)

Fast Loop Items	Weighting Factor
Fast loop samples	None
PPs active	Number of PPs available
Move request pending	1†
No PP available	1
EM transfer in progress	1
MTR cycle time	100††
Monitor mode - CPU0	1
Monitor mode - CPU1	1
Scheduler active	1
Channel reserved	1
Channel active	1
Channel requested	1
Requests pending	100
Buffered I/O lists	Number of I/O buffers
Buffered I/O channel busy	1
CPU usage - CPU0	1
CPU usage - CPU1	1
Subsystem CPU usage	1

†The average value will not be reported if the weighting factor is 1.
††The percentage value will not be reported if the weighting factor is 100.

Table 15-1. Data Items (Sheet 2 of 2)

Medium Loop Items	Weighting Factor
Medium loop samples	None
CPS in W status	Number of control points
CPS in X status	Number of control points
CPS in I status	Number of control points
Same move request	1
FL available	Available field length (machine size - CMR size)
User EM available	Available user extended memory field length
Noninteractive jobs	Number of EJT entries
Detached jobs	Number of EJT entries
On-line jobs	Number of EJT entries
Preinitial job step	Number of EJT entries
Executing	Number of EJT entries
Scheduler rollout	Number of EJT entries
SCP rollin	Number of EJT entries
SCP rollout	Number of EJT entries
Timed/event rollout	Number of EJT entries
Interactive rollout	Number of EJT entries
Disabled rollout	Number of EJT entries
Suspended rollout	Number of EJT entries
Rollout file error	Number of EJT entries
EJT entries in use	Number of EJT entries
FL at control points	Available field length
FL in rollout queue	Available field length
EM memory at CP	User extended memory size/1000_8
EM in rollout queue	User extended memory size/1000_8
Subsystem FL	Available field length

Slow Loop Items	Weighting Factor
Slow loop samples	None
IAF users	Number of terminals defined
IAF pots allocated	100
IAF pots in use	IAF pots allocated
Queue files assigned	Number of QFT entries
Input files	Number of QFT entries
Print files	Number of QFT entries
Punch files	Number of QFT entries
Other queue files	Number of QFT entries
QFT entries in use	Number of QFT entries
Executive state count	100
Executive state time	100
Page table read	100
Segment table read	100
Tape drives in use	Number of available tape drives
Tracks available	Maximum number of tracks for monitored device

Fast Loop Items

The following paragraphs describe fast loop items. Fast loop items are continuously changing, so they should be sampled very frequently.

Fast Loop Samples

TRACER increments the fast loop samples counter each time the fast loop items are sampled.

PPs Active

TRACER increments the PP active counter for each active PP it finds when scanning the PP communication area. Disabled PPs (those turned off at deadstart time) are not considered active. An active PP is one that has a nonzero input register. MTR (PP0) and DSD (PP1) are always counted as active PPs.

Move Request Pending

TRACER increments the move request pending counter whenever it determines, from word CMCL of CMR, that a storage move request is outstanding.

No PP Available

TRACER increments the no PP available counter each time it determines, from word PPAL of CMR, that there are no PPs available.

EM Transfer in Progress

TRACER increments the extended memory transfer in progress counter whenever the S/C register (maintenance register for models 865 and 875) indicates an extended memory transfer is active. This data is available for CYBER 170 Computer Systems except models 176, 815, 825, 835, 845, and 855.

MTR Cycle Time

TRACER increments the MTR cycle time counter by the cycle time for the last MTR cycle. This item indicates how fast MTR is completing one complete scan of all PP output registers and processing those functions present.

Monitor Mode - CPU0

TRACER increments the monitor mode counter for CPU0 whenever the S/C register (maintenance register for models 865 and 875) indicates that the CPU0 is in monitor mode. This data is available for CYBER 170 Computer Systems except models 815, 825, 835, 845, and 855.

Monitor Mode - CPU1

TRACER increments the monitor mode counter for CPU1 whenever the S/C register (maintenance register for models 865 and 875) indicates that CPU1 is in monitor mode. This data is available for CYBER 170 Computer Systems except models 815, 825, 835, 845, and 855.

Scheduler Active

TRACER increments the scheduler active counter whenever it determines that the job scheduler (1SJ) is active. The job scheduler is considered active when the scheduler active flag in word JSCL is set.

Channel Reserved

TRACER maintains a channel reserved counter for each available channel and increments a counter whenever its channel is logically reserved by the operating system. TRACER samples the channel status table for this data.

Channel Active

TRACER maintains a channel active counter for each available channel and increments a counter whenever it detects that the channel is not inactive, as determined by an IJM PP instruction.

Channel Requested

TRACER maintains a channel requested counter for each available channel and increments a counter whenever there is an outstanding request for that channel. TRACER uses the channel status table to determine the channel requested status.

Requests Pending

TRACER maintains a request pending counter for each mass storage device available and increments a counter by the number of outstanding requests on that device when the sampling occurs. The MST provides this information.

Buffered I/O Lists

TRACER maintains a counter for each type of buffered I/O buffer list (Empty, Data Written, Read, Write). The number of buffers assigned to each list is incremented based on the buffered I/O data tables.

Buffered I/O Channel Busy

TRACER maintains a channel busy counter for each buffered I/O channel and increments a counter whenever a data transfer is in progess on that channel. TRACER uses the buffered I/O channel control table to determine the channel busy status.

CPU Usage

TRACER maintains a set of CPU usage counters for each CPU. There is a counter for each type of CPU use.

Counter	CPU Use
IDLE	CPU is not currently being used.
SYSTEM	CPU is being used by CPUMTR.
SUB-SYS	CPU is being used by a subsystem.
SYS ORG	CPU is being used by a system origin job (subsystems are not considered system origin).
USER	CPU is being used by a user program.

Each time the CPU status is sampled (in words CPAL and CPAL + 1 in CMR), TRACER increments one of the CPU usage counters. It determines which counter to update by investigating the control point area to which the CPU is assigned.

Subsystem CPU Usage

Subsystem CPU usage is a further breakdown of subsystems of the SUB-SYS CPU usage data. TRACER maintains a CPU usage counter for every subsystem. Whenever the SUB-SYS CPU usage counter is incremented, TRACER also increments the appropriate subsystem CPU usage counter.

Medium Loop Items

The following paragraphs describe medium loop items.

Medium Loop Samples

TRACER increments the medium loop samples counter each time the medium loop items are sampled.

CPS in W Status

TRACER increments the control points in waiting (W) status counter whenever a control point is found in W status (determined by STSW word of control point area). TRACER scans all control points during each medium loop cycle.

CPS in X Status

TRACER increments the control points in periodic or automatic recall (X) status counter whenever it finds a control point in X status (determined by STSW word of control point area). TRACER scans all control points during each medium loop cycle.

CPS in I Status

TRACER increments the control points in automatic recall (I) status counter whenever a control point is found in I status (determined by STSW word of control point area). TRACER scans all control points during each medium loop cycle.

Same Move Request

TRACER increments the same move request counter every time the move request pending for the current medium loop cycle is the same as the previous medium loop cycle. Word CMCL of CMR is used to determine this status.

FL Available

TRACER increments the FL available counter by the amount of available FL during the current medium loop cycle. Word ACML of CMR determines the available FL.

User EM Available

TRACER increments the user extended memory available counter by the amount of available user extended memory FL during the current medium loop cycle. Word AECL of CMR determines the available user extended memory FL.

Noninteractive Jobs

TRACER maintains a count of noninteractive jobs by monitoring the number of EJT entries with a connection status of NICS.

Detached Jobs

TRACER maintains a count of detached interactive jobs by monitoring the number of EJT entries with a connection status of DTCS.

On-Line Jobs

TRACER maintains a count of on-line jobs by monitoring the number of EJT entries with a connection status of OLCS.

Preinitial Job Step

TRACER maintains a count of preinitial jobs for each service class by monitoring the number of EJT entries with a job status of PRJS. A job is in this state after it has been assigned to an EJT entry but before it has been assigned to a control point for the first time.

Executing

TRACER maintains a count of executing jobs for each service class by monitoring the number of EJT entries with a job status of EXJS.

Scheduler Rollout

TRACER maintains a count of jobs rolled out by the job scheduler for each service class by monitoring the number of EJT entries with a job status of ROJS.

SCP Rollin

TRACER maintains a count of jobs rolled in by system control point processing for each service class by monitoring the number of EJT entries with a job status of SIJS.

SCP Rollout

TRACER maintains a count of jobs rolled out by system control point processing for each service class by monitoring the number of EJT entries with a job status of SOJS.

Timed/Event Rollout

TRACER maintains a count of jobs in a timed/event rollout queue for each service class by monitoring the number of EJT entries with a job status of TOJS.

Interactive Rollout

TRACER maintains a count of jobs rolled out by interactive input-output processing for each service class by monitoring the number of EJT entries with a job status of IOJS.

Disabled Rollout

TRACER maintains a count of disabled jobs rolled out for each service class by monitoring the number of EJT entries with a job status of DOJS.

Suspended Rollout

TRACER maintains a count of suspended jobs rolled out for each service class by monitoring the number of EJT entries with a job status of SUJS.

Rollout File Error

TRACER maintains a count of jobs with rollout file errors for each service class by monitoring the number of EJT entries with a job status of ERJS.

EJT Entries in Use

TRACER maintains a count of the number of EJT entries in use for all jobs during the specified time interval.

FL at Control Points

TRACER maintains an FL at control point counter for each service class. When an active control point is found, the service class is determined and the appropriate counter is incremented by the amount of FL assigned to that control point (determined by FLSW of control point area). TRACER scans all control points during the medium loop cycle.

FL in Rollout Queue

TRACER maintains an FL in rollout queue counter for each service class. When a rollout file is found in the queue, and it is not assigned to a control point, the amount of FL it will require (determined from the EJT) when it is rolled into a control point is added to the appropriate counter. TRACER scans all EJT entries during the medium loop cycle.

EM Memory at CP

TRACER maintains an extended memory at control point counter for each service class. When an active control point is found, the service class is determined and the appropriate counter is incremented by the amount of extended memory assigned to that control point (determined by ECSW of control point area). TRACER scans all control points during the medium loop cycle.

EM in Rollout Queue

TRACER maintains an extended memory in rollout queue counter for each service class. When a rollout file is found in the queue, and it is not assigned to a control point, the amount of extended memory FL it will require when rolled in (determined from the EJT) is added to the appropriate counter. TRACER scans all EJT entries during the medium loop cycle.

Subsystem FL

TRACER maintains a subsystem FL counter for every possible subsystem. When a subsystem is found at a control point, the amount of FL assigned to that subsystem is added to the appropriate counter. TRACER scans all control points during the medium loop cycle.

Slow Loop Items

The following paragraphs describe slow loop items.

Slow Loop Samples

TRACER increments the slow loop samples counter each time the slow loop items are sampled.

IAF Users

TRACER increments the IAF users counter by the number of users connected to IAF during the slow loop cycle. IAF must be active for this data to be collected. Word VANL of IAF FL determines the number of users.

IAF Pots Allocated

TRACER increments the pots allocated counter by the number of pots that are currently available for use, whether they are being used or not. Word VPAL of IAF FL determines the number of pots allocated.

IAF Pots in Use

TRACER increments the pots in use counter by the number of pots currently assigned to a connection. Word VPUL of IAF FL determines the number of pots in use.

Queue Files Assigned

TRACER maintains a count of the number of queued files assigned to control points by monitoring QFT entries.

Input Files

TRACER maintains a count of the number of input files for each service class by monitoring QFT entries.

Print Files

TRACER maintains a count of the number of print files for each service class by monitoring QFT entries.

Punch Files

TRACER maintains a count of the number of punch files for each service class by monitoring QFT entries.

Other Queue Files

TRACER maintains a count of the number of other queued files not assigned to control points for each service class by monitoring QFT entries. This includes any queued file that is not an input, print, or punch file.

QFT Entries in Use

TRACER maintains a count of the number of QFT entries in use for all jobs during the specified time interval.

Executive State Count

TRACER maintains a count of the number of times executive state was entered as reported by the appropriate maintenance register for models 815, 825, 835, 845, and 855. Executive state is used to perform compare and move unit (CMU) instructions on models that do not have a CMU.

Executive State Time

TRACER increments the executive state time counter by the executive state time reported by the appropriate maintenance register for models 815, 825, 835, 845, and 855.

Page Table Read

TRACER increments the page table read counter by the count reported by the appropriate maintenance register for models 815, 825, 835, 845, and 855.

Segment Table Read

TRACER increments the segment table read counter by the count reported by the appropriate maintenance register for models 815, 825, 835, 845, and 855.

Tape Drives in Use

TRACER maintains two tape drives in use counters; one for seven-track and one for nine-track drives. A tape drive is considered to be in use if an EST entry indicates it is logically turned on, and it is assigned to a job. TRACER increments the appropriate counter for each drive found in use.

Tracks Available

TRACER maintains a tracks available counter for each mass storage equipment and adds the number of available tracks (tracks not currently assigned to a file) for a device to the appropriate counter for each mass storage device found in the EST. TRACER obtains this information from TDGL of the MST.

Statistical Summary

The following paragraphs describe various statistics collected by TRACER.

Average Time in Executive State

TRACER reports the average time spent each time executive state is entered (executive state time divided by executive state count).

Page Map Hit Rate

TRACER reports the percentage of times that the page map contains the requested page table entry.

Segment Map Hit Rate

TRACER reports the percentage of times that the segment map contains the requested segment table entry.

MTR Maximum Time

TRACER reports the maximum time, in microseconds, that MTR waits for a CPU exchange to occur after being initiated by a monitor exchange jump (MXN).

Worst Case MTR Cycle Time

TRACER reports the maximum time, in milliseconds, that it takes MTR to make a complete cycle; processing all PP output register requests and performing its other system functions.

Extended Memory Moves

TRACER reports the number of storage moves of extended memory performed by CPUMTR.

Central Memory Moves

TRACER reports the number of storage moves of central memory performed by CPUMTR.

Rollouts

TRACER reports the number of jobs rolled out by the job rollout routine (1RO).

Sectors Rolled

TRACER reports the number of sectors of mass storage used by the job rollout routine (1RO) for rollouts.

Rollouts/User Limits

TRACER reports the number of jobs rolled out due to a time limit or SRU limit detected by the job scheduler (1SJ).

Time Slices

TRACER reports the number of jobs whose scheduling is set to the lower bound for its service class due to an expired CPU or CM time slice.

PP Priority Exchanges

TRACER reports the number of priority exchange requests issued by PPs. A priority exchange is issued after three unsuccessful attempts to perform a monitor exchange jump (MXN).

EJT Scans

TRACER reports the number of times the job scheduler (1SJ) scans the executing job table (EJT) to schedule a job to a control point.

Schedulable Jobs

TRACER reports the total number of schedulable jobs. This is determined by adding the number of schedulable jobs in EJT on each EJT scan.

Jobs Preempted

TRACER reports the number of jobs rolled out so the job scheduler (1SJ) could schedule a higher priority job.

Jobs Scheduled

TRACER reports the number of jobs scheduled to a control point.

Scheduled No Constraints

TRACER reports the number of jobs scheduled with no service class, central memory, or extended memory constraints imposed.

Insufficient CM Scans

TRACER reports the number of EJT scans for which a schedulable job was found, but could not be scheduled due to insufficient central memory.

Insufficient EM Scans

TRACER reports the number of EJT scans for which a schedulable job was found, but could not be scheduled due to insufficient extended memory.

No Control Point Scans

TRACER reports the number of EJT scans for which a schedulable job was found, but could not be scheduled because all control points were busy.

PROBE UTILITY

The PROBE utility measures the following:

- The number of times a PP routine was loaded.
- The number of CIO RA+1 requests by function number.
- The number of PP requests to CPUMTR by function number.
- The number of MTR requests to CPUMTR by function number.
- The statistical data accumulated in CMR includes such items as number of sectors rolled and number of rollouts.

PROBE data gathering is selectable at deadstart time by an IPRDECK entry. SYSEDIT resets the PROBE data tables to zeros.

The PROBE utility generates a report from the data collected by the system. PROBE analyzes data either from system tables or from a binary file containing data from a previous PROBE run. An IPRDECK entry ENABLE,PROBE. must be specified at deadstart time to allow the system to collect the data. (Refer to the NOS 2 Installation Handbook for more information.)

Format:

PROBE,p_1,p_2,...,p_n.

p_i	Description
B=readfile	Binary file to be read. Default is STATS.
L=outfile	Report file. Default is OUTPUT.
L=0	No report is to be generated.
LO=opt	Sort option for PP program load information. Default is F.

opt	Description
A	Sort data in alphabetic order.
F	Sort data by frequency of loads.
R	Sort data by location and frequency of loads.

p_i	Description
OP=opt	Processing option. Default is P.

opt	Description
C	Perform R option functions and clear system tables after they are read.
P	Generate report from binary file specified by the B parameter. This binary file has been created by a previous PROBE run with OP=C or OP=R specified.
R	Read system tables, and write binary file and report file as specified.

p_i	Description
P=writefile	Binary file to be written. Default is STATS.
P=0	No binary file is to be written.
R	Rewind binary files before and after operation. Default is no rewind.

NOTE

The file names must be unique. If the OP parameter is equal to R or C, the P parameter cannot be equal to zero.

Figure 15-2 is an example of the PROBE output file format.

PROBE VERSION 1.0. 83/06/15. 22.50.57. PAGE 1

PROBE VERSION 1.0	83/06/10.	10.38.01.
START OF SAMPLE INTERVAL	83/06/15.	07.21.25.
END OF SAMPLE INTERVAL	83/06/15.	22.50.57.

MONITOR REQUESTS

	PROGRAM MODE	MONITOR MODE	
	CPU0	CPU0	CPU1
AFAM(23)	0	9844	0
DLKM(24)	1	1	0
DTKM(25)	164914	225841	0
RTCM(26)	162640	162640	0
STBM(27)	0	254905	0
VMSM(30)	21230	21230	0
ACTM(31)	1886	27861	0
BFMM(32)	0	0	0
CKSM(33)	411	411	0
CSTM(34)	28414	28456	0
ECSM(35)	0	0	0
PIOM(36)	0	0	0
RDCM(37)	4687	4687	0
(40)	0	0	0
ABTM(41)	0	83	0
BIOM(42)	0	0	0
BMIM(43)	0	0	0
CCAM(44)	0	100989	0
CEFM(45)	0	47709	0
DCPM(46)	0	41738	2350
DEQM(47)	0	110233	0
DFMM(50)	0	48988	0
DPPM(51)	0	1737851	0
JACM(52)	0	128015	0
LDAM(53)	0	1409926	0
MTRM(54)	0	5908	0
PLFM(55)	0	91549	0
RCLM(56)	0	757232	0
RCPM(57)	0	46764	0
RECM(60)	0	488517	0
REQM(61)	0	110231	0
RLMM(62)	0	41015	0
ROCM(63)	0	18657	252
RPNM(64)	0	0	0
RPPM(65)	0	104712	241
RSJM(66)	0	21287	0
SCDM(67)	0	81263	0
SFBM(70)	0	83996	0
SJCM(71)	0	22338	0
SPLM(72)	0	1870458	0
TDAM(73)	0	6935	0
TGPM(74)	0	26821	0
TIOM(75)	0	14440	0
TSEM(76)	0	62391	0
UADM(77)	0	746592	0
UTEM(100)	0	1295751	0
VFPM(101)	0	38951	0
VSAM(102)	0	17546	0
(103)	0	0	0
(104)	0	0	0
SUBTOTAL		12051853	2843
TOTAL	384183		12054696

Figure 15-2. Example of PROBE Output (Sheet 1 of 7)

```
PROBE VERSION 1.0.                                    83/06/15. 22.50.57.  PAGE     2


    MTR REQUESTS

                   CPU0      CPU1
      ARTF( 1)    55772     55772
      IARF( 2)        0         0
      CSLF( 3)    42425         0
      RCLF( 4)  8477164   2198803
      MFLF( 5)    70927         4
      SCSF( 6)        0         0
      SMSF( 7)        0         0
      CMSF(10)        0         0
      PRQF(11)   477428         0
      ACSF(12)   130614   1805792
      PCXF(13)        4      1171
      ARMF(14)        0         0
      ----(15)        0         0
      MFEF(16)        0         0
    SUBTOTAL    9254334   4061542
    TOTAL      13315876


    PROGRAM MODE

                   CPU0
      MSTF( 1)    42425
      PDMF( 2)        0
      PMRF( 3)        0
      MECF( 4)        0
         TOTAL    42425


    MTR PERFORMANCE PARAMETERS
         WORST CASE *MXN* TIME =                     2572
         WORST CASE CYCLE TIME =                        6

    CPUMTR PERFORMANCE PARAMETERS
         NUMBER OF ECS STORAGE MOVES =                  0
         NUMBER OF CM STORAGE MOVES =               42582
    COMMUNICATIONS BUFFER NOT AVAILABLE =               0
    PP PRIORITY EXCHANGE REQUESTS =                  1798
    COUNT OF TIMES RECALL STACK FULL =                  0
    COUNT OF FL INCREASES FOR NEGATIVE FL =             0

    1RO PERFORMANCE PARAMETERS
         NUMBER OF ROLLOUTS =                       23467
         NUMBER OF SECTORS ROLLED =               3969679

    1SJ PERFORMANCE PARAMETERS
         COUNT OF ROLLOUTS FOR USER LIMITS =            6
         COUNT OF TIME SLICES =                      2045
```

Figure 15-2. Example of PROBE Output (Sheet 2 of 7)

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CIO REQUESTS

FUNCTION	CALLS	FUNCTION	CALLS
RPHR(000)	2522	READ(010)	168395
WRITE(014)	112896	READSKP(020)	51369
WRITER(024)	44425	WRITEF(034)	1436
BKSP(040)	1258	BKSPRU(044)	2
REWIND(050)	71609	UNLOAD(060)	658
RETURN(070)	39542	OPEN(100)	5054
OPEN(104)	644	EVICT(114)	2290
OPEN(120)	2948	CLOSE(130)	864
OPEN(140)	934	OPEN(144)	1251
CLOSE(150)	323	OPEN(160)	460
CLOSE(170)	1417	CLOSE(174)	485
READCW(200)	14071	WRITECW(204)	10823
READLS(210)	2018	REWRITE(214)	13226
REWRITER(224)	31332	RPHRLS(230)	57563
SKIPF(240)	10725	READNS(250)	472
READEI(600)	10600	SKIPB(640)	5430

TOTAL CIO FUNCTIONS PROCESSED 667042

Figure 15-2. Example of PROBE Output (Sheet 3 of 7)

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PPU PROGRAM LOADS

NAME	LOC	LOADS	NAME	LOC	LOADS
CPM	CMR	981662	3CK	DSK	6
1MS	CMR	542049	3DD	DSK	6
1MI	CMR	426390	3PC	DSK	6
4MB	CMR	293750	3TD	DSK	6
4MD	CMR	200623	3RJ	DSK	5
QAC	CMR	151692	3QY	DSK	4
3Q1	CMR	151692	3QZ	CMR	4
4ME	CMR	134598	4NC	DSK	4
1SJ	CMR	114580	0TD	DSK	3
4MC	CMR	110944	3SV	DSK	3
1AJ	CMR	107865	0CI	DSK	2
LFM	CMR	91217	2DB	DSK	2
3QU	CMR	85191	2RP	DSK	2
3AE	CMR	80235	3FA	DSK	2
RPV	CMR	70388	3ID	DSK	2
3QS	CMR	66483	4MH	DSK	2
3LB	CMR	61637	1RP	DSK	1
3SB	CMR	55786	2NY	DSK	1
1IO	CMR	55370	2SG	DSK	1
3NW	CMR	51005	3MB	DSK	1
TCS	CMR	50755	3MD	DSK	1
NDR	CMR	46897	3PL	DSK	1
3AB	DSK	46691	3SY	DSK	1
LDR	CMR	44820	3SZ	DSK	1
OBF	CMR	44756	3TA	DSK	1
3ME	CMR	42946	ADC	DSK	0
1MT	CMR	42945	BAT	DSK	0
SFM	DSK	39881	CPD	DSK	0
3SX	DSK	39420	CUX	DSK	0
QFM	DSK	33607	DDF	DSK	0
3CD	DSK	28804	DOG	DSK	0
1MA	CMR	26697	DS1	DSK	0
ODF	CMR	25277	ELM	DSK	0
1RI	CMR	23445	EYE	DSK	0
1RO	CMR	23438	FDP	DSK	0
3AF	CMR	19976	HFM	DSK	0
RHH	DSK	17093	IMS	DSK	0
3SC	CMR	16582	LIF	DSK	0
3RH	CMR	16321	MDD	DSK	0
3RP	CMR	16319	PIP	DSK	0
STD	DSK	16244	PNC	DSK	0
4SD	DSK	16243	SBP	DSK	0
3MF	CMR	16037	SLL	DSK	0
3LD	CMR	15359	SMP	DSK	0
PFM	CMR	9756	TMG	DSK	0
3MQ	CMR	9389	VEJ	DSK	0
3PI	CMR	8102	VER	DSK	0
3PA	CMR	7446	WRM	DSK	0
3LC	CMR	7084	XIS	DSK	0
TLX	CMR	6524	X26	DSK	0
3LE	CMR	5989	0IP	DSK	0
3QD	DSK	5971	0SI	DSK	0
1DD	CMR	5746	0TI	DSK	0
3QA	DSK	5461	0TJ	DSK	0

Figure 15-2. Example of PROBE Output (Sheet 4 of 7)

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3CR	CMR	5273	1FA	DSK	0
3CS	CMR	5273	1HP	DSK	0
3MJ	CMR	5253	1IE	DSK	0
1TO	CMR	5233	1IP	DSK	0
3AI	CMR	5181	1IS	DSK	0
2TO	CMR	5121	1LC	DSK	0
3PK	CMR	3998	1LT	CMR	0
7EP	CMR	3424	1MF	DSK	0
7SI	CMR	3423	1MR	DSK	0
7DI	CMR	3422	1PC	DSK	0
7EI	CMR	3422	1PD	DSK	0
7EM	CMR	3422	1PL	DSK	0
7EN	CMR	3422	1PR	DSK	0
7EO	CMR	3422	1RM	DSK	0
1CK	DSK	3373	1RU	DSK	0
3CB	CMR	2987	1TM	DSK	0
4MF	CMR	2986	1TN	DSK	0
2MA	DSK	2969	1TP	DSK	0
OAV	CMR	2889	1TS	DSK	0
LDQ	CMR	2511	1VP	DSK	0
ORP	CMR	2423	2IE	DSK	0
1TA	DSK	2418	2IM	DSK	0
ODQ	DSK	2078	2IN	DSK	0
3PD	CMR	2018	2IP	DSK	0
3PO	CMR	2018	2IQ	DSK	0
3AK	DSK	1810	2LD	DSK	0
OAU	DSK	1804	2MB	DSK	0
3AJ	DSK	1797	2ME	DSK	0
DSP	DSK	1794	2MF	DSK	0
3CC	DSK	1788	2MN	DSK	0
3AA	DSK	1785	2MR	DSK	0
3DA	DSK	1762	2NX	DSK	0
3DB	DSK	1760	2PT	DSK	0
3TC	DSK	1723	2PV	DSK	0
CVL	DSK	1634	2PX	DSK	0
OFA	CMR	1522	2RU	DSK	0
SFP	CMR	1433	2SB	DSK	0
1DL	CMR	1299	2SE	DSK	0
LDD	CMR	1289	2SI	DSK	0
2NW	DSK	1199	2TN	DSK	0
1DS	DSK	1088	3AG	DSK	0
PFU	DSK	1086	3AH	CMR	0
3NM	DSK	1033	3BB	DSK	0
2NR	DSK	1032	3BC	DSK	0
2MD	DSK	1001	3BD	DSK	0
3SA	DSK	881	3BE	DSK	0
CMS	DSK	865	3BF	DSK	0
4DB	DSK	865	3CA	DSK	0
4DD	DSK	865	3CE	DSK	0
3MI	CMR	749	3CV	DSK	0
3QC	DSK	717	3FB	DSK	0
3PH	DSK	678	3IC	DSK	0
3PG	DSK	668	3IM	DSK	0
3QW	DSK	625	3IN	DSK	0
3QX	DSK	623	3IP	DSK	0
3QO	DSK	623	3IQ	DSK	0
OVJ	DSK	562	3MA	DSK	0
OVU	DSK	562	3MK	CMR	0

Figure 15-2. Example of PROBE Output (Sheet 5 of 7)

4MA	CMR	509	3MM	DSK	0
MLD	DSK	489	3MR	CMR	0
9AA	DSK	462	3MU	DSK	0
1ML	DSK	461	3PN	DSK	0
3PB	CMR	459	3PP	DSK	0
9BA	CMR	458	3QR	DSK	0
9BB	CMR	458	3RF	DSK	0
9BC	CMR	458	3RU	DSK	0
9BD	DSK	458	4DF	DSK	0
2MC	DSK	423	4DI	DSK	0
3PE	DSK	418	4DJ	DSK	0
ORF	DSK	396	4DZ	DSK	0
3PM	DSK	383	4IM	DSK	0
3PF	DSK	381	4IP	DSK	0
9EA	DSK	369	4IQ	DSK	0
3TE	DSK	363	4MG	DSK	0
3MO	CMR	340	4NM	DSK	0
3TB	DSK	327	4RA	DSK	0
3RG	DSK	290	4RB	DSK	0
3ML	DSK	277	4RC	DSK	0
3MC	CMR	263	4RD	DSK	0
2NS	DSK	225	4RE	DSK	0
3MG	DSK	209	5BA	DSK	0
3PJ	DSK	204	5BB	DSK	0
3MP	CMR	191	5BC	DSK	0
SSH	DSK	173	5BD	DSK	0
3MH	DSK	162	5CU	DSK	0
3AM	DSK	134	5CV	DSK	0
3SW	DSK	134	5D1	DSK	0
3MT	DSK	100	5D2	DSK	0
6DI	CMR	81	5D3	DSK	0
2SH	DSK	80	5FF	DSK	0
3MN	DSK	75	5FH	DSK	0
NLD	DSK	72	5IA	DSK	0
T76	DSK	70	5IC	DSK	0
3MS	DSK	70	5ID	DSK	0
DIS	DSK	62	5IG	DSK	0
ORT	DSK	57	5IH	DSK	0
2SD	DSK	43	5LL	DSK	0
OPT	CMR	42	5ME	DSK	0
57X	DSK	37	5MR	DSK	0
2SC	DSK	36	5MS	DSK	0
3AC	DSK	36	5MT	DSK	0
2SA	DSK	34	5MU	DSK	0
3DC	DSK	28	5MW	DSK	0
QAP	DSK	24	5SU	DSK	0
2NQ	DSK	22	5SV	DSK	0
3AD	DSK	22	541	DSK	0
OPI	DSK	21	55X	DSK	0
3QB	DSK	20	56X	DSK	0
3QT	DSK	18	58F	DSK	0
3QV	DSK	18	58H	DSK	0
2DA	DSK	16	58X	DSK	0
1MB	DSK	15	7FI	CMR	0
1MP	CMR	15	7GI	CMR	0
3AL	DSK	13	7HI	CMR	0
3PQ	DSK	13	7SE	CMR	0
3BA	DSK	12	7WI	CMR	0

Figure 15-2. Example of PROBE Output (Sheet 6 of 7)

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     3BG     DSK        12            8XA     DSK        0
     1CD     DSK        11            8XB     DSK        0
     3IA     DSK        11            8XC     DSK        0
     3IB     DSK        11            9AD     CMR        0
     5IE     DSK        11            9A3     CMR        0
     3LA     DSK        10            9A4     CMR        0
     5LC     DSK        10            9A9     CMR        0
     9GA     DSK        10            9BH     CMR        0
     OST     DSK         9            9CA     DSK        0
     3RI     DSK         9            9JN     DSK        0
     2SF     DSK         8            9VA     DSK        0
     026     DSK         7            9WA     DSK        0
     4DA     DSK         7
     4DC     DSK         7
     4DG     DSK         7

     NUMBER OF ASR PROGRAMS =       0
     NUMBER OF CMR PROGRAMS =      94
     NUMBER OF DSK PROGRAMS =     273
     NUMBER OF PLD ENTRIES =      367
```

Figure 15-2. Example of PROBE Output (Sheet 7 of 7)

REMOTE HOST FACILITY UTILITIES 16

This section describes utilities that are related to the Remote Host Facility (RHF).

MAINTENANCE LOGGING TRANSFER FACILITY (MLTF)

MLTF is a utility program that controls logging NAD error logs into the binary maintenance log. At regular intervals MLTF maintains the network description file on disk, calls the NETLOG program, and rolls out after execution. The time interval is determined by an input parameter to MLTF (refer to the NOS 2 Operator/Analyst Handbook).

NETLOG uses the network configuration file to determine which remote NADs should be logged. Each time NETLOG runs it receives a copy of the network configuration file from RHF and saves the file on disk. If RHF is not active, NETLOG uses the saved copy of the network configuration file from disk to determine which NADs to log. Local NADs are always logged. For each NAD that is logged, NETLOG enters the NAD error log into the binary maintenance log.

The MLTF utility is started automatically by RHF when RHF is initialized. MLTF may also be started by using the ENABLE command. Refer to the NOS 2 Operator/Analyst Handbook. The mainframe identified as the maintenance host must have the MLTF utility running periodically even if RHF is not active.

DUMP NAD MEMORY (DMPNAD)

DMPNAD is a utility program that reads the NAD memory and formats the data into an output file. The dump is formatted so that each NAD word is printed in both hexadecimal and 7-bit ASCII code representations.

The format of the command is:

DMPNAD,p_1,p_2,...,p_n.

p_i	Description
AC=aaaa	Four-digit hexadecimal number specifying the remote NAD's access code (refer to NOS 2 Operator/Analyst Handbook). The default is AC=0000.
B=binfile	One- to seven-character name of the file on which the binary output is to be written. The default is no binary output file.
B	Same as B=BINOUT.
CH=cc	One- or two-digit octal number specifying the channel number of the local NAD defined in the EST entry associated with the NAD.
I=infile	One- to seven-character name of the file on which the binary input is written. The default is no binary input file.

Pi	Description
I	One as I=BININ.
L=outfile	One- to seven-character name of the file on which the list output is to be written. The default is L=OUTPUT.
LT=$t_0t_1t_2t_3$	Four-digit binary bit pattern specifying the TCUs that connect a local NAD to a remote NAD. t_n=1 enables TCU_n. For example, LT=1100 indicates that local TCUs 0 and 1 are enabled.
ND=nn	Two-digit hexadecimal number specifying the remote NAD's logical trunk address (refer to NOS 2 Operator/Analyst Handbook).

The DMPNAD utility can be called from the console or a batch job. The calling job must be system origin or the user must be validated for system origin privileges. You normally include the channel number on the DMPNAD command to specify which on-line NAD is to be dumped. The dump can also be saved as a binary output file (B parameter) which can later be formatted for printing by using the file as a binary input file (I parameter) and no access to the NAD is required. No special privileges are required when using the I parameter.

For a local NAD dump, DMPNAD can dump either a local NAD (380-170 NAD connected to the host mainframe using a channel and configured in the EST) or a remote NAD (any 380 NAD accessible to a local NAD using a loosely-coupled network trunk), The EST entry associated with the local NAD's channel number must be OFF or the controlware-not-loaded flag must be set. Since the local NAD dumping process stops all NAD activity, the NAD controlware must be reloaded using LOADBC (refer to the Controlware Loading Utility section) before the local NAD can be used by the operating system.

Remote NAD dumping is selected by specifying the remote NAD to be dumped (AC and ND parameters), the local NAD's channel number used to access the remote NAD (CH parameter), and the TCU used to connect the local NAD to the remote NAD (LT parameter). For remote NAD dumping, the local NAD must be loaded and running and its EST entry must be ON.

Remote NAD dumping operations can occur concurrently with RHF use of the local NAD. However, extreme care should be exercised when performing a remote NAD dump to ensure that the correct remote NAD is being dumped and that the remote NAD is not being used by the mainframe to which it is connected. After the remote NAD dumping operation, the NAD controlware must be reloaded into the remote NAD before it can be used by the remote mainframe.

RHF CONFIGURATION FILE GENERATION (RCFGEN)

The RCFGEN utility reads configuration definition statements to create a permanent file which RHF uses for the network description and proper access to the network. Refer to the NOS 2 Installation Handbook for additional information concerning the RCFGEN utility.

DIAGNOSTIC MESSAGES A

This appendix contains diagnostic messages issued by routines and utilities documented in this manual. Messages are listed alphabetically; leading nonalphanumeric characters are ignored for this purpose. Messages whose first character is a digit follow those at the end of the alphabet. Lowercase letters in a message indicate a variable field; such fields are explained in the accompanying message description. Messages beginning with a variable field are also listed alphabetically using the first nonvariable field.

For messages concerning system usage and accountability, refer to Account Dayfile Messages in section 5. These messages have a standard format that differs from the messages listed in this appendix.

If you encounter a diagnostic or informative message that does not appear in this appendix, consult the NOS Diagnostic Index. This publication catalogs all messages produced by NOS and its products and specifies the manual or manuals in which each message is fully documented.

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
ABORT RUN DUE TO ERRORS.	The ASVAL run aborted because of errors on the command.	Correct errors and retry.	ASVAL
jsn ABORTED - message.	Unauthorized or incorrect user program sent incorrect requests to MSSEXEC; message can be any of the following. - ALREADY CONNECTED - CARTRIDGE ACTIVE - INVALID ADDRESS - INVALID REQUEST CODE - INVALID REQUEST TYPE - MULTIPLE REQUESTS - MULTIPLE RUN - NOT CONNECTED - MSSEXEC IS CLOSED	Ensure that only authorized versions of the utilities are used.	EXUCP
jsn ABORTED - UTILITY CONFLICT.	ASVAL, ASLABEL, and ASDEBUG are mutually exclusive utilities. Only one copy of ASMOVE per family can be run at a time.	Rerun the aborted utility after the other one has terminated.	EXUCP
ACCESS LEVEL LIMITS OUT OF RANGE.	The access level limits specified in a QDUMP or QLOAD command are not within the system access level limits.	Reenter the command with access level limits that are within the system access level limits.	QFSP
ACCESS LEVEL OUT OF RANGE.	The access level limits you specified in a PFDUMP, PFLOAD, or PFCOPY command are not within the system access level limits.	Reenter the command with access level limits that are within the system access level limits.	PFS
****ACCESS LEVEL OUT OF RANGE.	K display message indicating the selected access level is not within system limits.	Correct and retry.	QREC QLOAD QDUMP QMOVE QFTLIST QALTER
ACCESSED AFTER yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files accessed after the specified date and time have been loaded (or dumped).	None.	PFDUMP PFLOAD
ACCESSED AFTER yy/mm/dd.hh.mm.ss. BEFORE yy/mm/dd.hh.mm.ss.	Informative output file message indicating that files accessed in the specified interval have been loaded (or dumped).	None.	PFDUMP PFLOAD
ACCESSED BEFORE yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files accessed before the specified date and time have been loaded (or dumped).	None.	PFDUMP PFLOAD
ACCOUNT DAYFILE PROCESSED.	The account dayfile dump is complete.	None.	DAYFILE
ACPD ARGUMENT - xx.	The xx parameter in the ACPD command is either undefined or is an incorrect value.	Enter a correct value and retry.	ACPD
ACPD COMPLETE.	ACPD analysis completed.	None.	ACPD
ACPD CONTROL STATEMENT ERROR.	Error detected in ACPD command syntax.	Correct command and retry.	ACPD
ACPD/CPD VERSION MISMATCH.	The version of CPD that created the data file is not the same version of ACPD that is currently processing the data file.	Use the correct version of CPD to process the data file.	ACPD
ACTIVE FILES ON DEVICE.	Device initialization was attempted on a device with activated fast-attach files.	Use the R option on the ISF command to release these files.	MSI
ACTIVE LOAD NOT ALLOWED.	The load is not allowed because the device selected to receive active queues is removable.	Select another device and retry the load.	QLOAD
ADDCUBE - ONLY 100 LOCATIONS PROCESSED.	At most 100 cubicles can be added. The coordinate pairs specified by the XI and YI parameters encompass more than 100 cubicles.	Use multiple AB directives.	ASLABEL
AFD - ARGUMENT ERROR.	Keyword specified is not recognizable or command is not properly formatted.	Check keyword and command formats.	DAYFILE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
AFD - BUFFER TOO SMALL.	The buffer DAYFILE used to hold the central memory dayfile buffer is not large enough.	Either make the internal DAYFILE buffer larger or specify a smaller dayfile buffer during deadstart.	DAYFILE
AFD - DATA LOST.	A data read error occurred while processing an active dayfile. Processing continues with the next readable message. Lost data is not recoverable.	Inform site analyst.	DAYFILE
AFD - FR INVALID FOR THIS OPTION.	The FR=string parameter is not allowed with this utility.	Use an appropriate option or omit the FR=string parameter and retry.	DAYFILE
AFD - ILLEGAL PAGE SIZE FORMAT.	The page size value is nonnumeric.	Retry with a numeric value.	DAYFILE
AFD - ILLEGAL PRINT DENSITY.	The print density value is not 3, 4, 6, or 8.	Retry with a valid print density.	DAYFILE
AFD - ILLEGAL PRINT DENSITY FORMAT.	The print density value is nonnumeric. Print density must be 3, 4, 6, or 8.	Retry with a valid print density.	DAYFILE
AFD - RESERVED FILE NAME.	The file name specified for the L=filename parameter is a reserved name.	Retry using a nonreserved name.	DAYFILE
AFD - UNABLE TO ACCESS DAYFILE.	Dayfile message indicating that an unexpected error was encountered.	Inform site analyst.	DAYFILE
AFD - UNEXPECTED EOF/EOI ENCOUNTERED.	An EOF or EOI was encountered before the PRU count was depleted on the input file. The dayfile is shorter than expected based on the PRU count.	Retry operation.	DAYFILE
AFD - UNKNOWN *OP* FIELD.	The option specified is not valid.	Retry using a valid option.	DAYFILE
ALL FILES FOR USER INDEX userindex.	Informative output file message indicating that all files with user index userindex have been loaded (or dumped).	None.	PFLOAD PFDUMP
ALTERING FLAW MAP S/N=serialn.	Console message indicating that the utility flaw map is undergoing modification. Here serialn is the actual pack serial number as read from the manufacturing data recorded in cylinder 6328 (or 1466B), track 0, sector 0.	None.	FORMAT
ALTERNATE FILE ACTIVE.	Output file message indicating that the alternate file was already being processed when entry of the OUTPUT directive was attempted.	Wait until processing is complete to enter the OUTPUT directive.	DSDI
ALTERNATE IMAGE OBSOLETE.	The disk space for the file cannot be released because the alternate storage image is labeled obsolete or the alternate storage address is not specified in the permanent file catalog.	Inform site analyst.	PFM
ALTERNATE OUTPUT TO TERMINAL ILLEGAL.	Output file message indicating that the file name OUTPUT was specified on the OUTPUT directive entered from a terminal. Alternate list output cannot be assigned to the terminal.	Specify a file name other than OUTPUT on the OUTPUT directive when it is entered from a terminal.	DSDI
ALTERNATE STORAGE ERROR.	The disk space for the file cannot be released because a permanent error status is set for the alternate storage file copy.	Inform site analyst.	PFM
ARGUMENT ERROR.	Dayfile message indicating that the parameter list on the ISF entry contained an incorrect parameter.	Repeat the ISF entry with the correct parameter list.	ISF
ARGUMENT ERROR.	Error detected in ICPD command syntax.	Correct command and retry.	ICPD
ASDEBUG ABNORMAL, xxx.	There is an ASDEBUG internal error in module xxx.	Submit a Programming System Report (PSR) with supporting material.	ASDEBUG

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
ASDEBUG COMPLETE.	Informative message indicating that ASDEBUG completed normally.	None.	ASDEBUG
ASDEBUG ERROR xxx. DIRECTIVE yyy.	First two lines of a three-line message indicating that error xxx was encountered during the processing of directive yyy. The third line of the message gives more details about the error.	Refer to the ASDEBUG report file for a copy of the directive. Refer to the message given in the third line for more information about appropriate action to be taken.	ASDEBUG
ASDEBUG, NO DIRECTIVES.	The directive file is empty or not rewound.	Add a directive to the file or rewind the directive file.	ASDEBUG
ASDEF ABNORMAL, xxx.	There is an ASDEF internal error in module xxx.	Submit a Programming System Report (PSR) with supporting material.	ASDEF
ASDEF ABORT - ILLEGAL CS VALUE.	The CS parameter on the ASDEF command was not a letter from A through M.	Correct CS parameter and retry.	ASDEF
ASDEF ABORT - NO PARAMETER SPECIFIED.	Neither the CS nor the FM parameter was specified on the ASDEF command.	Specify at least one CS or FM parameter.	ASDEF
ASDEF ABORT - SYNTAX ERROR.	The ASDEF command is syntactically incorrect.	Correct the parameters on the command and retry.	ASDEF
ASDEF COMPLETE.	Informative message indicating that ASDEF completed normally.	None.	ASDEF
ASDEF ERRORS.	Informative message indicating that ASDEF completed normally with the errors reported in the dayfile.	None.	ASDEF
ASLABEL ABNORMAL, xxx.	There is an ASLABEL internal error in module xxx.	Submit a Programming System Report (PSR) with supporting material.	ASLABEL
ASLABEL COMPLETE.	Informative message indicating that ASLABEL completed normally.	None.	ASLABEL
ASLABEL ERROR xxx. DIRECTIVE yyy.	First two lines of a three-line message indicating that error xxx was encountered during the processing of directive yyy. The third line of the message gives more details about the error.	Refer to the ASLABEL report file for a copy of the directive. Refer to the message given in the third line for more information about appropriate action to be taken.	ASLABEL
ASLABEL - NO DIRECTIVES.	The directive file is empty or not rewound.	Add a directive to the file or rewind the directive file.	ASLABEL
ASMOVE ABNORMAL, xxx.	There is an ASMOVE internal error in module xxx.	Submit a Programming System Report (PSR) with supporting material.	ASMOVE
ASMOVE COMPLETE.	Informative message indicating that ASMOVE completed normally.	None.	ASMOVE
ASMOVE - SYNTAX ERROR.	The ASMOVE command is syntactically incorrect.	Correct the parameters on the command and retry.	ASMOVE
ASSIGNED FILE CONFLICT - SDF.	A local file named SDF is assigned at the control point. SDF is a reserved file name.	Rename the local file.	1IS
ASSIGNED TTYS GREATER THAN (NT).	Nonfatal K display message indicating that the number of terminals assigned to sessions is greater than the number of terminals being stimulated.	Reduce the number of terminals assigned by using the MX entry.	STIMULA
AST CORRECTION. DESTAGE DELAYED, FM=familyname, SF=subfamily, CSU=id.	An error with the AST was corrected. The destage of the affected file will be automatically restarted.	None.	EXDEST

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
AST SUBSTITUTED. PFN=filename, FAMILY=familyname, UI=userindex. SUBCATALOG CSU ID=id.	The AST was rebuilt because it no longer matched the FCT.	None.	EXINIT
ASUSE ABNORMAL, xxx.	There is an ASUSE internal error in module xxx.	Inform site analyst.	ASUSE
ASUSE COMPLETE.	Informative message indicating that ASUSE completed normally.	None.	ASUSE
ASUSE - SYNTAX ERROR.	The ASUSE command is syntactically incorrect.	Correct command and retry.	ASUSE
ASVAL ABNORMAL, xxx.	There is an ASVAL internal error in module xxx.	Inform site analyst.	ASVAL
ASVAL COMPLETED.	Informative message indicating that ASVAL completed normally.	None.	ASVAL
ATTACH ERROR ON filename.	MSSEXEC was unable to attach file filename.	Ensure that the file is direct access and not in use, and then retry.	ASDEBUG
ATTACH ERROR ON MSF CSUMAP. PFN=filename, FAMILY=familyname, UI=userindex.	System error.	Recover or create the missing CSU map.	EXINIT
ATTACH ERROR ON MSF SUBFAMILY CATALOG. PFN=filename, FAMILY=familyname, UI=userindex.	At least one but fewer than eight subfamily catalogs exist for the family familyname.	Recover the missing catalogs.	EXINIT
AUTOMATIC NAME ASSIGNMENT IMPOSSIBLE.	DFTERM was unable to determine an available name for the terminated dayfile.	Enter a valid name for the file using the K display. Use the NM directive to override automatic name assignment.	DFTERM
BAD CATALOG/PERMIT SECTOR.	PFM has encountered a catalog or permit sector which does not have a valid sector length.	Inform site analyst.	PFM
BAD DUMP FILE.	Dump cannot be written on the specified file.	Request another dump file.	QDUMP
BAD SYSTEM POINTER.	Output file message indicating that a bad system pointer was detected in the EDD file during processing of an input directive.	Ensure that the dump file contains meaningful information (can use P option on DSDI to cause use of CMR pointers from running system) and rerun.	DSDI
BLOCK SEQUENCE MISMATCH. filename STAGING ERROR, JSN=jsn, FM=familyname, UI=userindex, CSU=id, MST=n, VSN=vsn, ASA=addr, STRM=s.	The staging of file filename was aborted because of a block sequence error, which was detected during the stream label verification procedure or the file label verification procedure. All jobs attempting to attach this file will be aborted or given an error response. The stream conflict error flag is set in the MSF catalog entry for the affected cartridge and stream.	Retrieve the file from a dump tape if a backup copy is available. Run ASVAL to identify other files, if any, that are affected by this error. Either remove and reassign the cartridge or run ASDEBUG to clear the stream conflict error flag. Refer to Error Conditions and Corrective Action section.	EXSTGE
BOTH FAMILY AND PACK NAME.	Familyname and packname cannot both be specified.	Correct error and retry.	PFS
BT/BD NOT FOUND.	The beginning date and/or beginning time is greater than the time of the last record on the data file.	Correct BT/BD parameters and retry.	ACPD
BUFFER ARGUMENT ERROR.	One of the FET pointers is outside the caller's field length.	Examine program to determine error.	LOADBC 1LC

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
BUFFER LENGTH TOO SHORT.	An internal error indicting that the length of the buffer to contain the decoded data is too short.	Inform site analyst.	ACPD
BUFFER SIZE TOO SMALL FOR DUMP FILE RECORD x.	Record x is too large to be read into the allocated buffer space. The NPU dump file is bad.	Correct error and try again.	NDA
**** CANNOT ALTER XD/XT OF *CSAP*.	You have security administrator privileges and you attempted to specify an expiration date or term for your interactive or batch password.	None.	MODVAL
CANNOT ATTACH *IQFT* FILE.	An attempt to attach the IQFT file on the destination device failed.	Check for other utilities accessing the file. When the file is free, retry the load operation.	QLOAD
CANNOT CATLIST FAMILY/PACK-fampck.	DFTERM was unable to perform a CATLIST operation on the familyname/pack fampck.	Ensure that catalogs exist on the familyname/pack and retry the operation.	DFLIST DFTERM
**** CANNOT DELETE *CSAP* PRIVILEGE.	You attempted to delete your security administrator privilege while executing MODVAL.	None.	MODVAL
**** CANNOT DELETE USER RUNNING MODVAL.	You attempted to delete your user name from the VALIDUS file while executing MODVAL.	None.	MODVAL
CANNOT FIX VSN FOR GOOD LABEL.	The cartridge specified in the FX directive to ASLABEL already has a good label.	Add or restore the cartridge to the CSU.	ASLABEL
CANNOT LOCATE START ADDRESS.	Indicates the record containing the beginning NPU address on the NDA call cannot be found.	Correct error and try again.	NDA
CARTRIDGE NOT ASSIGNED AS EXPECTED.	One of the cartridges specified has a vsn that does not allow the assignment or removal specified by a directive to ASLABEL.	Correct directive to ASLABEL and retry.	ASLABEL
CARTRIDGE NOT EMPTY, vsn.	The cartridge, whose volume serial number is vsn, cannot be removed because it still contains file data.	None.	ASLABEL
CARTRIDGE NOT FOUND.	The cartridge is not in its assigned cubicle.	Locate and restore the missing cartridge or change the directive to ASLABEL or ASDEBUG to select a different cartridge.	ASLABEL ASDEBUG
CARTRIDGE PRESENT - LOST BIT SET.	The lost (LT) option was specified on the RM directive to ASLABEL, but the cartridge is physically present.	Clear the lost flag in the MSF catalog.	ASLABEL
CATALOG COMPLETE.	Informative message indicating that catalog processing is complete.	None.	CATALOG MODVAL PFATC
CATALOG FORMAT ERROR.	An attempt was made to catalog a permanent file device which was created on a system whose permanent file catalog format is different from that used by the currently running system.	Dump and reload the affected device.	PFCAT
CATALOG INDEX OUT OF RANGE.	Location of catalog entry is not in buffer range.	Inform site analyst.	PFDUMP
CATALOG LOST BIT MUST BE SET.	The lost (LT) option was specified on the RM directive to ASLABEL, but the cartridge is not known to be lost.	Correct directive and retry.	ASLABEL
CATALOG/MAP FILE INTERLOCKED.	Another utility is using the CSU map or MSF catalog required to process the directive to ASLABEL.	Rerun at a later time.	ASLABEL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
CATALOG/MAP INTERLOCKED.	Another utility is using the CSU map or MSF catalog required to process the directive to ASDEBUG.	Rerun at a later time.	ASDEBUG
CATALOG/MAP NOT OPEN.	The CSU map or MSF catalog was created after the last initialization of MSSEXEC.	Idle down and restart MSSEXEC before rerunning the directive to ASDEBUG.	ASDEBUG
CATALOG/MAP NOT OPENED.	The CSU map or MSF catalog was created after the last initialization of MSSEXEC.	Idle down and restart MSSEXEC before rerunning the directive to ASLABEL.	ASLABEL
CATALOG MISSING FOR FAMILY familyname. UNABLE TO PROCESS MOVE REQUEST FILE.	ASMOVE was run on the family familyname that has no MSF catalogs.	Correct the FM parameter and rerun ASMOVE.	EXUCP
CATALOGING filename userindex.	Informative K display message indicating which file and user index are being cataloged by PFATC or PFCAT.	None.	PFATC PFCAT
CATALOGING COMPLETED.	Informative message indicating that cataloging is complete.	None.	PFCAT
CATALOGS MODIFIED.	Informative message indicating that ASVAL repaired the MSF catalogs.	None.	ASVAL
CATALOGS NOT MODIFIED.	Informative message indicating that ASVAL did not repair any MSF catalogs.	None.	ASVAL
CHcc,ABORT,ALL DATA NOT TAKEN.	The controller did not accept all the data on an attempt to download controlware.	Inform customer engineer.	LOADBC
CHcc,ABORT,Fffff.	Function ffff timed out while accessing the controller.	Inform customer engineer.	LOADBC
CHcc,ABORT,NO GENERAL STATUS.	After a download of controlware completed, the controller did not return a general status word after a status function.	Inform customer engineer.	LOADBC
CHcc,ABORT,Snnnn.	An error in the general status of the controller occurred after the controlware was loaded. cc Channel on which controlware was loaded. nnnn General status of the controller.	Inform customer engineer.	LOADBC
CHcc,MAttt,Avv,LOAD COMPLETE.	Informative message indicating that the controlware was successfully loaded. cc Channel on which disk controlware was downloaded. ttt Controlware type (401, 710, or 721).. vv Version number (12, 13, 14, ...).	None.	LOADBC
CHANNEL NUMBER ARGUMENT ERROR.	The ARG common deck routine reported an error in the channel number supplied on the LOADBC command.	Check the C=cc parameter and retry.	LOADBC
CHANNEL 36 NOT ACTIVE.	HFM was called to perform a function on S/C register channel 36 while the mainframe has only 1 S/C register.	Inform site analyst.	HFM
**** CHARGE NUMBER ACTIVE.	The user has attempted to activate an already active charge number.	Rerun using correct charge number or directive, if necessary.	PROFILE
**** CHARGE NUMBER DOES NOT EXIST.	A directive for which the charge number must exist has made a reference to a charge number that does not exist.	Rerun using the correct charge number.	PROFILE
**** CHARGE NUMBER INACTIVE.	A directive for which the charge number must be active made a reference to a charge number that is inactive.	Activate charge number and rerun, or rerun using correct charge number.	PROFILE
CHECK DAYFILE FOR ERRORS.	Informative message indicating that you should check the dayfile for errors.	Examine error messages in dayfile.	COPY PFATC PFCAT PFCOPY PFDUMP PFLOAD TCOPY

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
CHECK OUTPUT FOR WARNING MESSAGES.	No directive errors were encountered, but certain input directives (on create or update) received warning messages.	Check output listing.	MODVAL
CIO ERROR.	A parity error was encountered while file MOVCOM was being written.	Purge MOVCOM.	ASMOVE
CIO ERROR ON MSF CSUMAP. PFN=filename, FAMILY=familyname, UI=userindex.	A CIO error was encountered while the CSU map was being read.	Investigate cause of error and take appropriate action.	EXINIT
CKLAB - ABNORMAL TERMINATION.	The label from stream zero contains the wrong stream number.	Restore label with the FX directive to ASLABEL.	ASLABEL
CLEAR ALTERNATE STORAGE INFORMATION.	Informative output file message indicating that the alternate storage address field in the PFC will be cleared for all files loaded, and no PFC only files will be loaded. (OP=Z selected)	None.	PFLOAD
CLEARING PF ACTIVITY COUNT.	PFDUMP or PFCAT is waiting for PFU to decrement the permanent file device activity count because catalog processing has been completed. This message should be displayed for a few seconds only.	Inform site analyst if message is displayed for an extended period of time.	PFCAT PFDUMP
CLEARING UTILITY INTERLOCK.	PFLOAD is waiting for PFU to clear the permanent file utility interlock on a device after it is loaded. This message should be displayed for a few seconds only.	Inform site analyst if message is displayed for an extended period of time.	PFLOAD
CM RECORD NOT FOUND.	Dayfile and output file message indicating that the central memory record was not found in the EDD file.	Ensure that the dump file contains meaningful information and is positioned correctly.	DSDI
COMMUNICATION FILE BUSY.	The communication file MOVCOM is busy.	Rerun ASMOVE when MOVCOM is no longer busy.	ASMOVE
COMMUNICATION FILE NOT PROCESSED.	MSSEXEC was unable to process the communication file MOVCOM.	Check the MSSEXEC dayfile for the reason MOVCOM was not processed.	ASMOVE
CONNECT TO EXEC FAILED.	ASVAL is not running at full capacity because MSSEXEC is not running. No MSS release processing or catalog repair processing is done but a validation report is produced.	None.	ASVAL
CONTROL CARD ARGUMENT ERROR.	Dayfile message indicating that incorrect command arguments have been encountered.	Correct and retry operation.	QFSP
CONTROL CARD OPTION MISMATCH.	OP parameter R or C was specified without a P parameter being specified.	Correct parameter and retry.	PROBE
CONTROL CARD SYNTAX ERROR.	The syntax in the ASVAL command is incorrect.	Correct errors and retry.	ASVAL
CONTROLLER DID NOT TAKE ALL THE CONTROLWARE.	The controller did not accept all the data in the controlware record. The contents of a register did not equal zero after one of the OAM instructions in the PP.	Inform customer engineer.	LOADBC
CONTROLWARE LOAD ABORT, C=cc.	First line of a two-line message indicating that controlware was not successfully loaded on channel cc. The second line of the message indicates the reason for the abort.	Refer to the message given in the second line for information about appropriate action to be taken.	LOADBC
CONTROLWARE LOAD COMPLETE. yyyFIRMWARE MAttt-vvv,C=cc.	Informative message indicating that the controlware was successfully loaded. yyy Controller type. ttt Controlware type. vvv Version number. cc Channel number.	None.	LOADBC
CONTROLWARE NOT FOUND.	Either the file (system file by default or F=filename) does not contain the requested controlware, or F=0 was specified.	Check that the file being used contains the correct controlware.	LOADBC

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
CONVERSION ERROR.	The SU and/or SL parameter on the ASUSE command was not numeric.	Correct parameter and retry.	ASUSE
CONVERSION ERROR.	The parameter given to SCRSIM contained one of the following errors: - A character was detected after the postradix. - An 8 or a 9 was detected when a postradix of B was specified.	Correct and reenter.	SCRSIM
CONVERSION TO SOURCE COMPLETE.	Dayfile message indicating that source run successfully completed.	None.	MODVAL
COPYING filename userindex.	Informative message indicating that file filename with user index userindex is being copied.	None.	PFCOPY
COPYING DUMP TO RANDOM FILE.	DSDI is creating a random dump file from the EDD tape during initialization.	None.	DSDI
COPYING SESSION DATA TO OUTPUT	DEMUX is copying the translated session output from the scratch file to the selected OUTPUT file.	None.	DEMUX
CPD/ACPD VERSIONS MISMATCH.	CPD and ACPD versions are not compatible.	Use compatible versions of CPD and ACPD.	ACPD
CPD - FILE NOT FOUND.	CPD could not find the specified data file.	Inform site analyst.	CPD
CPD - FILE STATUS ERROR.	One of the following conditions existed regarding the specified data file. - The file is not assigned to mass storage. - The file is empty (no mass storage space assigned). - The file is busy, or is not a PMFT type. - The file resides on an auxiliary removable device.	Inform site analyst.	CPD
CPD - ILLEGAL USER ACCESS.	The calling program did not have system origin privileges.	None.	CPD
CPD - INITIATED.	An informative message indicating that system monitoring has begun.	None.	CPD
CPD NOT ACTIVE.	An informative message indicating that ENDCPD was called when CPD was not active.	None.	ICPD
CPD - PARAMETER ERROR.	The specified parameter address was incorrect.	Ensure that CPD was called correctly.	CPD
CPD - TERMINATED.	An informative message indicating that system monitoring is complete.	None.	CPD
CPD - TRACK LIMIT.	An informative message indicating that the track is not assigned.	None.	CPD
CPU SECONDS = xxx. CPU PERCENT = xx.x. FL CHANGES = xxx. MAXIMUM FL = xxx. OVERLAY LOADS = xxx. FILES STAGED = xxx.	Informative messages, issued when MSSEXEC terminates, which report MSS statistics.	None.	EXINIT
CREATED AFTER yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files created after the specified date and time have been loaded (or dumped).	None.	PFLOAD PFDUMP
CREATED AFTER yy/mm/dd. hh.mm.ss BEFORE yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files created in the specified interval have been loaded (or dumped).	None.	PFDUMP PFLOAD
CREATED BEFORE yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files created before the specified date and time have been loaded (or dumped).	None.	PFLOAD PFDUMP
CREATING username.	Message displayed at line 1 of control point indicating that the username is being created.	None.	MODVAL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
CREATING CATALOG IMAGE RECORD.	Informs operator that the catalog image record from the archive file is being copied to a scratch file.	None.	PFLOAD
CREATION COMPLETE.	Dayfile message indicating that creation run successfully completed.	None.	MODVAL
CREATION DATE MISMATCH. filename STAGING ERROR, JSN=jsn, FM=familyname, UI=userindex, CSU=id, MST=n, VSN=vsn, ASA=addr, STRM=s.	The staging of file filename was aborted because the file's creation date and time in the PFC entry on disk did not agree with the PFC entry on MSF. All jobs attempting to attach this file will be aborted or given an error response. The stream conflict error flag is set in the MSF Catalog entry for the affected cartridge and stream.	Retrieve the file from a dump tape if a backup copy is available. Run ASVAL to identify other files, if any, that are affected by this error. Either remove and reassign the cartridge or run ASDEBUG to clear the stream conflict error flag. Refer to Error Conditions and Corrective Action in section 3.	EXSTGE
CSMAPx CLOSED.	The CSU map CSMAPx is closed. A preceding message indicates why the CSU map is closed.	Inform site analyst.	MAPACC
CSU ALREADY DEFINED.	The CSU to be added to the subfamily has already been added to that subfamily.	Add a different CSU.	ASLABEL
CSU EST ERROR est. DESTAGE RESTARTED.	A file destage operation was restarted although a CSU EST entry (est) was incorrect.	Check the indicated EST entry for the CSU.	EXDEST
CSU id INPUT DRAWER EMPTY.	A cartridge is needed from the input drawer of the cartridge storage unit (CSU id) to process the directive to ASLABEL or ASDEBUG. id CSU identifier (A through M).	Put the required cartridge into the input drawer.	ASLABEL ASDEBUG
CSU id OUTPUT DRAWER NOT EMPTY.	An empty slot in the output drawer of the cartridge storage unit (CSU id) is needed to process the directive to ASLABEL or ASDEBUG. id CSU identifier (A through M).	Remove cartridges from the output drawer.	ASLABEL ASDEBUG
CSUMAP ERROR FLAG NOT SET IN FCT.	The RL directive to ASDEBUG did not remove the FCT entry in the MSF Catalog because the CSU map error flag was not set in the FCT entry.	Correct the FCT ordinal and the SB and CS parameters and retry.	ASDEBUG
CSUMAP OPEN ERROR.	The CSU map does not exist or is incorrect for the specified CSU on the NOS default familyname.	Correct the CS parameter on the ASVAL command or reload/ recreate the CSU map.	ASVAL
CSUMAP PARITY ERROR.	There is a read parity error on the CSU map.	Recover the CSU map from a backup copy and retry.	ASUSE
CSUMAP READ ERROR.	A parity error was encountered on the CSU map.	Recover the CSU map from a back copy and retry.	ASVAL
CUBE EMPTY - CSUMAP ENTRY REMOVED.	Informative message indicating that the cubicle corresponding to the CSUMAP entry being removed with an RC directive was empty.	None.	ASDEBUG
CUBES ASSIGNED TO SUB-FAMILY.	The CSU cannot be removed from the subfamily because it contains cubicles that are still assigned to the subfamily.	Correct the RC directive to ASLABEL.	ASLABEL
CYCLE STILL PROCESSING.	Dayfile message indicating that a command other than END. was entered before the total time limit was reached.	Wait until processing is complete before entering commands other than END.	SCRSIM
DATA BASE ERROR.	The system has detected an error in its validation file.	Contact installation personnel.	CHARGE
DATA BASE ERROR n - NOTIFY ANALYST.	System error dayfile message indicating that an abnormal situation exists. n is displayed for consideration by the analyst. The internal documentation, obtained by using the DOCMENT command, contains an explanation of each error n for use by the analyst. (Refer to the NOS 2 Reference Set, Volume 3 for a description of DOCMENT.)	Inform site analyst.	PROFILE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DATA BLOCKS MISSING.	Expected data blocks following a header record were not found.	Regenerate the data file.	ACPD
DATA ELEMENT NAME UNDEFINED - element.	The data name element is not defined in the common deck COMSCPD.	Check the program ACPD and common deck COMSCPD to see if the name element is being referenced correctly.	ACPD
DATA FILE CONTENT ERROR.	Data file is not in the expected format.	Regenerate the data file.	ACPD
DATA FILE EMPTY.	Data file is empty.	Use nonempty data file.	ACPD
DATA FILE FORMAT ERROR.	The specified data file does not conform to the format expected by ACPD.	Make sure the correct data file format has been specified on the command.	ACPD
DATA FILE NOT AT BEGINNING OF FILE.	Data file was not initially positioned at the beginning of a file.	Reposition the data file.	ACPD
DATA FILE NOT FOUND - filename.	Data file filename was not local to the job at the time ACPD is running.	Make filename local before initiating ACPD	ACPD
DATA FILE NOT IN CHRONOLOGICAL ORDER.	Data file is not in the increasing order of time of the records.	Rebuild the data file.	ACPD
DATA FILE POSITIONED AT EOI.	Data file is initially positioned at end of information.	Reposition the data file.	ACPD
DAYFILE BUSY.	The dayfile to be terminated is currently attached to another job.	Retry operation.	DFTERM
DAYFILE STATUS INDEFINITE.	An error exit occurred which caused DFTERM to abort while it was terminating a dayfile. Status of the dayfile is unknown.	Inform site analyst immediately.	DFTERM
DAYFILE TERMINATED.	Informative message issued to the terminated dayfile.	None.	SFM
DBest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DB is 885-42 disk (full track). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DBest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DB Equipment type is 885-42 disk (full track). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DBest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DB is 885-42 disk (full track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
DEADSTART FILE FORMAT ERROR.	An error was detected in the directory of the deadstart file.	Check the contents and format of the deadstart file for errors.	INSTALL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DEBUG NOT TURNED ON.	The system was not in DEBUG mode when you entered the SCRSIM command.	Put the system in DEBUG mode and reenter the job.	HFM
DEFAULT CHARGE ABORTED.	Default charge processing was aborted due to a system error.	Inform site analyst.	CHARGE
DEFAULT CHARGE NULL.	Informative message indicating that the default charge information was not specified in the accounting block.	None.	CHARGE
**** DELETE NON-EXISTENT USER NUMBER.	The user name to be deleted from the specified charge/project number entry does not exist. This message is not posted on the K display (DUN directive is ignored) and is not listed on the output file until all directives for the specified charge/project number have been processed.	Check the user name and retry.	PROFILE
DELETING username.	Message displayed at line 1 of control point indicating that the user name is being deleted.	None.	MODVAL
DEMUX ARGUMENT ERROR.	An incorrect argument was specified or an argument was equivalenced that cannot be equivalenced.	Correct the argument format and retry.	DEMUX
DEMUX COMPLETE.	DEMUX normal termination.	None.	DEMUX
DEMUX MEMORY OVERFLOW.	DEMUX required more field length than the maximum field length allowed.	Recommended action is one of the following. - Decrease the number of terminals (NT). - Increase the maximum field length (MFL). - Reassemble DEMUX and modify one or more assembly parameters (see listing).	DEMUX
DEMUX NT VALUE TOO LARGE.	DEMUX NT value is greater than 512 (decimal).	Decrease the number of terminals (NT) value and retry.	DEMUX
DEMUX NUMERIC ARGUMENT CONVERSION ERROR.	An error was detected when converting the SL or NT argument.	Ensure correct argument format and value and retry.	DEMUX
DEMUX SL VALUE TOO LARGE.	DEMUX SL value is greater than the NT value.	Decrease the SL value or increase the NT value.	DEMUX
DESTINATION DEVICE ERROR.	An unrecoverable error occurred while QLOAD was writing to the destination device.	Check the output file for the files that were processed. Reload to different device.	QLOAD
DESTINATION DEVICE REQUIRED.	An attempt was made to load inactive queues but the destination device was not selected correctly. Either the familyname and device number or the pack name of the destination device must be specified.	Enter correct parameters and retry load operation.	QLOAD
DESTINATION FAMILY NOT SPECIFIED.	K display message indicating that a GO command has been entered before the destination family (DF) or familyname (FM) has been specified.	Enter the familyname and type GO.	QFSP
DEVICE ERROR.	The device number (DN) specified to be cataloged refers to a nonmaster device.	Specify master device and retry operation.	PFCAT
DEVICE FULL FOR COMMUNICATION FILE.	A disk full condition does not allow file MOVCOM to be written.	Manually free disk space and rerun ASMOVE.	ASMOVE
DEVICE NOT FOUND.	The device number (DN) specified to be cataloged was not defined in the system.	Retry operation with device defined in the system.	PFCAT

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DEVICE UNAVAILABLE.	One of the following: - A packname was specified for a pack that is not currently mounted. - For a DIS job, no SUI or USER command has been entered. - No permanent file device could be found for your user name. - On a secure system, no permanent file device with the proper access level could be found for your user name.	If a packname was specified, try again with the WB or NA parameter to request that the pack be mounted. For other errors, inform site analyst.	PFM
DEVICE UNAVAILABLE ON MSF CATALOG ACCESS.	MSSEXEC received a device unavailable status from PFM while attempting a PFM request on an MSF catalog. The MSF catalog is closed.	Inform site analyst. When the condition which caused the device unavailable status has been cleared, MSS can be restarted to reopen the MSF catalog.	CATACC
DFD - message.	Refer to explanation of AFD-message.	None.	DAYFILE
DFTERM ABORTED.	An error exit caused DFTERM to abort.	Check the dayfile for more information.	DFTERM
DIest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DI is 844-21 disk (half track). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DIest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DI Equipment type is 844-21 disk (half track). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DIest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DI is 844-21 disk (half track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
DIRECT ACCESS FILE ERROR.	The system sector for the file contains incorrect data or cannot be read.	Inform site analyst.	PFM
number DIRECT FILES SKIPPED WITH ERRORS. number FILES WITH LENGTH ERRORS. number DIRECT ACCESS FILES DUMPED. number INDIRECT ACCES FILES DUMPED. number DUMPED FILES PURGED. number DUMPED FILES NOT PURGED.	This listing of six messages gives the number of files of each type that were found and dumped.	None.	PFDUMP
DIRECTIVE ERRORS.	Dayfile message indicating that one or more input directives were in error.	Examine output file to determine reason for error.	MODIFY OPLEDIT LIBTASK MODVAL PROFILE SYSEDIT

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DIRECTIVE FILE xxxxxxx EMPTY.	The directive file specified as the default directive file via the I parameter is an empty file.	Correct error and try again.	NDA
**** DIRECTIVE NOT AUTHORIZED.	The user must be either a special accounting user or from system origin to issue this directive.	None.	PROFILE
DIRECTIVE NOT MEANINGFUL.	The ALLMEM, CB, CBW, MPP, or PMS directive for the DSDI command has no meaning for this dump.	Remove the directive.	DSDI
DIRECTIVE PARAMETER ERROR.	Output file message indicating that an error was detected in a directive parameter.	Correct and rerun.	DSDI
DIRECTIVE RESTRICTED TO PRINTER OUTPUT.	Output file message indicating that the directive entered produces output which cannot be listed at a terminal.	Assign the output to an alternate output file for later printing at a line printer (refer to the description of the OUTPUT directive).	DSDI
DIRECTIVE RESTRICTED TO TERMINAL OUTPUT.	Output file message indicating that the directive entered produces output which must be listed at a terminal.	Use directive from terminal.	DSDI
DIRECTIVE SHOULD HAVE NO PARAMETERS.	Output file message indicating that a directive entered with parameters should not have parameters.	Correct and rerun.	DSDI
DIRECTORY TABLE BAD.	Dayfile message indicating that an EOR or EOF was encountered while the random file directory which was created by the D option was being read.	Ensure that the dump file contains meaningful information.	DSDI
DISK FILE ERROR.	MSSEXEC encountered a write error on a file.	Retry using a different file name.	ASDEBUG
DISK FULL. STAGING DELAY, FM=familyname, UI=userindex.	Staging is delayed because of insufficient disk space.	Use ASMOVE to free up disk space.	EXSTGE
DJest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error mccurred. The equipment type DJ is 844-41/44 disk. est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DJest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DJ Equipment type is 844-41/44 disk (half track). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DJest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DJ is 844-41/44 disk (half track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DKest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DK is 844-21 disk (full track). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DKest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DK Equipment type is 844-21 disk (full track). est EST ordinal of the device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DKest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DK is 844-21 disk (full track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
DLest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DL is 844-41/44 disk (full track). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DLest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DL Equipment type is 844-41/44 disk (full track). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DLest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DL is 844-41/44 disk (full track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
DMest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DM is 885-11/12 disk (half track). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DMest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DM Equipment type is 885-11/12 disk (half track). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DMest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DM is 885-11/12 disk (half track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
DMPNAD ABORTED - CHANNEL NUMBER INVLAID OR MISSING	A NAD dump requires CH=nn where nn is an octal number (0-13 or 20-33).	Correct command and retry.	DMPNAD
DMPNAD ABORTED - CVL ERROR CODE = nnB.	CVL did not allow the calling program to access the specified NAD. nnB is the CVL response code explaining why access was not granted.	Wait a few seconds and retry. If the same error occurs, inform site analyst.	DMPNAD
DMPNAD ABORTED - EQUIVALENCE MISSING.	The AC, CH, LT, and ND parameters must be followed by an equivalence character.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - FILE NAME CONFLICT.	The B, I, and L parameters must have unique file names when used at the same time.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - ILLEGAL CHANNEL NUMBER.	Channel number must be 0 to 13B inclusive or 20B to 33B inclusive.	Correct channel number and retry.	DMPNAD
DMPNAD ABORTED - ILLEGAL DIRECTIVE NAME.	Only AC, B, CH, I, L, LT, and ND are valid parameters for DMPNAD.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - INVALID ACCESS CODE.	Command contained an AC=aaaa, where aaaa was not a valid hexadecimal number.	Correct access code and retry.	DMPNAD
DMPNAD ABORTED - INVALID NAD ADDRESS.	Command contained an ND=nn, where nn was not a valid hexadecimal number.	Correct NAD address and retry.	DMPNAD
DMPNAD ABORTED - INVALID TRUNK ENABLES.	Command contained an LT=tttt, where tttt was not a valid binary number.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - MORE THAN 10 CHARACTERS IN NAME.	DMPNAD command parameters must not exceed ten characters.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - NAD ADDRESS INVALID OR MISSING	A remote NAD dump requires ND=nn where nn must be a hexadecimal number.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - NLD ERROR CODE = nnB.	NLD was unable to dump the specified NAD. nnB is the NLD response code explaining why the NAD was not dumped.	Make sure the command is correct. Inform site analyst if the correct NAD information had been entered.	DMPNAD
DMPNAD ABORTED - NUMERIC FIELD MUST NOT BE BLANK.	DMPNAD expects a numeric value to follow the equivalence sign for the AC, CH, LT, and ND parameters.	Correct command and retry.	DMPNAD
DMPNAD ABORTED - TRUNK ENABLES INVAID OR MISSING	A remote NAD dump requires LT=tttt where tttt must be a binary number (t = 0 or 1).	Correct command and retry.	DMPNAD
DMPNAD ABORTED - 8/9 NOT ALLOWED IN OCTAL FIELD.	Self explanatory.	Correct command and retry.	DMPNAD
DMPNAD COMPLETE.	Informative message indicating that DMPNAD was successful in dumping the requested NAD.	None.	DMPNAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DMPNAD DUMPING REMOTE NAD xx - GO/DROP.	Informative message indicating that NAD is about to be dumped.	If correct NAD, type GO,jsn to dump the NAD. If incorrect NAD, type DROP,jsn correct command and retry.	DMPNAD
DNdn FM familyname FNT/QFT FULL.	The FNT or QFT was filled while recovering the specified device. dn Device number. familyname Family name.	Retry at a later time when the system is not as busy.	QREC
DNdn, FM familyname IGNORED - ERROR IDLE.	Informative message indiating that queues on the specified device were not processed because the device had an error idle status. dn Device number. familyname Family name.	None.	QREC
DNdn FM familyname IGNORED - REMOVABLE.	Informative message indicating that queues on the specified device were not processed because the device is removable. dn Device number. familyname Family name.	None.	QREC
DNdn FM familyname IQFT INTERLOCKED.	The track interlock on the IQFT file is set. It is possible IQFT is currently being used by another utility. dn Device number. familyname Family name.	Retry at a later time.	QREC
DNdn FM familyname MS ERROR.	A mass storage error occurred while processing the IQFT file on the specified device. dn Device number. familyname Family name.	Refer to appropriate message for device information.	QREC
DNdn FM familyname NO IQFT FILE.	Informative message indicating that no IQFT file exists for the specified device. dn Device number. familyname Family name.	None.	QREC
DNdn FM familyname UNDEFINED ERROR.	System failure has occurred generating an erroneous error code. dn Device number. familyname Family name.	Inform site analyst.	QREC
DQest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DQ is 885-11/12 disk (full track). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DQest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DQ Equipment type is 885-11/12 disk (full track). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DQest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DQ is 885-11/12 disk (full track). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DSDI ARGUMENT ERROR.	Dayfile message indicating that an unknown keyword was encountered on the DSDI command.	Correct and rerun.	DSDI
DSDI ERROR LIMIT EXCEEDED.	Dayfile message indicating that more than 50 errors were detected.	Examine output file for specific errors.	DSDI
DSFB USED = n.	Informative message indicating that the destage for backup value used by ASMOVE is n.	None.	ASMOVE
DUMP FILE dumpfile EMPTY.	The NPU dump file specified via the NDF parameter or the default NPU dump file NDF is an empty file.	Correct error and try again.	NDA
DUMPING filename userindex.	Informative message indicating the name of the file being dumped and the user index under which the file is stored.	None.	PFDUMP
DUMPING - DIRECT ACCESS FILES ONLY.	Informative output file message indicating that only direct access files have been selected to be dumped (OP=D option specified).	None.	PFDUMP
DUMPING - INDIRECT ACCESS FILES ONLY.	Informative output file message indicating that only indirect access files have been selected to be dumped (OP=I option specified).	None.	PFDUMP
**** DUPLICATE CHARGE NUMBER.	An existing charge number was referenced on a create run.	Rerun using correct charge number, if required.	PROFILE
**DUPLICATE CS PARAMETER.	The same CSU is indicated more than once on the CS parameter.	Correct the CS parameter.	ASVAL
DUPLICATE FILE NAME.	Dayfile message indicating that when QFM tried to attach an inactive queue file to the control point, a file by the same name was already assigned.	Rename, or return the file with the conflicting name.	QFM
DUPLICATE FILE NAME ERROR.	The files for input and output have the same name.	Change and retry.	PROBE
DUPLICATE FILE NAME - FILE IGNORED.	QFM has detected a duplicate file name on the source device.	Check device and change one file name, then retry.	QDUMP QMOVE
**** DUPLICATE PROJECT NUMBER.	An existing project number was referenced on a create run.	Rerun using correct project number, if required.	PROFILE
**DUPLICATE SB PARAMETER.	The same subfamily is indicated more than once on the SB parameter.	Correct the SB parameter.	ASVAL
**** DUPLICATE USER NAME.	The user name to be added already exists for the specified charge/project number entry. This message is not posted on the K display (AUN directive is ignored) and is not listed on the output file until all directives for the specified charge/project number have been processed.	Choose a different user name.	PROFILE MODVAL
DVest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type is 819 disk (single density). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
DVest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DV Equipment type is 819 disk (single density). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DVest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DV is 819 disk (single density). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
DWest,DNdn,message.	A form of PFM error message (issued to the system dayfile, error log, and sometimes the user dayfile) identifying the mass storage equipment on which the error occurred. The equipment type DW is 819 disk (double density). est EST ordinal of device. dn Device number. message PFM error message.	Refer to the significance and action of the message as given in this list of error messages.	PFM
DWest,FM=familyname,PF=filename, UI=userindex.	Additional line is written only in error log after one of the following messages: - DATA TRANSFER ERROR. - DIRECT ACCESS FILE ERROR. - FILE LENGTH ERROR. - FILE BOI/EOI/UI MISMATCH. - MASS STORAGE ERROR. - RANDOM INDEX ERROR. - REPLACE ERROR. - SYSTEM SECTOR ERROR. - TRACK LIMIT. DW Equipment type is 819 disk (double density). est EST ordinal of device. familyname Family name. filename Permanent file name. userindex User index.	Inform site analyst.	PFM
DWest,TK=track,SC=sector.	Additional message written only in error log after the message BAD CATALOG/PERMIT SECTOR. The equipment type DW is 819 disk (double density). est EST ordinal of device. track Track number of bad sector. sector Sector number of bad sector.	Inform site analyst.	PFM
ECS RECORD NOT FOUND.	Output file message indicating that the extended memory record was not found in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
ELD - message.	Refer to explanation of AFD - message.	None.	DAYFILE
EMPTY SESSION FILE.	Nonfatal K display message indicating that the session file was empty.	Resupply the correct file name, or put data into the file.	STIMULA
END OF COPY.	Informative K display message indicating that the copy is complete.	None.	PFCOPY
END OF DUMP FILE ENCOUNTERED WHILE SEARCHING FOR RECORD x.	Attempts to read record type x into memory have encountered an end-of-file condition. This indicates that the dump file is missing the record.	Correct error and try again.	NDA

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
END SIMULATOR.	Dayfile message indicating that the operator has entered STOP. to drop the simulator.	None.	SCRSIM
ENDCPD COMPLETE.	Informative message indicating that ENDCPD is finished. Completion of ENDCPD does not mean that system monitoring by CPD has been terminated. It means that the CPD drop flag has been set, and the next time CPD statuses this flag it will begin its termination process.	None.	ICPD
ENTER E TO TERMINATE LOADING. L TO LIST REMAINING FILES. GO TO RESUME INCREMENTAL LOAD.	This message occurs as a result of a complete load of an archive file during incremental load operations. The message appears at the end of a reel during incremental loading to allow the operator to optionally load additional archive files. If something other than one of the three specified options is entered, ILLEGAL OPTION - REENTER is issued to the K display.	Enter E, L, or GO as indicated in the message.	PFLOAD
ENTERED PARAMETER IS ILLEGAL.	Parameter is not legal for the utility being run.	Enter correct parameter via the K display.	PFS
EQest,DNdn,message.	A permanent file utility has encountered an error on equipment with EST ordinal est and device dn.	Refer to the explanation given for the message following the device number for further information. This is an abbreviated form of the message issued to the error log. The complete message is issued to the system dayfile and the control point dayfile.	PFDUMP PFLOAD
EQest TRACK LIMIT.	Mass storage device with EST ordinal est has no allocatable tracks left and a program is waiting for a track in order to continue processing of a file. Additional space must be made available on the device.	Inform site analyst.	PFU
ERROR FILE LIMIT.	One of the following. - An unrecoverable error occurred during an attempt to create the error file. - The number of error files created has exceeded the upper limit allowed.	Check the output file for files processed. Retry load skipping files in error.	QLOAD
ERROR FLAG NOT SET IN CSUMAP.	The RC directive to ASDEBUG did not remove the CSU map entry because the error flag was not set in the CSU map entry.	Correct the CS, XI, and YI parameters and retry.	ASDEBUG
ERROR IN libdeck.	An error was detected in the specified libdeck while processing the SYSEDIT command.	Correct the error in the libdeck and retry.	SYSEDIT
****ERROR IN ACCESS LEVEL.	K display message indicating no access is specified or an invalid separator is specified.	Correct and retry.	QREC QLOAD QDUMP QMOVE QFTLIST QALTER
ERROR IN ALPHANUMERIC DATA.	No data is present or an incorrect separator follows the data.	Correct and reenter K display input.	QFSP
**** ERROR IN ALPHANUMERIC DATA.	Output file message indicating any of the following. - No data was present. - The data accompanying the *AW* input identifier was unrecognizable. - The number of characters exceeded the maximum allowed. If entered from the K display, the line of input on which the error occurred is disregarded; otherwise, that particular user name is disregarded.	Rerun the corrected job or correct the new validation file, if necessary.	MODVAL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
ERROR IN DATE.	K display message indicating any of the following. - The date entry is not in the correct format. - An incorrect separator follows the date. - The date entry is prior to 70/01/01. - The date entry is not a valid date (e.g. 76/04/44).	Correct and reenter K display input.	QFSP
ERROR IN DEVICE NUMBER.	K display message indicating one of the following. - No familyname has been specified. - The device number is not in the specified familyname. - An incorrect separator follows the device number.	Correct and reenter K display input.	QFSP
ERROR IN FAMILY NAME.	K display message indicating that either the specified familyname cannot be found or an incorrect separator follows the familyname.	Correct and reenter K display input.	QFSP
ERROR IN FILE SIZE RANGE.	K display messge indicating one of the following. - File size is nonnumeric. - File size range is not within the range 0 through 77777B. - An incorrect separator follows the last size.	Correct and reenter K display input.	QFSP
ERROR IN IAFEX ARGUMENTS.	An error was encountered on the IAFEX command.	Correct error and retry.	IAFEX
ERROR IN IAFEX PARAMETER - T.	The value assigned to the T parameter on the IAFEX command is not valid.	Correct T parameter and retry.	IAFEX
ERROR IN ID RANGE.	K display message indicating one of the following. - ID is not within the range 0 through 77B. - Illegal separator between or after ID data. - Minimum ID is greater than the maximum ID. - Identifier number is nonnumeric.	Correct and reenter K display input.	QFSP
ERROR IN IDENTIFIER.	K display message indicating that an incorrect directive or command has been entered, or a directive is incorrect for the selected utility.	Correct and reenter K display input.	QFSP
**** ERROR IN IDENTIFIER.	Output file message indicating that an incorrect parameter identifier was encountered. If entered from the K display, that line of input is disregarded; otherwise, that particular user name is disregarded.	Rerun the corrected job or correct the new validation file, if necessary.	MODVAL
ERROR IN *LO* SPECIFICATION.	The list option parameter has an incorrect option specified.	Correct and retry.	PROBE
ERROR IN NUMERIC DATA.	K display message indicating one of the following. - No data is present. - Nonnumeric data was entered where numeric data was required. - Numeric data exceeds maximum value.	Correct and reenter K display input.	QFSP
**** ERROR IN NUMERIC DATA.	Output file message indicating any of the following. - The data was nonnumeric and numeric data was required. - Numeric data exceeded the maximum allowed. - No data was present. If entered from the K display, the line of input on which the error occurred is disregarded; otherwise, that particular user name is disregarded.	Rerun the corrected job. Correct the new validation file, if necessary.	MODVAL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
ERROR IN *OP* SPECIFICATIONS.	The OP parameter has an incorrect option specified.	Correct and retry.	PROBE
ERROR IN PARAMETERS.	There is an error in the channel parameter (C=cc) on the LOADBC command or in the other required parameters if attempting to load NAD controlware.	Correct parameter and retry.	LOADBC
ERROR IN PROFILE ARGUMENTS.	Dayfile message indicating there was an error on the PROFILE command.	Correct command and rerun.	PROFILE
ERROR IN SELECTED QUEUE TYPE.	The queue type selected cannot be recognized or an incorrect separator follows the queue type.	Correct and reenter K display input.	QFSP
ERROR IN STIMULATOR ARGUMENTS.	Fatal dayfile message indicating that a parameter other than the I parameter is present, or the parameter is in the wrong format.	Correct and rerun.	STIMULA
ERROR IN USER INDEX RANGE.	K display message indicating one of the following. - User index is nonnumeric data. - User index is not within the range 0 through 377777B. - An incorrect separator follows the last user index.	Correct and reenter K display input.	QFSP
**** ERROR IN USER NAME.	Output file message indicating that incorrect data was encountered where the user name was expected. MODVAL disregards the incorrect data and goes to the next user entry.	Rerun the job or correct the new validation file, if necessary.	MODVAL
ERROR LOG PROCESSED.	The error log dump is complete.	None.	DAYFILE
ERROR ON FILE - PROFILa.	Either the profile file cannot be found or there is a bad profile file level-3 block random address.	Inform site analyst.	CPM
ERROR ON OUTPUT FILE.	K display message indicating that the OUT command was entered when no output file existed.	None.	QREC
ERROR READING THE PFC.	The PFC entries for the familyname are either missing or have a bad sector error.	Reload the permanent files.	ASVAL
ERROR-TERMINATED DAYFILE ON LOCAL FILE.	An error occurred while defining the permanent file for the terminated dayfile which remains on the local file DAYFILE.	Dispose of DAYFILE as desired. Examine dayfile to determine *PFM* error.	DFTERM
ERRORED FILE PARTIALLY DUMPED - filename.	Informative message indicating that an unrecoverable read error was encountered on file filename while the option to dump files in error was disabled. The backspace on the dump file hit the beginning of the tape reel, leaving filename partially dumped on the previous reel. This file will not be loaded if the option to load files in error is disabled.	None.	QDUMP
EXCESSIVE PARITY ERRORS.	Excessive recovered parity errors due to a faulty MST or cartridge were encountered while the cartridge label was being written.	Retry after cleaning or repairing the MST, or discard the cartridge.	ASLABEL
EXCESSIVE WRITE ERRORS. DESTAGE RESTARTED.	A file destage operation was restarted using different cartridges because excessive write errors were encountered.	Run ASVAL to identify the problem cartridges and any permanent files on these cartridges. Remove the files from the cartriges. Refer to Error Conditions and Corrective Action in section 3.	EXDEST

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
EXEC ABNORMAL, xxx.	There is an internal error in module xxx of MSSEXEC.	Inform site analyst.	EXCVL EXDEST EXHLR EXINIT EXLLR EXMAIN EXSTGE EXSERV EXUCP EX3UCP
EXEC ABORT - SYNTAX ERRORS.	The MSSEXEC command is syntactically incorrect.	Correct errors and retry.	EXINIT
EXEC IN SINGLE MAINFRAME MODE.	Informative message indicating that MSSEXEC is running in a single mainframe environment.	None.	EXINIT
EXEC MMF INITIALIZATION FAILED - - message.	MSSEXEC failed to establish communication with any of the slave machines in a multimainframe environment; message indicates the reason and can be one of the following: - ALL SLAVES OMITTED. - ATTACH MTOS FAILED. - DEFINE MTOS FAILED. - MTOS FILE BUSY. - SETPFP PROBLEM.	Inform site analyst.	EXINIT
EXEC MMF INITIALIZATION OK.	Informative message indicating that MSSEXEC is ready to run in a multimainframe environment.	None.	EXINIT
EXEC - SLAVE i xxxx.	MSSEXEC is ready to communicate with MSSSLV on mainframe i or that the status of MSSSLV on mainframe i has changed. The current status of MSSSLV is indicated by xxxx and can be ACTIVE or INACTIVE.	None.	EXINIT EXMAIN
EXEC - SLAVE i OMITTED - message.	MSSEXEC was unable to establish or maintain access to a communication file with MSSSLV on mainframe i; message indicates the reason and can be one of the following: - STOM FILE LENGTH PROB. - NO *STOM* FILE. MSSEXEC will continue to operate, but will not attempt to receive requests from MSSSLV on mainframe i.	If MSSSLV is to be run on mainframe i and the message is NO *STOM* FILE; idle MSSEXEC, purge the STOM file, initiate MSSSLV, and then initiate MSSEXEC. If the message is STOM FILE LENGTH PROB, purge the existing STOM file, and reinstall MSSEXEC and MSSSLV using identical values for NUMRB, MAXSLV, and NUMSLV in common deck COMEIPR and for RBSIZE in common deck COMAMSS.	EXINIT
EXEC SMF MODE - ALL SLAVES OMITTED.	MSSEXEC has lost access to all of the MSSSLVs and is now running in single mainframe mode.	Inform site analyst.	EXMAIN
EXPRESS DUMP COMPLETE (FL USED xxxxxxB).	Dayfile message indicating that the dump was completed normally. The amount of field length used was xxxxxx octal words.	None.	DSDI
FAMILY FILES ACTIVE.	Dayfile message indicating that the direct access file count is greater than the number of fast attach files.	Use IDLEFAMILY, and wait for direct access file count to decrease until it equals the number of fast attach files.	ISF
FAMILY FOR TERMINAL MUST BE ENTERED.	The operator attempted to enter a destination user index before entering a destination familyname for the terminal.	Enter a destination familyname for the terminal and reenter a destination user index.	QFSP
FAMILY NAME MUST BE ENTERED.	K display message indicating that the operator attempted to enter a specific device number before entering a specific familyname.	Enter the missing familyname and type GO.	QFSP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
FAMILY NOT FOUND.	The familyname specified by the FM parameter on the ASLABEL, ASMOVE, ASUSE, or ASDEBUG command does not exist or is not on line.	Specify an existing on-line familyname and retry.	ASMOVE ASLABEL ASDEBUG ASUSE
FAMILY NOT FOUND IN SYSTEM.	The familyname specified by the FM parameter on the ASVAL command or the familyname in the RDF header was not found in the system familyname packs.	Correct the parameter or add the familyname to the system.	ASVAL
FAMILY/PACK NOT FOUND.	Familyname or packname specified is not defined in the permanent file system.	Reenter parameters and specify correct packname or familyname, or mount the correct family or pack into the system if not currently present.	PFS
FAST-ATTACH ALTERNATE FILE NOT ALLOWED.	The file specified by the P option cannot be a fast-attach file.	Use the ISF command R parameter to release the file from fast-attach status, or change name.	PROFILE
.FAST ATTACH FILES ON DEVICE.	An attempt was made to initialize a mass storage device on which one or more fast-attach files are currently active. This message also appears in the comment field of the system control point in the job status (B) display.	Inform site analyst; the fast-attach files will have to be released, via ISF function, before the device can be initialized. The recommended procedure is as follows. - Examine the FNT (H) display to determine the names of the fast-attach files on the device (typically, VALIDUS, PROFILC, or RSXDid). - Release those files via ISF entries in the following format X.ISF,R=filename. If fast-attach files are to be reloaded after the device is initialized, those files must be initialized via the entry X.ISF.	1DS
FAST-ATTACH PROFILE FILE ILLEGAL.	Dayfile message indicating that the project file cannot be in fast-attach status on a reformat run.	Use the ISF command with the R option to release the project file from fast-attach status, or change name.	PROFILE
FCT ORDINAL OUT OF RANGE.	The FCT ordinal specified by the FO parameter in a directive to ASDEBUG is out of range.	Correct FO parameter and retry.	ASDEBUG
FDP ABORT - USER VALIDATION ERROR.	Dayfile message indicating that ENGINEERING mode has not been set at the system console.	Set ENGINEERING mode at the system console.	FDP
FETCHING FLAW DATA S/N=serialn.	Console message indicating that the factory recorded data is being retrieved from cylinder 632B (or 1466B), track 0, sectors 0, 1, and 2. Here, serialn is the actual pack serial number read.	None.	FORMAT
FILE ALREADY DESTAGED. DESTAGE ABANDONED.	A file destage operation was abandoned because the file already had been destaged.	None.	EXDEST
FILE ALREADY INTERLOCKED.	The track interlock for an IQFT file is currently interlocked.	Inform site analyst.	QFM
FILE EQUIVALENCE MAY NOT BE 0.	Dayfile message indicating that either the input or the standard output file has been declared empty (that is, set equal to 0).	Correct and rerun.	FORMAT

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
FILE ERROR.	K display message indicating that the change file specified could not be attached.	Verify that the change file is an indirect file.	STIMULA
FILE LENGTH ERROR.	The length of a file does not equal the length specified in the catalog.	Inform site analyst.	PFM
FILE NAME CONFLICT.	The file names specified by the I and L directives are identical or a reserved file name was specified. Reserved file names include IQF, MIQFT, NIQFT, and SCR.	Change the incorrect file name(s) and reenter directives(s).	QFSP
FILE NAME CONFLICT.	The file to receive output cannot be named IQF or NIQFT.	Change output file name and enter new directive.	QREC
FILE NAME CONFLICT.	The names of the output, load, and IQFT files conflict.	Change the name of the output or load file and retry the operation.	QLOAD
FILE NAME CONFLICT - filename.	The named file was specified on more than one parameter of a PF utility program.	Correct and retry.	PFS
FILE NAME CONFLICT.	Dayfile message indicating that the file name specified with the P option (terminal network description) is the same as the file specified with the L option (error listing).	Specify unique file names with the P and L options.	ITEMIZE COPYL COPYLM
FILE NAME CONFLICT - filename.	File filename was used for more than one purpose.	Correct call parameters and retry.	MODVAL
FILE NAME CONFLICT - FILE filename.	The names of the output, dump, and IQFT files conflict.	Change the name of the output or dump file and retry the operation.	QDUMP
FILE NAME NOT SET.	Nonfatal K display message indicating that a GO was entered, and the file name was not set.	Set the file name.	STIMULA
FILE NOT FOUND.	Requested file could not be found.	Verify that file exists and retry.	LFM SFM QFM ENQUIRE STIMULA
FILE NOT IN ALTERNATE FAMILY.	The file specified via the *R* parameter is a default familyname file, but an alternate familyname was specified via the *FM* parameter.	Verify which familyname and file you want to return. Repeat the ISF entry with the correct combination of parameters.	ISF
FILE READ ERROR. DESTAGE ABANDONED.	A file destage operation was abandoned because of a disk read error.	Investigate cause of disk error and take appropriate corrective action.	EXDEST
FILE WRITE ERROR. STAGING DELAY, FM=familyname, UI=userindex.	Staging is delayed because of a file write error. The staging will resume automatically and will either complete successfully or encounter the same file write error.	Investigate cause of disk error and take appropriate corrective action.	EXSTGE
FILENAME filename USER INDEX userindex.	Informative output file message indicating that only the specified file for the specified user index will be loaded (or dumped).	None.	PFLOAD PFDUMP
nnnn FILES ACTIVATED DNdn FM familyname.	Informative message indicating the number of queued files that have been activated on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QREC QMOVE
nnnn FILES DEQUEUED DNdn FM familyname.	Informative message indicating the number of files that have been dequeued on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QREC QMOVE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
nnnn FILES DUMPED (A) DNdn FM familyname.	Informative message indicating the number of active queued files which have been dumped and remained active on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QDUMP
nnnn FILES DUMPED (I) DNdn FM familyname.	Informative message indicating the number of inactive queued files which have been dumped and remained inactive on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QDUMP
nnnn FILES IGNORED DNdn FM familyname.	Informative message indicating the number of queued files which have been ignored on the specified device during a queue operation. nnnn Number of files. dn Device number. familyname Family name.	None.	QREC QDUMP QMOVE
nnnn FILES MOVED (A) DNdn FM familyname.	Informative message indicating the number of active queued files that have been moved and remained active on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QMOVE
nnnn FILES MOVED (I) DNdn FM familyname.	Informative message indicating the number of inactive queued files that have been moved and remained inactive on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QMOVE
nnnn FILES PURGED DNdn FM familyname.	Informative message indicating the number of queued files which have been purged on the specified device. nnnn Number of files. dn Device number. familyname Family name.	None.	QREC
number FILES WITH ERRORS. number DIRECT ACCESS FILES LOADED. number INDIRECT ACCESS FILES LOADED.	This listing of three messages gives the number of files of each type that were found and loaded.	None.	PFLOAD
FINAL PF SPACE = n.	Informative message indicating that the permanent file space at the end of the ASMOVE run is n PRUs.	None.	ASMOVE
FL OPTION VIOLATED.	The FL parameter was used with a directive which prohibits it, omitted with a directive which requires it, or used to specify an incorrect flag name.	Correct directive and retry.	ASDEBUG
FM NOT LEGAL FAMILY.	Dayfile message indicating that an incorrect familyname was specified with the FM parameter.	Correct FM parameter and retry.	PROFILE MODVAL
FNT IF FULL.	All files could not be requeued because of a full FNT.	Inform site analyst.	QFM
FO NOT SPECIFIED CORRECTLY.	The FO parameter was specified without an equals sign in a directive to ASDEBUG.	Specify FO correctly and retry.	ASDEBUG
FORMAT ERROR.	An error exists in the syntax of the command or the values of the parameters.	Correct the command or parameters and retry operation.	TAF STIMULA

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
FORMAT ERROR xxxx.	Dayfile message indicating that a channel malfunction has occurred, causing FDP to abort the control point. xxxx One of the following errors. 0001 The coupler was reserved from the opposite access. 0004 The disk drive was hung busy. 0010 An uncorrectable error has occurred. 0014 Status was expected, but none was received. 0015 An uncorrectable error on the channel connection occurred. 0024 An output failure occurrred on the FORMAT parameter array. 0026 A read abort occured. 0027 A detailed status abort occured. 0032 An uncorrectable eror occurred during formatting.	Correct and retry.	FDP
FORMAT ERROR IN TIME PARAMETER.	The values specified for the loop operation times do not conform to standard numeric format (digits 0-9 with optional post-radix D or B). Default base is decimal.	Correct and retry.	ICPD
FOT IS FULL.	All files could not be re-queued because of a full FOT.	Inform site analyst.	QFM
FREE FILES NOT RELEASED.	Informative message indicating that ASVAL did not release the MSF space allocated to trouble-free orphans, because the last release date was after the last RDF dump date.	Retry with the correct RDF file.	ASVAL
FREE FILES RELEASED.	Informative message indicating that ASVAL released the MSF space allocated to trouble-free orphans.	None.	ASVAL
FROZEN CHAIN.	While trying to read a file, ASDEBUG encountered the frozen chain flag set in the stream chain.	Run ASVAL to identify the problem streams on the chain, and then read each stream separately using the RS directive to ASDEBUG.	ASDEBUG
FUNCTION TIMED OUT = nnnn.	1LC timed out in the function routine while accessing the controller. nnnn Function code.	Inform customer engineer.	LOADBC
GENERAL STATUS = nnnn.	The controlware load was not successful and the general status of the controller (nnnn) is not zero.	Inform customer engineer.	LOADBC
GENERATING CATALOG IMAGE.	Informative K display message indicating that catalog image record (CIR) is currently being written to the archive file.	None.	PFDUMP
GENLAB - ABNORMAL TERMINATION.	The label from stream zero contains an incorrect vsn.	Restore label with the FX directive to ASLABEL.	ASLABEL
HARDWARE PROBLEM. filename FOR jsn NOT STAGED.	The staging of file filename for job jsn was abandoned because an MSF hardware problem was detected.	Inform customer engineer.	EXSTGE
HARDWARE PROBLEM. DESTAGE RESTARTED.	A file destage operation was restarted because of a hardware problem.	Inform customer engineer.	EXDEST
HARDWARE REGISTERS NOT FOUND.	Output file message indicating that the hardware register record was not found in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
HEAD MOTION ERROR. DESTAGE RESTARTED.	A file destage operation was restarted because of a hardware problem.	Inform customer engineer.	EXDEST

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
HFM ARGUMENT ERROR.	Invalid function code was encountered or a parameter-word address was out of range.	Inform site analyst.	HFM
HFM ILLEGAL REQUEST.	HFM was called by job that did not contain one of the following. - SSJ=. - a RECALL setting. - not system origin with user not validated for system privileges. - not CYBER 70 or CYBER 170 mainframe.	Inform site analyst.	HFM
I/O ERROR xxxx IN FFFFFFF.	I/O error (error code xxxx) in file FFFFFFF.	Correct error and try again.	NDA
IAF NOT ACTIVE.	Fatal dayfile message indicating that the time-sharing subsystem is not at a control point.	Bring the time-sharing subsystem to a control point before running the stimulator.	1TS
ICPD COMPLETE.	Informative message indicating system monitoring by CPD has been terminated.	None.	ICPD
ILLEGAL APPLICATION ACCOUNTING REQUEST.	The application program that issued this message attempted to initiate application accounting incorrectly.	Inform site analyst.	CPM
ILLEGAL BIT NUMBER.	Dayfile message indicating that the bit number specified was greater than 203.	Correct and reenter.	SCRSIM
ILLEGAL BYTE NUMBER.	Dayfile message indicating that the byte number specified was greater than 16.	Correct and reenter.	SCRSIM
ILLEGAL CHARACTER.	Dayfile message indicating that an alphabetic character other than B or D was entered as a postradix on a decimal value, an alphabetic character, or a character with a display code of 60B or above was entered.	Correct and reenter.	SCRSIM
ILLEGAL COMMAND.	Dayfile message indicating that the command entered was not a legitimate SCRSIM command.	Correct and reenter.	SCRSIM
ILLEGAL COMMAND.	One of the following has occurred. - The command could not be identified. - The USER command does not have a user name specified. - You specified an incorrect parameter or no terminator. - You included too many parameters on the program call command or the program was not present. - You submitted a command that you were not authorized to use (for example, the unauthorized use of PASSWOR). - You submitted a command that is incorrect for a particular job type or file type (for example, the use of a FAMILY command in a nonsystem origin job).	Ensure accuracy and suitability of command.	TCS CONFIG MODVAL RESEX 026
ILLEGAL CONTROL POINT NUMBER.	The control point number specified was greater than the system control point number or was not in a recognized numeric format.	Correct and rerun.	DSDI
ILLEGAL CSU.	The CS parameter in a directive to ASDEBUG was not a letter from A through M.	Correct CS parameter and retry.	ASDEBUG ASUSE
ILLEGAL CSU NUMBER.	The CS parameter in a directive to ASLABEL was not a letter from A through M.	Correct CS parameter and retry.	ASLABEL
ILLEGAL D.	The D parameter in a directive to ASDEBUG was not a number from 0 through 7.	Correct D parameter and retry.	ASDEBUG
ILLEGAL DATA.	Nonfatal K display message indicating that the data contains an incorrect display character.	Correct data and retry.	STIMULA
ILLEGAL DIRECTIVE.	The directive specified is not a valid directive to ASLABEL or ASDEBUG.	Correct directive and retry.	ASLABEL ASDEBUG

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
**** ILLEGAL DIRECTIVE.	Output file message indicating one of the following. - The system encountered an unrecognizable identifier. - An equal sign does not separate the identifier and a value. - The system encountered a DCN, DPN, or DUN directive when OP=C was specified.	Rerun using correct directives.	PROFILE
ILLEGAL DRAWER NUMBER.	The D parameter in a directive to ASLABEL was not a number from 0 through 7.	Correct D parameter and retry.	ASLABEL
ILLEGAL DUMP REQUESTED.	One of the following conditions has been detected prior to a queue file dump. - The device specified to receive the dump is not a mass storage device. - The device specified to receive the dump is removable and the type specified is A (active) or ALL.	Enter the correct parameters and retry the operation.	QDUMP
ILLEGAL ENTRY.	K display message indicating that the processor could not recognize the specified utility option.	Correct and reenter K display input.	QFSP MSI MREC
ILLEGAL FAMILY NAME.	Dayfile message indicating that the familyname specified in the ISF entry is not defined in the running system.	Repeat ISF entry with correct familyname.	ISF
ILLEGAL FILE NAME - filename.	Dayfile message indicating that a file has been given an incorrect or duplicate name filename.	Correct and rerun.	FORMAT
ILLEGAL FILE NAME.	Dayfile message indicating that the file name specified in the ISF entry (file to be initialized) was not available to the system. Valid file names include VALIDUs, PROFILa, RSXDid, and RSXVid.	Repeat the ISF entry with the correct file name.	ISF
ILLEGAL FILE NAME.	Output file message indicating that an incorrect file name was specified.	Correct and rerun.	DSDI
ILLEGAL FILE NUMBER.	Nonfatal K display message indicating that the file number is greater than 18 bits.	Reenter the correct decimal file number.	STIMULA
ILLEGAL - L AND RF PARAMETERS.	The files specified by the L and RF parameters on the ASVAL command are the same.	Use a different file name for either the L or RF parameter.	ASVAL
ILLEGAL - L AND RF PARAMETERS.	The files specified by the L and RF parameters on the ASVAL command are the same.	Use a different file name for either the L or RF parameter.	ASVAL
ILLEGAL LINE NUMBER.	Dayfile message indicating that the line number entered was not 0, 1, 2, or 3.	Correct and reenter.	SCRSIM
ILLEGAL MOVE REQUESTED.	One of the following. - Device specified is not mass storage. - Device specified is removable; the queue file type to be moved is A (active) or ALL. - Destination device is removable; destination disposition option is A (files remain active). - Destination device is a shared device, QPROTECT is disabled, and destination disposition option is I (files remain inactive).	Enter the correct parameters and retry move operation.	QMOVE
ILLEGAL N.	The N parameter in a directive to ASLABEL was not a number from 1 through 2000.	Correct N parameter and retry.	ASLABEL
ILLEGAL NDA CALL PARAMETER xxxxxxx PARAMETER VALUE ILLEGAL FOR xxxxxxx VALUE NEEDED FOR PARAMETER xxxxxxx INVALID CHARACTER AFTER ITEM xxxxxxx.	Parameter xxxxxxx in NDA call is incorrect or has incorrect items associated with it. Processing is aborted with any of these errors.	Correct errors and try again.	NDA
**** ILLEGAL NUMERIC VALUE.	The value specified by a directive does not convert to binary or is not within limits for the parameter specified.	Rerun using correct value.	PROFILE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
ILLEGAL OPTION.	Nonfatal K display message indicating that an incorrect keyboard entry was made.	Reenter the correct option.	STIMULA MREC
ILLEGAL OPTION - REENTER.	The operator response to a previous message was incorrect.	Enter valid response.	PFDUMP
ILLEGAL PASSWORD. or **** ILLEGAL PASSWORD.	One of the following. - The password entered is greater than seven characters or contains an incorrect character. - In the PASSWOR command either an incorrect old password was specified or the new password was unacceptable. - In the MODVAL command (for a create or update run) the password for a new user contained fewer characters than the minimum length required by the site. If entered from a K display, the line of input is ignored; otherwise, that particular user name is disregarded.	Correct error and retry.	MODVAL PFILES
**** ILLEGAL PASSWORD IGNORED.	Output file message indicating that the password encountered during an update run was less than the minimum length required by the site. The update of the user name proceeds without the password change.	Choose a correct password and update VALIDUs via PASSWOR or rerun MODVAL, if desired.	MODVAL
ILLEGAL PRINT DENSITY SELECTION.	Output file message indicating a print density other than 3, 4, 6 or 8 lines per inch was specified or that no room would remain on the page after printing the header at the specified print density because the system value for lines per page is too small.	Specify valid print density and rerun, or increase print density and/or request site analyst to increase system value for lines per page.	DSDI
ILLEGAL PRINT OPTION SELECTION.	Output file message indicating that an incorrect list option was specified in a directive.	Correct and rerun.	DSDI
ILLEGAL REPORT OPTION.	The OP parameter on the ASUSE command was not a letter from A through E.	Correct OP parameter and retry.	ASUSE
ILLEGAL - RF AND AM PARAMETERS.	AM cannot be specified if RF is specified. Both AM and RF were specified on the ASVAL command.	Specify either AM or RF, or neither AM nor RF, but not both.	ASVAL
ILLEGAL - RF AND FM PARAMETERS.	FM cannot be specified if RF is specified Both FM and RF were specified on the ASVAL command.	Specify either FM or RF, or neither FM nor RF, but not both.	ASVAL
ILLEGAL - RL AND NO RF PARAMETER.	RL can be specified only if RF is also specified. RF was not specified, but RL was specified on the ASVAL command.	Either specify both RF and RL or neither.	ASVAL
ILLEGAL ROLLOUT REQUEST.	SYSEDIT and routine SLL can not be rolled out during execution.	None.	SLL
ILLEGAL SDF DEVICE.	The equipment selected to receive a deadstart file does not meet the requirements of an RMS deadstart device.	Ensure acuracy of command or select another device.	1IS
ILLEGAL SL.	The SL parameter in a directive to ASDEBUG was not a number from 0 through 15 or was greater than the SU parameter.	Correct SL parameter and retry.	ASDEBUG
ILLEGAL SU.	The SU parameter in a directive to ASDEBUG was not a number from 0 through 15 or was less than the SL parameter.	Correct SU parameter and retry.	ASDEBUG
ILLEGAL SUBFAMILY.	The SB parameter on the ASUSE command or in a directive to ASLABEL or ASDEBUG was not a number from 0 through 7.	Correct SB parameter and retry.	ASLABEL ASDEBUG ASUSE
ILLEGAL TASK PERCENTAGE.	The task percentage specified exceeds 100.	Correct task percentage in the task definition in the session file.	STIMULA

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
ILLEGAL USER ACCESS.	You tried to perform an operation for which you are not authorized. Possible causes include attempts to access a file or equipment which you are not authorized to access.	Ensure accuracy of command or determine proper validation requirements via LIMITS command.	LFM
ILLEGAL USER ACCESS.	You tried to perform an operation for which you are not authorized. Possible causes include attempts to - Run a system origin job from nonsystem origin. - Access a restricted subsystem without proper validation. - Enter an incorrect SRU value. - Use the V carriage control character without validation.	Ensure accuracy of command or macro, or determine proper validation requirements via LIMITS command.	DSD EXUBUT EXCSLV MSI QFSP RESEX 1MA IAFEX
ILLEGAL USER ACCESS.	You attempted to run MODVAL in a mode that would access the system validation file (FA parameter or K display input) without having security administrator privileges.	None.	MODVAL
ILLEGAL USER ACCESS.	You are not authorized to create direct access or indirect access files or to access auxiliary devices.	Contact site personnel concerning validations.	PFM
ILLEGAL USER/FAMILY.	Dayfile message that may indicate that VALIDUs file is not present in the system or that the user has submitted an incorrect user name or family name.	Examine the EST (H,A.) display to determine if the VALIDUs file is active in the system (VALIDUs is a fast-attach file). If VALIDUs is active, no operator action is necessary; assume an incorrect user name or family name was entered. However, if VALIDUs is not active, it must be initialized (activated) via the console entry X.ISF.	ACCFAM
ILLEGAL USER INDEX.	Nonfatal K display message indicating that the user index is greater than 18 bits.	Enter the correct user index.	STIMULA
IMPROPER NUMERIC PARAMETER.	Nonfatal K display message indicating that the field was too large, too small, or alphabetic.	Reenter the correct data.	STIMULA
IMS - TRACK FLAWED,EQest,TKtttt.	Flawed track found on equipment with EST ordinal est and logical track tttt.	Hardware error. Inform customer engineer.	IMS
IN LESS THAN FILE WRITE TIME.	Report interval length (IN) is less than the file write time of the data file. The file write time is specified by the FW parameter of the ICPD command.	Correct the IN parameter of ACPD.	ACPD
INACTIVE DAYFILE NOT FOUND ON DEVICE.	An inactive dayfile of the specified type was not found on the specified device.	Enter the correct familyname and device number using the K display. Use DFLIST to see where dayfiles reside.	DFTERM
INACTIVE DAYFILE ON DEVICE.	An inactive dayfile already exists on the device on which a new active dayfile is to be created.	Enter another device using the K display.	DFTERM
INCOMPLETE DESTINATION FAMILY/USER.	Either the DF or UN parameter was entered without the other.	Specify both parameters and rerun utility.	QFTLIST
INDEX BUFFER LIMIT.	The limit for user indexes on a catalog track has been reached.	Increase index buffer length (INDBL).	PFCAT
INITIAL PF SPACE = n.	Informative message indicating that the permanent file space at the beginning of the ASMOVE run is n PRUs.	None.	ASMOVE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
INITIALIZATION PROBLEMS - NO FAMILIES WITH 8 CATALOGS FOUND.	MSF catalogs are missing.	Recover or recreate the missing MSF catalogs.	EXINIT
INITIALIZATION PROBLEMS - BAD MSS CONFIGURATION.	The CMRDECK entries for the mass storage facility equipment are incorrect.	Correct the CMRDECK.	EXINIT
INITIALIZATION PROBLEMS - NO CSUMAP FOUND.	CSU maps are missing.	Recover or recreate the missing CSU maps.	EXINIT
INQUIRING username.	Message displayed at line 1 of control point indicating that the user name is being inquired.	None.	MODVAL
INQUIRY COMPLETE.	Dayfile message indicating that the inquiry is completed.	None.	MODVAL
INSTALL ABORTED.	The install job was aborted by the operator.	None.	1IS
INSTALL - ARGUMENT ERROR.	The INSTALL command is syntactically incorrect.	Check parameters on INSTALL command.	INSTALL
INSTALL FILE NOT FOUND.	The file to be installed as a deadstart file was not found (is not assigned to the job control point).	Assign the file to be installed to the job control point before calling INSTALL.	1IS
INSTALL FILE NOT MASS STORAGE.	The file to be installed as a deadstart file does not reside on mass storage.	If the file to be installed is a tape file, copy it to mass storage.:	1IS
INSUFFICIENT CUBES. NUMBER PROCESSED = n.	The number of cubicles to be added to the subfamily is more than the number of unassigned cubicles contained in the CSU. However, n cubicles were added.	Reassign empty cubicles presently assigned to another subfamily or acquire an additional CSU.	ASLABEL
INSUFFICIENT NFL SPACE.	The negative field length for the control point being dumped is less than the default value.	Ensure that the dump file contains meaningful information. Check that the correct control point is being dumped.	DSDI
INVALID CATALOG UPDATE.	Verification of the PFC entry prohibits the setting of a new alternate storage address when a current alternate storage address exists and is not labeled obsolete. Also, an existing valid disk address cannot be replaced in the PFC entry.	Inform site analyst.	PFM
INVALID CHANNEL NUMBER.	The channel number specified by the C=cc parameter on the LOADBC command is incorrect.	Correct channel number and retry.	LOADBC
INVALID CHARGE.	Dayfile and output file message indicating one of the following. - The charge or project number does not exist. - The project number is not available to a user with this user name. - The charge or project number exists but is inactive.	Check to see that charge and project numbers are correct and reenter.	CHARGE
INVALID CS PARAMETER.	The CS parameter on the ASVAL command was not a letter from A through M.	Correct CS parameter and retry.	ASVAL
INVALID DATA IN INPUT STREAM.	Dayfile message indicating that the input file contains data that is incorrect.	Refer to the listing of the input stream for statements in error.	FORMAT
INVALID DEFAULT CHARGE.	One of the following has occurred. - Default charge information or project number does not exist. - Default project number is not available to a user with this account number. - Default charge information or project number exists, but is inactive.	Verify that the default charge and project numbers are valid.	CHARGE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
INVALID DEVICE SPECIFIED.	Dayfile message indicating that the device specified is in an improper state for the selected operation to proceed.	Correct and rerun.	FORMAT
INVALID FX PARAMETER.	The FX parameter on the ASVAL command was not a number.	Correct FX parameter and retry.	ASVAL
INVALID JOB START INFORMATION.	CPN did not return the user's accounting block correctly.	Inform site analyst.	CHARGE
INVALID NEW SECURITY ACCESS LEVEL.	The equipment in which the queued file resides is not validated for the new access level, or the owner of the file is not validated for the new access level.	Inform site analyst.	QALTER
INVALID PAGING ATTEMPT.	K display message indicating that the page advancing command (+) was entered before a LIST command or after a GO command.	None.	QREC QFTLIST
INVALID PARAMETER ON PROGRAM CALL CARD.	Dayfile message indicating that at least one unrecognizable parameter was found on the FORMAT command.	Correct and rerun.	FORMAT
INVALID PFC ADDRESS.	The device number, track, and sector specified as the PFC address are incorrect.	Inform site analyst.	PFM
INVALID SB PARAMETER.	The SB parameter on the ASVAL command was not a numeric character string specifying some of the subfamilies from 0 through 7.	Correct SB parameter and retry.	ASVAL
INVALID SERVICE CLASS.	The two character service class was not valid for the user or not valid for the origin type. This message is issued by CHARGE if a service class is specified by a non-system origin job.	Correct and retry.	MODVAL
INVALID ST PARAMETER.	The ST parameter on the ASVAL command parameter was not a number.	Correct ST parameter and retry.	ASVAL
INVALID SYSTEM SECTOR.	An error occurred while the system sector was being read.	Inform site analyst.	QFM
INVALID TDAM REQUEST.	MSSEXEC received a TDAM request with an invalid function code.	Inform site analyst.	EXSTGE
INVALID TDAM REQUEST.	MSSEXEC received a TDAM request with an invalid function code.	Inform site analyst.	EXMAIN
INVALID USER ACCESS.	The permanent file utilities were called by a non-system origin user without proper validation.	Ensure proper validation.	PFS
INVALID VSN.	The VSN specified on an FX directive contains incorrect characters; or the cartridge label for the current directive has an incorrect VSN.	Retry specifying a valid VSN; or use FX directive to relabel the cartridge.	ASLABEL
IQFT FILE ERROR DN dn FAMILY familyname.	An error was encountered during an attach or read of the IQFT file. The message which follows this message in the dayfile describes the error. dn Device number. familyname Family name.	Inform site analyst.	QDUMP QMOVE
IQFT NOT FOUND.	Mass storage devices require an IQFT file, but the selected device did not have one.	Initialize the device and retry.	QLOAD QMOVE
ISF COMPLETE.	Dayfile message indicating that ISF operation is complete.	None.	ISF
JSN EQest TRACK tttt LENGTH ERROR.	The QUEUE file on track tttt of equipment est had a length error at recovery time. est EST ordinal of the equipment.	Inform site analyst.	QDUMP QREC QMOVE
JSN LIST FULL.	K display message indicating that the job sequence name list does not have room for the specified job sequence name. The job sequence name list may have up to five job sequence names entered.	None.	QFSP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
LA AND UA BOTH REQUIRED.	You specified a lower access level limit or an upper access level limit, but not both.	Reenter the command with both lower and upper access level limits specified.	PFS
****LA AND UA BOTH REQUIRED.	K display message indicating both LA and UA must be specified when selecting access levels.	Correct and retry.	QREC QLOAD QDUMP QMOVE QFTLIST QALTER
LA VALUE LARGER THAN UA.	The lower access limit you specified is greater than the upper access limit you specified.	Enter appropriate access level limits.	PFS
****LA VALUE LARGER THAN UA.	K display message indicating the value associated with the lower access level (LA) must be less than or equal to the value of the upper access level (UA).	Correct and retry.	QREC QLOAD QDUMP QMOVE QFTLIST QALTER
LABEL ERROR, xxx. DESTAGE RESTARTED.	A file destage operation was abandoned because the cartridge label verification procedure for a selected cartridge encountered an error of type xxx on the stream selected for writing. These errors result in the stream conflict error flag being set in the MSF Catalog entry for that stream of the cartridge. The destage is automatically restarted and a different cartridge is used. xxx One of the following errors. CSU FAMILY READ PARITY STREAM VSN VSN AND CSU VSN AND XY XY	Run ASVAL to identify the problem cartridge and stream and the affected permanent file, if any. Refer to Error Conditions and Corrective Action in section 3.	EXDEST
LABEL xxx MISMATCH. filename STAGING ERROR, JSN=jsn, FM=familyname, UI=userindex, CSU=id, MST=n, VSN=vsn, ASA=addr, STRM=s.	The staging of file filename was aborted and an error flag was set in the file's PFC entry because an error with xxx was detected during the stream label verification procedure or the file label verification procedure. All jobs attempting to attach this file will be aborted or given an error response. The stream conflict error flag is set in the MSF Catalog entry for the affected cartridge and stream. xxx One of the following errors. ASA BACKLINK CSU FAMILY PRU STREAM NUMBER UI VSN XY	Retrieve the file from a dump tape if a backup copy is available. Run ASVAL to identify other files, if any, that are affected by this error. Either remove and reassign the cartridge or run ASDEBUG to clear the stream conflict error flag. Refer to Error Conditions and Corrective Action in section 3.	EXSTGE
LDLIST OPERATION COMPLETE.	Informative message indicating completion of QLOAD.	None.	QLOAD
LENGTH IN 52 TABLE .NE. FET.	The controlware record length in the 52 table did not equal the controlware record length specified in the FET after the controlware was read into the LOADBC field length.	Check system controlware records.	LOADBC
LEVEL-0 DATA BASE ERROR.	Dayfile message indicating that a level 0 block on the VALIDUs file was not present or was incorrect.	Ensure that the file is local and contains valid level 0 and level 1 blocks (at least one user entry) and rerun.	MODVAL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
LEVEL-1 INDEX BLOCKS LINKED.	Dayfile message indicating that index blocks are linked.	None, although if the validation file can be reformatted to eliminate block linkage, searches will be faster for user names residing in linked blocks and for nonexistent user names which would have resided in linked blocks.	MODVAL
LEVEL-2 DATA BASE ERROR.	Dayfile message indicating that a VALIDUs structure error in the level 2 block was detected.	Inform site analyst immediately.	MODVAL
LFG COMPLETE.	Indicates normal LFG termination.	None.	LFG
LFG ERRORS.	Indicates abnormal LFG termination. Consult LFG summary listing for detailed error descriptions.	Correct error and try again.	LFG
LID NOT IN TABLE.	An *NLD* (New Destination Logical Identifier) was specified that was not in the LID table.	Correct and reenter K display input or use the LID operator utility to add the LID to the table.	QFSP
LIST COMPLETE.	Informative message on the K display indicating that the LIST command has completed.	None.	QREC QFTLIST
LISTING REMAINING FILES.	Informative message indicating that the remaining catalog image files are being listed.	None.	PFLOAD
LISTPPM - ARGUMENT ERROR.	Dayfile message indicating that an incorrect parameter or an undefined parameter was encountered.	Correct error and retry.	LISTPPM
LISTPPM COMPLETE.	Dayfile message indicating that the LISTPPM run was completed successfully.	None.	LISTPPM
LISTPPM - INVALID DUMP FILE.	Dayfile message indicating that the PIP-PP memory dump was formatted incorrectly.	Inform site analyst.	LISTPPM
LO OPTION NOT RECOGNIZED.	The LO option specified on the command is not a legal option.	Correct and retry.	ACPD
LOAD FILE MISPOSITIONED.	Either of the following situations has occurred. - A file position function indicated an attempt to position beyond EOI. - During a file read function, the control word read was not the expected control word.	Rewind the load file and retry the operation.	QLOAD
LOAD FILE POSITION LOST.	Position on the load file was lost during the write error recovery sequence.	Retry or inform site analyst.	QLOAD
LOADBC ABORT - BAD INITIATION PARAMETERS.	The actual NAD memory size is smaller than the specified LOADBC default memory size.	Inform site analyst.	LOADBC
LOADBC ABORT - xxx ERROR CODE = yyy.	PP program xxx (either CVL or NLD) returned response code yyy when validating the NAD or when loading NAD controlware.	Inform site analyst.	LOADBC
LOADBC REMOTE NAD LOAD - GO OR DROP.	Flashing B display message indicating that CVL could not determine the status of the NAD.	Operator must determine status of the NAD. If NAD is not in use by remote mainframe or by customer engineers, enter GO,jsn. Otherwise, enter DROP,jsn.	LOADBC
LOADING filename userindex.	Informative message indicating the name of the file currently being loaded and the user index under which the file is stored.	None.	PFLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
LOADING - DIRECT ACCESS FILES ONLY.	Informative input file message indicating that only direct access files have been selected to be loaded (OP=D option specified).	None.	PFLOAD
LOADING FROM xxx TO yyy.	Informative output file message indicating the device from which the files being loaded came and the device to which they are being loaded. xxx Device mask of the device that was dumped to the archive tape being loaded. yyy Device mask of the device to be loaded.	None.	PFLOAD
LOADING - INDIRECT ACCESS FILES ONLY.	Informative input file message indicating that only indirect access files have been selected to be loaded (OP=I option specified).	None.	PFLOAD
LOST STIMOUT DATA.	Nonfatal output file message indicating that the buffer has overrun, since CIO is not servicing the stimulator output buffer fast enough.	Reassemble STIMULA with a larger output buffer, reduce line speed or input speed, or increase think time for stimulation.	1TS
LT OPTION NOT SPECIFIED CORRECTLY.	The LT option is valid only with the RM directive; LT was specified in another directive to ASLABEL.	Correct directive and retry.	ASLABEL
MAINLOG - message.	Refer to AFD - message.	None.	DAYFILE
MAINLOG - FR TIME VALUE ILLEGAL.	The time specified via the FR option cannot be converted to a packed time for searching the binary maintenance log.	Retry with a valid time specified.	DAYFILE
MAINLOG - OP OPTION ILLEGAL.	The specified option is not valid when dumping the binary maintenance log.	Retry with a valid option.	DAYFILE
MAINLOG - RECOVERY SECTOR ENCOUNTERED.	A level 0, 1, or 2 deadstart was performed at this point in the binary maintenance log. If the utility detects a linkage error it discards any message fragment being processed.	Always checkpoint the system before performing a level 0, 1, or 2 deadstart.	DAYFILE
MAINLOG - TTY BINARY OUT-FILE NOT ALLOWED.	The binary maintenance log cannot be written to a terminal (TT) device type.	Specify a non-TT destination file.	DAYFILE
MAINTENANCE LOG PROCESSED.	The binary maintenance log dump is complete.	None.	DAYFILE
MANUFACTURING DATA INVALID.	Dayfile message indicating that one of the factory-recorded sectors, containing either manufacturing or flaw data, is either unreadable or not present.	Refer to the output listing for a detailed status report indicating the actual problem. If the factory-recorded data cannot be read, the pack cannot be processed using this utility. Customer engineering must be contacted to add this format information off-line.	FORMAT
MASS STORAGE ERROR.	An error was encountered in reading a portion of the permanent file catalog or permit information (error log and dayfile message).	Inform site analyst.	PFM
MASTER USER NUMBER REQUIRED.	Dayfile message indicating that the job did not enter a user name (via USER command). This is needed for a master user list run and for a master user inquire run.	Rerun job with USER command.	PROFILE
MAXIMUM NUMBER OF ARGUMENTS.	Dayfile message indicating that only the first 30 bit numbers were accepted on a SET. or a CLEAR. command.	Correct and reenter.	SCRSIM
MEMORY ADDRESS BEYOND CM BOUNDARY.	The last word address to be dumped for the C, D, or E directive extends beyond the central memory boundary.	Check that central memory dump is desired. Else, correct and rerun.	DSDI

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
MEMORY OVERFLOW.	There is no more space left in memory for SYSEDIT internal tables.	Reduce the number of programs to SYSEDIT and retry.	SYSEDIT
MEMORY REQUEST ERROR.	Fatal dayfile message indicating that STIMULATOR and 1TS do not agree on the correct field length.	Rerun job; this could be caused by a system failure.	1TS
MERGING STIMOUT DATA.	STIMULA is copying the task data to the STIMOUT file.	None.	STIMULA
MISSING CARTRIDGE. DESTAGE RESTARTED.	A file destage operation was restarted using a different cartridge because the selected cartridge could not be found in its assigned cubicle.	Run ASUSE (OP=B) to identify the lost cartrige. When it is located, run ASLABEL to restore it to its proper cubicle.	EXDEST
MISSING CARTRIDGE. filename FOR jsn NOT STAGED.	The staging of file filename for job jsn was abandoned because a cartridge was missing.	When the cartridge is located, a site analyst should run ASLABEL to restore it to its proper cubicle. (Refer to section 3 of the NOS 2 System Maintenance Reference Manual.)	EXSTGE
**** MISSING VALUE.	Output file message indicting that the user has specified a directive identifier without a value.	Correct and rerun.	PROFILE
MLTF, ERROR - BUFFER FOR NLD TOO SMALL.	The system could not write the specified NADs error log within the buffer specified.	Inform site analyst.	MLTF
MLTF, ERROR - CALLER NOT AUTHORIZED.	The system attempted to log a NAD that was reserved for another job.	Inform site analyst.	MLTF
MLTF, ERROR - CHANNEL NUMBER INVALID.	The system used an incorrect channel number while attempting to log errors from a NAD.	Verify the RHF configuration and specify the correct channel number.	MLTF
MLTF, ERROR - DEVICE ENABLE SWITCH OFF.	The system could not get the specified NAD's error log, because the device enable switch was turned off.	Inform site analyst.	MLTF
MLTF, ERROR - EST/CHAN UNAVAILABLE.	The equipment status table entry for the specified NAD is OFF or the entry had the Controlware Not Loaded flag set.	Load controlware in appropriate local NAD and retry.	MLTF
MLTF, ERROR - INVALID NLD RETURN CODE.	An invalid error code was returned.	Inform site analyst.	MLTF
MLTF, ERROR - NO MORE NADS IN EST.	There are no more NAD entries in the equipment status table.	Inform site analyst.	MLTF
MLTF, ERROR - REMOTE NAD UNAVAILABLE.	The error log from the specified NAD was not available.	Inform site analyst. Ensure the specified NAD is available via the specified path (see dayfile for logging information). Ensure the controlware is loaded in the local NAD and remote NAD (if appropriate).	MLTF
MLTF,LOG RN=nadid, LT=trunk, AC=nadaddr, CH=cc.	The remote NAD is on channel ch is currently being logged nadid — Remote NADs logical trunk address. trunk — Local trunk control unit. nadaddr — Remote NADs access code. cc — Channel number.	None.	MLTF
MLTF, LOGGING LOCAL NAD ON CHANNEL ch.	The local NAD on channel ch is currently being logged.	None.	MLTF
MLTF, NON FATAL ERRORS ENCOUNTERED.	At least one NAD was not successfully logged.	Check the system dayfile to see what NADs were not logged.	MLTF

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
MLTF, NORMAL TERMINATION.	All requested local and remote NADs have been succesfully logged.	None.	MLTF
MLTF, RHF MUST BE STARTED, NO NDT FILE.	The system was unable to NETON to RHF. The Network Description Table was not saved on disk.	Start up RHF and make sure MLTF is enabled.	MLTF
MODIFIED AFTER yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files modified after the specified date and time have been loaded (or dumped).	None.	PFLOAD PFDUMP
MODIFIED AFTER yy/mm/dd.hh.mm.ss. BEFORE yy/mm/dd.hh.mm.ss.	Informative output file message indicating that files modified in the specified interval have been loaded (or dumped).	None.	PFLOAD PFDUMP
MODIFIED BEFORE yy/mm/dd. hh.mm.ss.	Informative output file message indicating that files modified before the specified date and time have been loaded (or dumped).	None.	PFLOAD PFDUMP
MODVAL ABORTED.	Dayfile message indicating that a control point error flag has been set.	Consult the dayfile listing for reason.	MODVAL
MRF PROCESSING COMPLETE, FM=familyname.	Informative message indicating that MSSEXEC processing of file MOVCOM for the family familyname is complete.	None.	EXDEST
MS ERROR ON DEADSTART FILE.	A mass storage error was encountered while the deadstart file was being written.	Use FORMAT to reserve the bad sector.	1IS
MSF CATALOG CHAIN LINKAGE BAD. filename STAGING ERROR, JSN=jsn, FM=familyname, UI=userindex, CSU=id, MST=n, VSN=vsn, ASA=addr, STRM=s.	A linkage error was encountered on the MSF catalog.	A site analyst should run ASVAL to report on the problem and take appropriate corrective action. (Refer to section 3 of the NOS 2 System Maintenance Reference Manual.)	EXSTGE
MSF CATALOG ERROR FLAGS SET. filename FOR jsn.	Informative message indicating that the frozen chain flag or stream conflict flag was set on one or more streams of file filename. The file is staged successfully unless other messages are issued which indicate reasons why the stage is delayed or aborted.	Run ASVAL to identify the error flags that are set and take appropriate action. Refer to Error Conditions and Corrective Action in section 3.	EXSTGE
MSF CATALOG INTERLOCKED. DESTAGE DELAYED, FM=familyname, SF=subfamily.	A file destage operation was delayed because the MSF catalog for the family and subfamily indicated is being accessed. The destage will resume when the MSF catalog becomes available.	None.	EXDEST
MSF CATALOG INTERLOCKED. STAGING DELAY, FM=familyname, UI=userindex.	Staging is delayed because PFDUMP or ASVAL is accessing the MSF catalog. Staging will resume automatically when the interlock is no longer needed.	None.	EXSTGE
MSF CATALOG NOT ONLINE. DESTAGE ABANDONED, FM=familyname, SF=subfamily.	A file destage operation was abandoned because the MSF catalog for the family and subfamily indicated was not on line. The next ASMOVE run for this subfamily will reselect these files for destaging.	None.	EXDEST
MSF CATALOG NOT ONLINE. filename FOR jsn NOT STAGED.	The staging of file filename for job jsn was abandoned because the MSF catalog was not on line. This condition exists when a removable family is mounted after MSSEXEC was initiated or when an I/O error occurred on the MSF catalog.	A site analyst should ensure that the MSF catalog is on line and recover from the I/O error, if necessary. Then restart MSSEXEC.	EXSTGE
MSF CATALOG OPEN ERROR.	The MSF catalog does not exist or is incorrect for the specified familyname and subfamily.	Correct the SB parameter on the ASVAL command or reload/ recreate the MSF catalog.	ASVAL
MSF CATALOG PARITY ERROR.	There is a read parity error on the MSF catalog.	Recover the MSF catalog from a backup copy and retry.	ASUSE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
MSF CATALOG READ ERROR. DESTAGE ABANDONED, FM=familyname, SF=subfamily.	A file destage operation was abandoned because the MSF catalog for the family and subfamily indicated contained a read error. This error may result in subsequent MSF CATALOG NOT ONLINE messages.	Investigate cause of error and take appropriate corrective action.	EXDEST
MSF CATALOG REPLACE ERROR.	An error was encountered during an attempt to add, extend, or remove a subcatalog. The MSF catalog is closed.	Inform site analyst. It may be necessary to restore the MSF catalog from the temporary catalog TMSFCAT.	CATACC
MSF HARDWARE PROBLEM.	The directive to ASLABEL or ASDEBUG cannot be processed at this time because of an MSF hardware failure.	Rerun after a repair has been made.	ASLABEL ASDEBUG
MSF SYSTEM ERROR.	There are problems with the MSS software.	Inform site analyst.	ASDEBUG
MSFCATn FOR FAMILY familyname CLOSED.	The MSF catalog MSFCATn is closed. A preceding message indicates why the MSF catalog is closed.	Inform site analyst.	CATACC
MSS FILE STAGING SUPPRESSED.	Informative output file message indicating that files will not be staged from MSS; only PFC and permit data will be dumped for these files. (OP=S option specified).	None.	PFDUMP
MSSDRVR ABNORMAL, xxx.	There is an internal error in module xxx of the MSS driver.	Inform site analyst.	DR02 DR05 DR06 ER01
MSSEXEC ACTIVE.	Informative message indicating that the Mass Storage Subsystem is active at a control point.	None.	EXMAIN
MSSEXEC SEEKING FL INCREASE.	MSSEXEC needs space for its tables before it can be initialized.	Take action to make additional memory available.	EXMAIN
N EXCEEDS NUMBER OF FILES.	The number of files to be reported is greater than the number of files on the data file.	Correct the N parameter of ACPD.	ACPD
NEW DESTINATION USER/FAMILY INVALID.	K display message indicating that the user name specified by NUN is not on the VALIDUs file in the family specified by NDF.	Ensure accuracy of NUN and NDF parameters and rerun.	QFTLIST
NLD01 - FET ADDRESS ERROR.	The calling program specified a FET pointer that was not within the calling program's field length.	Inform site analyst.	NLD
NLD02 - NOT CALLED FROM SYSTEM LIBRARY.	The calling program did not have system origin privileges.	Inform site analyst.	NLD
NLD03 - INVALID FUNCTION CODE.	The calling program specified a function code that does not exist.	Inform site analyst.	NLD
NLD05 - BUFFER ARGUMENT ERROR.	The calling program specified a FET buffer pointer that was not valid.	Inform site analyst.	NLD
NLD06 - ABORTED BY SYSTEM.	One of the error flags in the calling program's control point area was set.	None.	NLD
NO ACTIVE DAYFILE FOUND.	An active dayfile of the specified type was not found in the QFSP equipment table.	Stop this DFTERM run, start another DFTERM run, and retry the operation. If the error still exists, check system for loss of dayfile.	DFTERM
NO BITS SPECIFIED.	Dayfile message indicating that no bit numbers were specified on a SET. or a CLEAR. command.	Correct and reenter.	SCRSIM
NO CARTRIDGE AVAILABLE IN POOL.	A cartridge from the pool is needed so that the directive to ASLABEL can be processed.	Assign more cartridges to the pool or change the directive.	ASLABEL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
**** NO CHARGE NUMBER IN EFFECT.	Output file message indicating that a charge number must be in effect before any charge value or project directives can be processed.	Enter a correct charge number directive before proceeding.	PROFILE
NO CONTROLWARE ON CHANNEL.	The channel controlware table indicates that no controlware exists on the requested channel.	Check the C=cc parameter on the LOADBC command and retry.	LOADBC
NO DEVICES IN THE FAMILY.	The family specified by the FM parameter on the ASMOVE command has no devices on line.	Bring the devices on line or specify a different family.	ASMOVE
NO DIRECTIVES PROCESSED.	No directives were specified on the DSDI command.	Reenter command with directives specified.	DSDI
NO EMPTY CARTRIDGES AVAILABLE IN FAMILY.	There are no empty cartridges that the RM directive to ASLABEL can remove.	None.	ASLABEL
NO EMPTY CUBE IN FAMILY/POOL.	Empty cubicles assigned to the family/pool are needed so that the directive to ASLABEL can be processed.	Assign more cubicles to the family/pool or change the directive.	ASLABEL
NO EMPTY CUBES. NUMBER PROCESSED=n.	There are no more empty cubicles in the family/pool/reserved area. The RB directive to ASLABEL could remove only n cubicles.	None.	ASLABEL
NO FILES PROCESSED.	Informative message indicating that no files have been cataloged during the utility run.	None.	PFCAT PFLOAD
NO GENERAL STATUS RECEIVED.	After the function was performed, no status word was received.	Inform customer engineer.	LOADBC
NO INACTIVE QUEUED FILES PRESENT.	No inactive queues were found during the processing of a LIST command.	None.	QREC
NO INACTIVE QUEUES ON DEVICE.	Informative message indicating that the LIST command failed to find any inactive queued files on the device specified on the K display by the FM/DN parameter.	None.	QREC
NO MANUFACTURER OR SCRATCH LABEL.	The cartridge to be added has a label of unknown type.	Discard the cartridge or use the FX directive to ASLABEL to restore the label.	ASLABEL
NO MATCHING FAMILY LABEL.	The familyname or subfamilyname in the cartridge label does not agree with the values specified in the directive to ASLABEL.	Try restoring the cartridge or use correct familyname and subfamilyname.	ASLABEL
NO MORE RECORDS OF TYPE x TO PROCESS.	Processing of record type x requires more records of type x than can be found in the dump file.	Correct error and try again.	NDA
NO MSF SPACE. DESTAGE ABANDONED, FM=familyname, SF=subfamily, CSU=id.	A file destage operation was abandoned because of insufficient MSF space; id is the CSU identifier of the CSU with the most space available.	Either use ASLABEL to add cartridges to the specified subfamily or use ASVAL to purge unneeded MSF space. ASUSE can be used to report on the availability of space for each CSU and subfamily.	EXDEST

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
NO MSF SPACE. DESTAGE ABANDONED, FM=familyname, SF=subfamily.	A file destage operation was abandoned because there was no CSU assigned to the indicated family and subfamily with any space available.	Run ASUSE to obtain a report on the availability of cartridge space. If enough space is available on a CSU, ensure that the CSU and at least one MST is available for use. If adequate space is not available, use ASLABEL to add cartridges to the subfamily or use ASVAL to purge unneeded MSF space.	EXDEST
NO OFF CARTRIDGE LINK. DESTAGE RESTARTED.	A file destage operation was restarted using a different cartridge because the selected cartridge could not contain the remainder of the file and could not be linked to another cartridge.	None.	EXDEST
NO OUTPUT FILE EXISTING.	K display message indicating that no output file was created before the OUT command was entered.	None.	DFTERM
NO OUTPUT FILE EXISTS.	K display message indicating that no output file was created before the OUT command was entered.	None.	QDUMP QMOVE
NO OUTPUT FILE PRESENT.	The OUT command was entered but QLOAD could not find an output file to release.	Create an output file and retry operation.	QLOAD
NO OUTPUT FILE PRESENT.	Informative message to dayfile.	None.	QREC
NO PARAMETER SUPPLIED (C=cc).	There was no channel parameter (C=cc) specified on the LOADBC command.	Add the C=cc parameter to the LOADBC command.	LOADBC
NO PERMANENT DAYFILES.	Informative message indicating that no permanent dayfiles exist on any permanent file device.	None.	DFTERM
NO *PROBE* DATA AVAILABLE.	The system failed to return any data. No report will be generated, nor will a file be created.	Ensure that PROBE was enabled at deadstart time.	PROBE
NO *PROBE* DATA ON FILE.	The file specified by the B option on the command has no PROBE data.	Check file for correctness.	PROBE
**** NO PROJECT NUMBER IN EFFECT.	Output file message indicating that a project number must be in effect before any project value directives can be processed.	Enter a project number directive before proceeding.	PROFILE
NO QUEUED FILES FOUND.	No queued files meet the specified selection criteria.	Ensure that correct selection criteria were entered and rerun.	QFTLIST
NO REPORT GENERATED.	The L option on the command was set to 0.	None.	PROBE
NO SCR ON MAINFRAME.	The user entered SCRSIM on a mainframe that does not support an S/C register or an S/C register simulator.	None.	SCRSIM
NO SDAL DATA ON FILE.	The file specified by the B option on the command has no SDAL data.	Check file for correctness.	PROBE
NO SUCH CSUMAP OR SUB-CATALOG.	The CSU specified by the CS parameter is not assigned to the subfamilyname specified by the SB parameter.	Correct the CS and/or SB parameter on the ASLABEL command.	ASLABEL
NO SUCH SUBCATALOG.	The CSU specified by the CS parameter is not assigned to the subfamilyname specified by the SB parameter.	Correct the CS and/or SB parameter.	ASDEBUG
NO TTYS ASSIGNED.	There are no terminals assigned to the sessions.	Enter assigned terminals using the MX directive.	STIMULA

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
**** NO USER INDICES AVAILABLE.	Output file message indicating that no more user indices are available for automatic assignment. If entered from the K display, the line of input on which the error occurred is disregarded; otherwise, that particular user name is disregarded.	Rerun the corrected job or correct the new validation file using the FUI directive (force user index to be inserted or changed) to specify user indices.	MODVAL
NO USER STATEMENT EXECUTED.	A USER command was not executed before the CHARGE command was executed.	Ensure that a USER command is executed before the CHARGE command is executed.	CHARGE
NO VERSION DATA ON FILE.	The file specified by the B option on the command has no version data.	Check file for correctness.	PROBE
NO 52 TABLE IN CONTROLWARE RECORD.	The controlware read from the specified file (system file by default or F=filename) did not contain a 52 table entry.	Check the controlware file being used.	LOADBC
NO 77 TABLE IN CONTROLWARE RECORD.	The controlware read from the specified file (system file by default or F=filename) did not contain a 77 prefix table entry.	Check the controlware file being used.	LOADBC
NON FROZEN FRAGMENT.	The specified fragment which ASDEBUG was requested to release did not have the frozen flag set.	Correct directive and retry.	ASDEBUG
NOT ALL VARIABLES IN MPAR.	An internal error occurred in generating the MAP and MPAR tables. Not all the entries in MAP are a subset of the entries in MPAR.	Inform site analyst.	ACPD
NOT ENOUGH ARGUMENTS.	Dayfile message indicating that before the correct number of arguments was specified, a terminator was encountered.	Correct and reenter.	SCRSIM
NOT ENOUGH MASS STORAGE.	Not enough mass storage exists on the specified device to enable creation of a new active dayfile.	Enter new device using the K display.	DFTERM
**** NOT MASTER USER.	Output file message indicating that the user is neither a master user of a specified charge number, a special accounting user, nor from system origin, as is required for the directive entered.	None.	PROFILE
NOT VALIDATED TO CHANGE ACCESS LEVEL.	The user must have security administrator privileges to change the access level of a queued file.	Inform site analyst.	QALTER
NOTICE*** DATA READ ERROR.	Read error caused loss of words in the dayfile.	None.	DAYFILE
NOTICE*** RECOVERY BOUNDARY.	Message(s) were lost due to crossing a deadstart recovery boundary.	None.	DAYFILE
NUMBER OF BITS TOO LARGE.	Dayfile message indicating that the number of bits entered on the AREA. command was larger than the number of bits from the starting bit to the end of the register.	Correct and reenter.	SCRSIM
NUMBER OF CYCLES TOO LARGE.	Dayfile message indicating that the number of cycles specified on the CYCLE. command was greater than 4095.	Correct and reenter.	SCRSIM
NUMBER OF LINE REGULATIONS = nnnnnnnn	Informative dayfile message indicating the number of time line regulations (REPEAT..) that were encountered.	To reduce the number of line regulations, reduce the stimulator load by reducing the number of terminals or by increasing the think time or think time increment.	STIMULA
**** OBSOLETE DIRECTIVE IGNORED.	The input directive entered is no longer meaningful and was ignored.	None.	MODVAL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
OBSOLETE MSF CATALOG ONLINE. filename FOR jsn NOT STAGED.	The staging of file filename for job jsn was abandoned because an obsolete MSF catalog was used.	Recover the current copy of the MSF catalog. A site analyst should run ASVAL to analyze the MSF catalog and the PFC entries (refer to section 3 of the NOS 2 System Maintenance Reference Manual).	EXSTGE
ON, OF OPTION VIOLATED.	The ON and OF parameters were omitted or both specified for a directive which requires that only one be present, or the ON and OF parameters were specified for a directive which prohibits their use.	Correct directive and retry.	ASDEBUG
ON, OFF NOT SPECIFIED CORRECTLY.	ON and OF are valid only with the IB directive; ON or OF was specified on another directive to ASLABEL.	Correct directive and retry.	ASLABEL
OUTPUT FILE NAME CONFLICT.	The specified output file name conflicts with a name already in use.	Change the output file name and retry operation.	QMOVE
OUTPUT FILE RELEASED.	Informative message on K display indicating that output file was released to the printer.	None.	DFTERM QREC QMOVE QDUMP QLOAD QFTLIST
P.F. DEVICE dn DUMPED.	Informative message indicating that dumping of permanent files from device with device number dn is complete.	None.	PFDUMP
P.F. DEVICE dn LOADED.	Informative message indicating that loading of permanent files from device with device number dn is complete.	None.	PFLOAD
PACK packname LOADED.	Informative message indicating that the auxiliary device, identified by packname, has been loaded.	None.	PFLOAD
PACKNAME packname DUMPED.	Informative message indicating that the auxiliary device, identified by packname, has been dumped.	None.	PFDUMP
PAGE DESCRIPTOR NOT FOUND.	A page table was not found when using the I directive.	Ensure that the dump file contains meaningful information.	DSDI
PAGING COMPLETE.	Informative message on the K display indicating that page advancing command (+) has completed.	None.	QREC
PARAMETER CHARACTER COUNT EXCEEDED.	A parameter has more than 10 characters in a DSDI command.	Correct parameter in DSDI command and rerun.	DSDI
PARAMETER OPTION COUNT EXCEEDED.	More than 10 options were chosen for a selected control point, when using the *CP* directive.	Reduce the number of options for selected control point to 10 or less, and rerun.	DSDI
PARITY ERROR IN CATALOG IMAGE dm ct.	A parity error was encountered while PFLOAD read catalog image information for catalog track ct for the master device with device mask dm.	Enter K.GO to skip the affected catalog track while processing others. Enter anything else to abort the load.	PFLOAD
**** PASSWORD REQUIRED.	A password was not encountered for the user name being created. If MODVAL is being run from batch, the user name is not created.	Specify a password if at K display or correct and rerun if from batch.	MODVAL
PASSWORD TOO SHORT.	In the PASSWOR command the new password specified contains fewer characters than the minimum required.	Use a longer password.	MODVAL
PERMANENT DAYFILE DEFINED AS filename.	Informative message indicating that the dayfile has been terminated and defined under the name filename.	None.	DFTERM

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PERMANENT DAYFILE LIST COMPLETE.	K display message for DFTERM or output file message for DFLIST indicating that the permanent dayfile list is complete.	None.	DFLIST DFTERM
PERMANENT FILE PROBLEM.	A permanent file error was encountered on the CSU map or the MSF catalog.	Recover the CSU map or MSF catalog.	ASDEBUG
PERMIT RI RANGE ERR filename userindex.	Random index of the permit information for file filename is not within the legal range. Dumping continues with the file data.	Inform site analyst.	PFDUMP
PF PROBLEM.	A permanent file error was encountered on the CSU map or the MSF catalog.	Recover the CSU map or MSF catalog.	ASLABEL
PF SPACE RELEASED = n.	Informative message indicating that the permanent file space released by ASMOVE is n PRUs.	None.	ASMOVE
PF SPECIFIED BUT NOT UI.	User index associated with permanent file name specified is required but was not entered.	Reenter parameters and specify both file name and user index.	PFS
PFATC ABORTED.	A fatal error occurred causing PFATC to abort.	Check dayfile for other error messages to aid in determining the cause of this error.	PFATC
PFATC COMPLETE.	Informative message indicating that PFATC is complete.	None.	PFATC
PFATC - NO FILES PROCESSED.	Informative message indicating that no files meeting the specified selection criteria were found.	None.	PFATC
PFATC - PARITY ERR filename userindex.	Parity error was encountered on tape while cataloging file filename; file is skipped.	Retry or use backup tape.	PFATC
PFATC - PREMATURE EOF DETECTED.	During dump tape processing, an EOF was detected before the end of dump control word.	Inform site analyst. The format of the dump tape should be investigated.	PFATC
PFATC - TAPE PARITY ERROR.	Parity error was encountered on tape. Tape is skipped to next EOR mark. This message is similar to the PFATC - PARITY ERR filename userindex message except that the file name and user index are not known. This will occur when the error is in reading control information rather than file data.	Try backup tape or inform site analyst.	PFATC
PFC VERIFICATION ERROR.	The creation date and time, user index, or alternate storage address does not agree with the current PFC contents.	Inform site analyst.	PFM
PFCAT ABORTED.	A fatal error occurred causing PFCAT to abort.	Check dayfile for other error messages to aid in determining the cause of the abort.	PFCAT
PFCAT COMPLETE.	Informative message indicating that the catalog of the permanent file device is complete.	None.	PFCAT
PFCAT - ILLEGAL DEVICE NUMBER filename userindex.	The device number specified in the catalog entry for file filename with user index is the number of an alternate device that cannot be found.	Mount the missing device and retry the operation.	PFCAT
PFCOPY ABORTED.	A fatal error occurred causing PFCOPY to abort.	Check dayfile for other error messages to aid in determining the cause of this error.	PFCOPY
PFCOPY - CATALOG CONTROL WORD MISSING.	During dump tape processing, a catalog control word was expected but not found.	Inform site analyst. Format of the dump tape should be investigated.	PFCOPY

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFCOPY COMPLETE.	Informative message indicating that PFCOPY is complete.	None.	PFCOPY
PFCOPY - DATA CONTROL WORD ERROR.	A data control word was expected on the dump file but was not found.	Retry or use backup tape.	PFCOPY
PFCOPY - FILE NAME CHANGED TO ZZZZZLF.	The name of the file being copied was the same as the specified output file. The local file name was changed to prevent a conflict.	None.	PFCOPY
PFCOPY - FILE NAME CHANGED TO ZZZZZTF.	The name of the file being copied was the same as the specified archive file. The local file name was changed to prevent a conflict.	None.	PFCOPY
PFCOPY - NO DEVICE FOR FILE filename userindex.	No mass storage device whose access level limits include the access level of file filename is available.	None.	PFCOPY
PFCOPY - NO FILES PROCESSED.	Informative message indicating that no files have been copied during the utility run.	None.	PFCOPY
PFCOPY - PARITY ERR filename userindex.	Parity error was encountered on tape while PFCOPY copied file filename; file is skipped.	Retry or use backup tape.	PFCOPY
PFCOPY - PREMATURE EOF DETECTED.	During dump tape processing, an EOF was detected before the end of dump control word.	Inform site analyst. The format of the dump tape should be investigated.	PFCOPY
PFCOPY - SYSTEM SECTOR TOO LONG.	The word count for a system sector exceeds the standard system sector length; probable cause is that two parts of different split system sectors were joined. The affected file is skipped. Processing continues with the next file.	Retry or use backup tape.	PFCOPY
PFCOPY - SYSTEM SECTOR TRUNCATED.	The word count for a system sector is less than the standard system sector length; probable cause is that part of a split system sector is missing. The affected file is skipped. Processing continues with the next file.	Retry or use backup tape.	PFCOPY
PFDUMP yy/mm/dd. hh.mm.ss.	Informative output file message indicating the date and time of the dump.	None.	PFDUMP
PFDUMP - ABORT REPRIEVE BEGUN.	Marks the start of PFDUMP's abort processing.	None.	PFDUMP
PFDUMP - ABORT REPRIEVE COMPLETED.	Marks the completion of PFDUMP's abort processing. No further PFDUMP processing occurs after this message is issued.	None.	PFDUMP
PFDUMP ABORTED.	A fatal error occurred causing PFDUMP to abort.	Refer to accompanying error message to aid in determining the cause of the abort.	PFDUMP
PFDUMP - ACCESS LEVEL LIMITS OUT OF RANGE.	The access level limits for the devices to be dumped are not within the system access level limits or, if the LA and UA parameters were specified, the values specified for these parameters are not within the system access level limits.	Change the system access level limits or specify different values for the LA and UA parameters.	PFDUMP
PFDUMP - ACCESS LEVELS NOT ALLOWED ON ARCHIVE FILE EQUIPMENT.	The access level limits for the devices to be dumped or, if specified the LA and UA parameters, are not within the access level limits for the equipment assigned to the ARCHIVE and VERIFY files.	Assign different equipment to the ARCHIVE and VERIFY files.	PFDUMP
PFDUMP - BAD SYSTEM SECTOR, FN=filename, UI=userindex.	Error was encountered in the system sector of file filename during dump to archive tape. Dumping continues with the next file. Error idle status is set for the device.	Inform site analyst.	PFDUMP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFDUMP - CATALOG READ ERROR, FM=familyname, DNdn, CTct, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read catalog information on the specified familyname, device number, logical catalog track, EST ordinal, logical track, and logical sector. Files cataloged in the bad sector are not dumped. If possible, dumping continues with the next sector of the affected catalog track. Otherwise, dumping continues with the next catalog track or device as appropriate for the dump type. Error idle status is set for the device.	Analyze error and retry. If error persists, assume cause is hardware malfunction.	PFDUMP
PFDUMP - CATALOG READ ERROR, FN=filename, UI=userindex.	File filename for the specified user index was not dumped because a catalog read error affected the sector on which the file was cataloged. Error idle status is set for the device.	Analyze error and retry.	PFDUMP
PFDUMP - CATALOG READ ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read catalog information on the specified auxiliary pack. The EST ordinal, logical track, and logical sector are given. Files cataloged in the bad sector are not dumped. If possible, dumping continues with the next sector of the affected catalog track. Otherwise, dumping continues with the next catalog track or device as appropriate for the dump type. Error idle status is set for the device.	Analyze error and retry. If error persists, assume cause is hardware malfunction.	PFDUMP
PFDUMP COMPLETE.	Marks normal termination of PFDUMP. No further processing occurs after this message is issued.	None.	PFDUMP
PFDUMP - DAPF BUSY, FN=filename, UI=userindex.	Direct access file filename with userindex cannot be dumped because it is attached in a writable mode. Dumping continues with the next file.	Retry PFDUMP operation after user has released the file.	PFDUMP
PFDUMP - DAPF READ ERROR, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read a direct access file on the specified familyname, device number, EST ordinal, logical track, and logical sector. The dump continues with the next record, unless suppressed by the error option.	Analyze error and retry.	PFDUMP
PFDUMP - DAPF READ ERROR, FN=filename, UI=userindex, PRU=pru.	A mass storage error occurred while PFDUMP read direct access file filename for user index at relative PRU pru. The dump continues at the next record, unless suppressed by the error option.	Analyze error and retry.	PFDUMP
PFDUMP - DAPF READ ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read a direct access file on the specified auxiliary pack, EST ordinal, logical track, and logical sector. The dump continues with the next record, unless suppressed by the error option.	Analyze error and retry.	PFDUMP
PFDUMP - DAPF TOO LONG, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A direct access file was truncated at the specified familyname, device, EST ordinal, logical track, and sector when the number of sectors read for the file exceeded the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - DAPF TOO LONG, FN=filename, UI=userindex, PRU=pru.	Direct access file filename for user index was truncated at the specified relative PRU address when the number of sectors read for the file exceeded the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFDUMP - DAPF TOO LONG, PN=packname, EQest, Ttttt, Sssss.	A direct access file on the specified auxiliary pack was truncated at the specified EST ordinal, logical track, and logical sector when the number of sectors read for the file exceeded the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - DAPF TOO SHORT, FM=familyname, DNdn, EQest, Ttttt, Sssss.	The number of sectors dumped for a direct access file on the specified familyname device with the specified EST ordinal, logical track, and sector was less than the length determined by the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - DAPF TOO SHORT, FN=filename, UI=userindex, PRU=pru.	The number of sectors dumped for the specified direct access file was less than the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - DAPF TOO SHORT, PN=packname, EQest, Ttttt, Sssss.	The number of sectors dumped for a direct access file on the specified auxiliary pack at the specified EST ordinal, logical track, and sector was less than the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - DAPF TRUNCATED, FN=filename, UI=userindex, PRU=pru.	Direct access file filename was truncated when a mass storage error occurred preventing further dumping of the file. PRU=pru gives the number of PRUs truncated. Dumping continues with the next file.	Analyze error and retry.	PFDUMP
PFDUMP - DEVICE ERROR IDLE SET, FM=familyname, DNdn, EQest, Ttttt, Sssss.	PFDUMP has set an error idle status on device dn with EST ordinal est for the reason given in the previous message.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - DEVICE ERROR IDLE SET, PN=packname, EQest, Ttttt, Sssss.	PFDUMP has set an error idle status on pack packname and EST ordinal est for the reason given in the previous message.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP DEVICE dn FAMILY familyname.	Informative message identifying the device being dumped, and the family name associated with that device. dn Device number. familyname Family name.	None.	PFDUMP
PFDUMP DEVICE MASK dm.	Informative message indicating device mask (dm) of device currently being dumped.	None.	PFDUMP
PFDUMP - DEVICE dn NOT FOUND.	The specified device was not found in the system.	Retry operation with device defined in the system.	PFDUMP
PFDUMP - DEVICE NOT FOUND, FN=filename, UI=userindex, DNdn.	The device dn containing file filename for user index userindex was not found. Dumping continues with the next file.	Retry operation with device defined in the system.	PFDUMP
PFDUMP DEVICE dn PACK packname.	Informative message identifying the pack name of the auxiliary device currently being dumped. dn Device number. packname Pack name.	None.	PFDUMP
PFDUMP - IAPF READ ERROR, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read an indirect access file on the specified familyname, device number, EST ordinal, logical track, and logical sector. Dumping continues with the next record, unless suppressed by the error option.	Analyze error and retry.	PFDUMP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFDUMP - IAPF READ ERROR, FN=filename, UI=userindex, PRU=pru.	A mass storage error occurred while PFDUMP read indirect access file filename for user index at relative PRU pru. Dumping continues with the next record, unless suppressed by the error option.	Analyze error and retry.	PFDUMP
PFDUMP - IAPF READ ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read an indirect access file on the specified auxiliary pack, EST ordinal, logical track, and logical sector. Dumping continues with the next record, unless suppressed by the error option.	Analyze error and retry.	PFDUMP
PFDUMP - IAPF TOO LONG, FM=familyname, DNdn,EQest, Ttttt, Sssss.	An indirect access file was truncated at the specified, familyname, device, EST ordinal, logical track, and sector when the number of sectors read for the file exceeded the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - IAPF TOO LONG, FN=filename, UI=userindex, PRU=pru.	An indirect access file filename for user index was truncated at the specified relative PRU address when the number of sectors read for the file exceeded the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - IAPF TOO LONG, PN=packname, EQest, Ttttt, Sssss.	An indirect access file on the specified auxiliary pack was truncated at the specified EST ordinal, logical track, and logical sector when the number of sectors read for the file exceeded the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - IAPF TOO SHORT, FM=familyname, DNdn, EQest, Ttttt, Sssss.	The number of sectors dumped for an indirect access file on the specified familyname device at the specified EST ordinal, logical track and sector was less than the length determined by the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - IAPF TOO SHORT, FN=filename, UI=userindex, PRU=pru.	The number of sectors dumped for the specified indirect access file was less than the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - IAPF TOO SHORT, PN=packname, EQest, Ttttt, Sssss.	The number of sectors dumped for an indirect access file on the specified auxiliary pack at the specified EST ordinal, logical track, and sector was less than the length determined from the TRT. Dumping continues with the next file. Error idle status is set for the device.	Dump files, initialize device, and reload files.	PFDUMP
PFDUMP - IAPF TRUNCATED, FN=filename, UI=userindex, PRU=pru.	Indirect access file filename for user index was truncated when a mass storage error occurred preventing further dumping of the file. PRU=pru gives the number of PRUs truncated. Dumping continues with the next file.	Analyze error and retry.	PFDUMP
PFDUMP - MSS PERMANENT ERROR, FN=filename, UI=userindex.	The system control error flag or the data error flag was set in the PFC for the specified file. The system control error flag is set by the MSS executive if the indicated alternate storage address does not provide a valid path to the file's data. The data error flag is set by the MSS executive if an unrecoverable parity error prevents the file from being staged. Only the PFC and permission information are dumped for this file.	None.	PFDUMP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFDUMP - MSS STAGED FILE RESCAN KILLED, FN=filename, UI=userindex.	The operator discontinued the rescan of a given catalog track for MSF files staged to disk. Probable cause of the operator's action is a malfunction of MSSEXEC and/or its auxiliaries. This message is issued for each file not dumped because of the operator's action. After all such files are listed, dumping continues with the next catalog track.	Analyze reason for operator's action and retry.	PFDUMP
PFDUMP - MSS TEMPORARY ERROR, FN=filename,UI=userindex.	The temporary error flag was set in the PFC for the specified file. This flag is set by the MSS executive if a temporary error prevents the file from being staged. Only the PFC and permission information are dumped for this file.	None.	PFDUMP
PFDUMP - NO FILES PROCESSED.	Informative message indicating that no files have been dumped.	Check file selection parameters and rerun if necessary.	PFDUMP
PFDUMP - NO FILES SELECTED.	The specified file selection parameters for the dump were such that the files could not exist on the system.	Change file selection parameters and restart dump.	PFDUMP
PFDUMP - OPERATOR DISABLED filename.	The PFDUMP archive or verify file named was disabled by operator action. The dump continues on the remaining file.	None.	PFDUMP
PFDUMP - ORPHAN PFC ENCOUNTERED, FN=filename, UI=userindex.	File filename does not have an image on disk or on MSF. Error idle status is set for the device. Dumping continues with the next file.	Analyze error and then purge the affected file.	PFDUMP
PFDUMP - PERMIT FORMAT ERROR, FN=filename, UI=userindex.	The permit entries for the specified file were not dumped because the user index of the file did not match the user index in the permit entry. Dumping continues with the file data. Error idle status is set for the device.	Recreate the permit entries for the file.	PFDUMP
PFDUMP - PERMIT READ ERROR, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read permit information on the specified familyname, device number, EST ordinal, logical track, and logical sector. The bad sector and any following sectors of permit information for the affected file are truncated. Dumping continues with the file data. Error idle status is set for the device.	Analyze error and retry.	PFDUMP
PFDUMP - PERMIT READ ERROR, FN=filename, UI=userindex.	A mass storage error occurred while PFDUMP read the permit information of file filename for user index userindex. The bad sector and any following sectors of permit information for file filename are truncated. Dumping continues with the file data. Error idle status is set for the device.	Analyze error and retry.	PFDUMP
PFDUMP - PERMIT READ ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFDUMP read permit information on the specified auxiliary pack, EST ordinal, logical track and logical sector. The bad sector and any following sectors of permit information for the affected file are truncated. Dumping continues with the file data. Error idle status is set for the device.	Analyze error and retry.	PFDUMP
PFDUMP - RD/WT ERROR ON UCDT UPDATE, FN=filename, UI=userindex.	An unrecoverable read/write error occurred while PFDUMP attempted to update the utility control date and time field in the PFC entry for file filename. Error idle status is set for the device. Dumping continues with the next file.	Dump the affected device and reload its files. PFLOAD will flaw the affected catalog track.	PFDUMP

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFDUMP - READ ERROR ON REQS.	There is an unrecoverable read error on the staging request file REQS. Thus, PFDUMP is not able to report the files not dumped because the operator suspended the rescan of a given catalog track for MSF files staged to disk.	Analyze error and retry.	PFDUMP
PFDUMP - READ ERROR ON RESS - ABORT.	There is an unrecoverable read error on the rescan screen file RESS. Thus, PFDUMP was not able to search for MSF files it has requested to be staged to disk.	Analyze error and retry.	PFDUMP
PFDUMP - VERIFY ERROR ON UCDT UPDATE, FN=filename, UI=userindex.	PFU has rejected the request to update the utility control date and time field in the PFC entry for file filename. The catalog entry found at the indicated catalog track location did not agree with the supplied verification information. Error idle status is set for the device. Dumping continues with the next file.	Notify the site analyst.	PFDUMP
PFDUMP - ZERO LENGTH FILE, FN=filename, UI=userindex.	File filename is empty and thus cannot be dumped. Error idle status is set for the device. Dumping continues with the next file.	None.	PFDUMP
PFLOAD yy/mm/dd. hh.mm.ss.	Informative output file message indicating the date and time of the load.	None.	PFLOAD
PFLOAD ABORTED.	A fatal error occurred causing PFLOAD to abort.	Check dayfile for other error messages to aid in determining the cause of the abort.	PFLOAD
PFLOAD - ALTERNATATE DEVICE NOT FOUND, FN=filename, UI=userindex.	The device on which a direct access file formerly resided is not available in the system and an alternate device was not specified. Loading continues with the next file.	To load the skipped file, rerun the utility and specify an alternate device (DD parameter) or specify OP=L to load the file to the device with the most space.	PFLOAD
PFLOAD - ARCHIVE FILE FORMAT ERROR.	Information not recognizable by PFLOAD was detected on the archive file. Loading continues with the next file.	Ensure correct tape is in use and/or retry operation.	PFLOAD
PFLOAD - ASSIGN TAPE.	Informs operator that assignment of an archive file is required.	Assign archive file.	PFLOAD
PFLOAD - CATALOG IMAGE FORMAT ERROR.	A catalog image record was found on the archive file in a format unrecognizable by PFLOAD.	The bad archive file can be used in a normal load by specifying the omit option (OP=O) to skip the catalog image record.	PFLOAD
PFLOAD - CATALOG READ ERROR, FM=familyname, DNdn, CTct, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD read catalog information on the specified familyname, device number, logical catalog track, EST ordinal, logical track, and logical sector. Error idle status is set for the device.	Analyze error and retry.	PFLOAD
PFLOAD - CATALOG READ ERROR, FN=filename, UI=userindex.	File filename was cataloged in a sector affected by a mass storage error. Error idle status is set for the master device.	Analyze error and retry.	PFLOAD
PFLOAD - CATALOG READ ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD read catalog information on the specified auxiliary pack, EST ordinal, logical track, and logical sector. Error idle status is set for the device.	Analyze error and retry.	PFLOAD
PFLOAD - CATALOG WRITE ERROR, FM=familyname, DNdn, CTct, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote catalog information on the specified familyname, device number, logical catalog track, EST ordinal, logical track, and logical sector. Error idle status is set for the device.	Analyze error and retry.	PFLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFLOAD - CATALOG WRITE ERROR, FN=filename, UI=userindex.	The catalog information for file filename could not be written because of a mass storage write error. Error idle status is set for the master device.	Analyze error and retry.	PFLOAD
PFLOAD - CATALOG WRITE ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while writing catalog information on the specified auxiliary pack, EST ordinal, logical track, and logical sector. Error idle status is set for the device.	Analyze error and retry.	PFLOAD
PFLOAD - DAPF WRITE ERROR, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote a direct access file on the specified familyname, device number, EST ordinal, logical track, and logical sector. Mass storage space for the affected file is dropped and the bad track is flawed. A catalog entry is not created for the file. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD - DAPF WRITE ERROR, FN=filename, UI=userindex.	A mass storage error occurred while PFLOAD wrote direct access file filename for user index. Mass storage space for the affected file is dropped and the bad track is flawed. A catalog entry is not created for the file. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD - DAPF WRITE ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote a direct access file on the specified auxiliary pack, EST ordinal, logical track, and logical sector. Mass storage space for the affected file is dropped and the bad track is flawed. A catalog entry is not created for the file. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD DEVICE dn FAMILY familyname.	Informative message identifying the device being loaded and the family name associated with that device. dn Device number. familyname Family name.	None.	PFLOAD
PFLOAD - DEVICE dn NOT FOUND.	The specified device was not found.	Retry operation with device defined in the system.	PFLOAD
PFLOAD DEVICE dn PACK packname.	Informative message identifying the pack name of the auxiliary device being loaded The device number will always be zero. dn Device number. packname Pack name.	None.	PFLOAD
PFLOAD - ERROR IDLE DETECTED, FM=familyname, DNdn, EQest, Ttttt, Sssss.	An error idle status was detected on the specified device. The EST ordinal, logical track, and logical sector are given.	Correct error idle condition and then rerun the load.	PFLOAD
PFLOAD - ERROR IDLE DETECTED, FN=filename, UI=userindex.	An error idle status was detected on the device being loaded. The file filename is the first file that could not be loaded.	Correct error idle condition and then rerun the load.	PFLOAD
PFLOAD - ERROR IDLE DETECTED, PN=packname, EQest, Ttttt, Sssss.	An error idle status was detected on the specified auxiliary device. The EST ordinal, logical track, and logical sector are given.	Correct error idle condition and then rerun the load.	PFLOAD
PFLOAD - ERROR IDLE SET, FM=familyname, DNdn, EQest, Ttttt, Sssss.	PFLOAD has set an error idle status on device dn, EST ordinal est for the reason given in the previous message.	Analyze error and retry.	PFLOAD
PFLOAD - ERROR IDLE SET, PN=packname, EQest, Ttttt, Sssss.	PFLOAD has set an error idle status on the specified auxiliary device for the reason given in the previous message.	Analyze error and retry.	PFLOAD
PFLOAD - EXCESSIVE PARITY ERRORS.	PFLOAD has encountered 100B consecutive read parity errors on the archive file. The load is aborted.	Retry or use backup tape.	PFLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFLOAD - EXTRACT ILLEGAL WITHOUT CIR.	The extract option was specified for the load when the archive file did not contain a catalog image record (CIR).	Retry without extract option.	PFLOAD
PFLOAD-FILE TRUNCATED, FN=filename, UI=userindex.	The data for the file on the archive tape is shorter than the length indicated in the catalog entry for the file. The file is truncated and the length in the catalog is updated to reflect the smaller size. Loading continues with the next file.	Load the file from a backup tape if desired.	PFLOAD
PFLOAD - IAPF WRITE ERROR, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote an indirect access file on the specified family name, device number, EST ordinal, logical track, and logical sector. A catalog entry with a special write error user index is created for that portion of the file up to and including the bad sector. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD - IAPF WRITE ERROR, FN=filename, UI=userindex.	A mass storage error occurred while PFLOAD wrote indirect access file filename for user index userindex. A catalog entry with a special write error user index is created for that portion of the file up to and including the bad sector. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD - IAPF WRITE ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote an indirect access file on the specified auxiliary pack, EST ordinal, logical track, and logical sector. A catalog entry with a special write error user index is created for that portion of the file up to and including the bad sector. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD - ILLEGAL NAME/INDEX, 00000000000000000000.	A file with an incorrect name and/or user index was encountered and skipped. The 42-bit file name and 18-bit user index are shown in octal. Loading continues with the next file.	Analyze error and retry.	PFLOAD
PFLOAD - LABEL BAD, ASSIGN NEW TAPE.	Informs operator that the archive file did not contain a correct dump label.	Assign a new archive file.	PFLOAD
PFLOAD-MISSING EOR, FN=filename, UI=userindex.	Logical EOR is missing on the file being loaded (incorrect data). The file is truncated and the length of the file is updated in the PFC. This message is followed by the message PFLOAD - TAPE ERROR, FN=filename, UI= userindex. to identify the file.	Retry or use backup tape.	PFLOAD
PFLOAD - NO DEVICE FOR FILE, FN=filename, UI=userindex.	No permanent file device whose access level limits include the access level of file filename is available.	None.	PFLOAD
PFLOAD - NO EOI FOR FILE, FN=filename, UI=userindex.	The next catalog (or other control word type that logically precedes the previous DATA control word) was found before EOI was detected for the current file. The file length is updated in the catalog entry. Loading continues with the next file. The message is followed by the message PFLOAD - TAPE ERROR, FN= filename, UI= userindex. to identify the file.	Retry or use backup tape.	PFLOAD
PFLOAD - NO FILES SELECTED.	The file selection parameters for the load were such that the specified files could not exist in the system.	Correct selection parameters and restart load.	PFLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFLOAD - NO SPACE FOR FILE, FN=filename, UI=userindex.	The length of the named direct access file is greater than the amount of space available on the selected device. Loading is coninued with the next file.	If the OP=L option was specified, there is no room for the file on any device; space must be made available by purging other files. If the OP=L was not specified, it can be used to select the device with the most space.	PFLOAD
PFLOAD - PARITY ERROR, FN=filename, UI=userindex.	A parity error was encountered on the archive tape while PFLOAD loaded file filename. Loading continues with the next file.	Retry or use backup tape.	PFLOAD
PFLOAD - PERMIT WRITE ERROR, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote permit information on the specified familyname, device number, EST ordinal, logical track, and logical sector. The bad sector and any following sectors of permit information for the affected file are truncated. Error idle status is set for the device.	Analyze error and retry.	PFLOAD
PFLOAD - PERMIT WRITE ERROR, FN=filename, UI=userindex.	A mass storage error occurred while PFLOAD wrote the permit information of file filename for user index userindex. The bad sector and any following sectors of permit information for file filename are truncated. Error idle status is set for the device.	Analyze error and retry.	PFLOAD
PFLOAD - PERMIT WRITE ERROR, PN=packname, EQest, Ttttt, Sssss.	A mass storage error occurred while PFLOAD wrote permit information on the specified auxiliary pack, EST ordinal, logical track and logical sector. The bad sector and any following sectors of permit information for the affected file are truncated. Error idle status is set for the device.	Analyze error and retry.	PFLOAD
PFLOAD - PERMITS MISSING, FN=filename, UI-userindex.	Permit information on the archive tape is missing or incomplete. Loading continues with the next file. This message is followed by the message PFLOAD - TAPE ERROR, FN=filename, UI=userindex. to identify the file.	Retry or use backup tape.	PFLOAD
PFLOAD - PERMITS PRESENT THAT SHOULD NOT BE, FN=filename, UI-userindex.	A permit block was found on tape but no permit random index was found in the catalog entry of the file. Loading continues with the next file. This message is followed by the message PFLOAD - TAPE ERROR, FN=filename, UI=userindex. to identify the file.	Retry or use backup tape.	PFLOAD
PFLOAD - SELECTED FILES NOT ON ARCHIVE FILE.	The archive file dump label showed that the selected files are not on the archive file.	Ensure correct archive tape is being used and that correct PFLOAD parameters are specified and retry operation.	PFLOAD
PFLOAD - SYSTEM SECTOR TOO LONG, FN=filename, UI=userindex.	The word count for the system sector encountered for file filename exceeds the standard length; probable cause is that two parts of different split system sectors were joined. Loading continues with the next file.	Analyze error and retry, or use backup tape.	PFLOAD
PFLOAD - SYSTEM SECTOR TRUNCATED, FN=filename, UI=userindex.	The word count for the system sector encountered for file filename is less than the standard length; probable cause is that part of a split system sector is missing. Loading continues with the next file.	Analyze error and retry.	PFLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFLOAD - TAPE ERROR, FN=filename, UI=userindex.	Error was encountered on tape while PFLOAD loaded file filename. Loading continues with the next file. This message identifies the file that PFLOAD was attempting to load when the error occurred. The error is described in the previously issued message.	Inform site analyst.	PFLOAD
PFLOAD - TAPE PARITY ERROR.	Parity error was encountered on tape. Tape is skipped to next EOR mark. This message is similar to the PFLOAD - PARITY ERROR message except that the file name and user index are not known. This will occur when the error is in reading control information rather than file data.	Try backup tape or inform site analyst.	PFCOPY PFLOAD
PFLOAD - TRACK LIMIT, FM=familyname, DNdn, EQest, Ttttt, Sssss.	A track limit condition was encountered on the specified familyname device. The EST ordinal, logical track, and logical sector are given.	Free up space on the device and then rerun the load.	PFLOAD
PFLOAD - TRACK LIMIT,FN=filename, UI=userindex.	A track limit condition was encountered on the permanent file device being loaded. The file filename is the first file that could not be loaded.	Free up space on the device and then rerun the load.	PFLOAD
PFLOAD - TRACK LIMIT, PN=packname, EQest, Ttttt, Sssss.	A track limit condition was encountered on the specified auxiliary device. The EST ordinal, logical track, and logical sector are given.	Free up space on the device and then rerun the load.	PFLOAD
PFM LENGTH ERROR filename	A length error was detected while de-queing file filename.	Inform site analyst.	PFM
PFN=filename, FAMILY=familyname UI=userindex - DEFINE ERROR.	ASDEF cannot define a CSU map or MSF catalog.	Submit a Programming System Report (PSR) with supporting material.	ASDEF
PFN=filename, FAMILY=familyname, UI=userindex - ALREADY PERMANENT.	One or more of the CSU maps and/or MSF catalogs to be created already exists.	Correct parameters on the ASDEF command and retry, or purge the existing MSF catalogs and/or CSU maps and retry.	ASDEF
PFN=filename, FAMILY=familyname, UI=userindex - FAMILY NOT FOUND.	The familyname specified by the FM parameter on the ASDEF command does not exist.	Specify an existing familyname and retry.	ASDEF
PFN=filename, FAMILY=familyname, UI=userindex - CIO ERROR.	A write error was encountered on the CSU map or the MSF catalog.	Purge the affected CSU map or MSF catalog and use ASDEF to create a new one.	ASDEF
PFN=filename, FAMILY=familyname, UI=userindex - FILE INITIALIZED.	Informative message indicating that the CSU map or MSF catalog was created successfully.	None.	ASDEF
PFU - ALTERNATE DEVICE NOT FOUND.	PFU is unable to locate the alternate device for a direct access file which does not reside on a master device.	Make device available and retry.	PFU
PFU - BUFFER ARGUMENT ERROR ON filename AT address.	The circular buffer pointers for file filename did not satisfy the following conditions. - FIRST .LE. IN .LT. LIMIT - FIRST .LE. OUT .LT. LIMIT - LIMIT .LE. FL filename Name of file being processed. address FET address of file.	Inform site analyst.	PFU
PFU - BUFFER CTL WORD ERROR ON filename AT address.	The word count of a disk sector to be read from a central memory buffer exceeds the word count limit of a sector (100B). filename Name of file being processed. address FET address of file.	Inform site analyst.	PFU
PFU - CATALOG TRACK NOT FOUND.	No permanent file catalog track could be found for the user index being processed.	Inform site analyst.	PFU

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PFU - CONTROL POINT ERROR FLAG DETECTED ffff.	Error flag ffff was detected at PFU control point; PFU aborts. If no operator action has been taken to drop the control point, other messages indicating the probable cause of the error flag should be present.	Inform site analyst, if operator did not drop the control point.	PFU
PFU - DUPLICATE FILE, filename AT address.	There is a file at the control point whose name, filename, is the same as one of the files used by the permanent file utility that is currently active. filename Name of file being processed. address FET address of the file.	Inform site analyst; recommended action is to return or rename the file and retry.	PFU
PFU - FILE NOT FOUND, filename AT address.	An entry for the file filename was not found in the file name table (FNT). filename Name of file being processed. address FET address of the file.	Inform site analyst.	PFU
PFU - I/O SEQUENCE ERROR ON filename AT address.	An operation was requested on a file before the previous operation completed. filename Name of file being processed. address FET address of file.	Inform site analyst.	PFU
PFU - NO DEVICE SPECIFIED.	No device number was specified with the PFU read list function.	Inform site analyst.	PFU
PFU - NOT SPECIAL SYSTEM JOB.	The calling program does not have an SSJ= special entry point defined.	None.	PFU
PFU - PARAMETER ERROR.	The program calling PFU has an error in the calling parameters. This should not occur unless there is an error in the utility or a nonutility program is calling PFU. Nonutility programs call PFU at their own risk.	Inform site analyst.	PFU
PFU - TRACK FLAWED, EQest, TKtttt.	PFU encountered a mass storage error while allocating and verifying a new track for catalogs, permits, or file data. The track is flawed, and another track requested. est EST ordinal of device. tttt Track number.	None.	PFU
PFU - TRACK INTERLOCK CLEAR ON filename AT address.	When PFU was called to clear the track interlock on a file, the FST entry for that file showed that the interlock was already clear. filename Name of file being processed. address FET address of file.	Inform site analyst.	PFU
PFU - TRACK INTERLOCK SET ON filename AT address.	When PFU was called to set the track interlock on a file, the FST entry for that file showed that the interlock was already set. filename Name of file being processed. address FET address of file.	Inform site analyst.	PFU
PK, PT OPTION VIOLATED.	One of the following. - The PK or PT option cannot be used with the directive specified. - The PK or PT option has not been specified correctly. - The PK or PT option cannot be used with one of the other parameters specified.	Correct error and retry.	ASLABEL
PPU NOT FOUND.	Output file message indicating that the requested PP record was not found in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
PREMATURE END OF FILE ON dumpfile.	Unexpected EOR or EOF encountered while processing NPU dump file dumpfile.	Inform site analyst. Possible bad NPU dump file.	NDA
PREMATURE EOF.	A premature EOF was detected while copying the EDD file to a random file during initialization.	Ensure that the dump file contains meaningful information.	DSDI
PREMATURE *EOF* ENCOUNTERED.	During processing of the load file, an EOF was encountered before it was expected.	Inform site analyst. Format of the load tape should be investigated.	QLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
PRIVATE PACK/PERMIT UN CONFLICT.	User name of the private pack is not the same as the user name specified for permits. In this case, no new active dayfiles may be started on the private pack.	Select a different device for the new dayfile.	DFTERM
PROBE CONTROL STATEMENT ERROR.	An error has been detected in the PROBE command.	Correct command and retry.	PROBE
PROBE DATA DISABLED.	PROBE data gathering was disabled at deadstart time.	None.	PROBE
PROBE NOT ENABLED.	PROBE was not enabled on the system prior to the creation of the EDD tape.	Ensure that the dump file contains meaningful information.	DSDI
PROBE REPORT COMPLETE.	Informative message.	None.	PROBE
PROBE TABLES NOT AVAILABLE.	The PROBE tables were not found on the dump file.	Ensure that the dump file contains meaningful information.	DSDI
PROBE VERSION MISMATCH.	The version under which the data was built is not the current PROBE version.	Use correct version of PROBE to generate report.	PROBE
PROCESSING COMPLETE ON NPxxxxx.	This message is output for each NPU dump record processed.	None.	NDA
PROCESSING DUMP FILE. dmp yy/mm/dd. hh.mm.ss.	Informative message indicating which dump is currently being processed and the date and time. This message is issued when the dump header field is encountered. In cases where file positioning requests position the file beyond this point, the message will not appear.	None.	QLOAD
PROCESSING INPUT DIRECTIVES.	DSDI initialization is complete and directives are being processed.	None.	DSDI
PROFILE ABORTED.	Dayfile message indicating that an error flag has been set at the control point.	Consult dayfile listing for reason (operator drop, for example).	PROFILE
PROFILE FILE CREATE COMPLETE.	Dayfile message indicating that the creation run is complete.	None.	PROFILE
PROFILE FILE DATA BASE ERROR.	Dayfile message indicating that the project file does not contain both a level 0 and level 1 block.	Ensure that the project file is local and contains a level 0 and level 1 block (at least one charge entry) and rerun.	PROFILE
PROFILE FILE INQUIRY COMPLETE.	Dayfile message indicating that the inquire run is complete.	None.	PROFILE
PROFILE FILE INTERLOCKED	Message displayed at line 1 of the control point indicating that the PROFILE file is interlocked for modification during update run.	None.	PROFILE
PROFILE FILE LIST COMPLETE.	Dayfile message indicating that the list of PROFILa is complete.	None.	PROFILE
PROFILE FILE REFORMAT COMPLETE.	Dayfile message indicating that the reformat run is complete.	None.	PROFILE
PROFILE FILE RELEASED	Message displayed at line 1 of the control point indicating that the PROFILE file has been released during update run to allow other system updates.	None.	PROFILE
PROFILE FILE SOURCE COMPLETE.	Dayfile message indicating that the source run is complete.	None.	PROFILE
PROFILE FILE UPDATE COMPLETE.	Dayfile message indicating that the update run is complete.	None.	PROFILE
PROGRAM ABNORMAL, xxx.	There is a catalog access internal error in module xxx.	Inform site analyst.	CATACC ASLABEL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
**** PROJECT COUNT LIMIT EXCEEDED.	The user has tried to create more active projects under this charge number than allowed.	None.	PROFILE
PROJECT EPILOGUE NOT FOUND.	Although a project epilogue was defined, it could not be accessed.	The project master user should either delete the epilogue definition or create an epilogue file.	CHARGE
**** PROJECT NUMBER ACTIVE.	The user has attempted to activate an already active project number.	Rerun using correct project number, if necessary.	PROFILE
**** PROJECT NUMBER DOES NOT EXIST.	A directive for which a project number must exist made reference to a project number that does not exist.	Correct and rerun using existing project number.	PROFILE
**** PROJECT NUMBER INACTIVE.	The user has made a reference to a project number that is inactive with a directive for which the project number must be active.	Activate project number and rerun or rerun using correct project number.	PROFILE
PROJECT PROGRAM AND SHELL CONFLICT.	Either a project prologue or project epilogue and a no abort shell are defined.	Delete the prologue, epiloque, or shell, or change the shell control option.	CPM
PROJECT PROLOGUE NOT FOUND.	Although a project prologue was defined, it could not be accessed.	The project master user should either delete the prologue definition or create a prologue file.	CHARGE
PURGING filename userindex.	Informative message indicating that file filename is being purged after being dumped as directed by the OP=P option.	None.	PFDUMP
Q PARAMETER TOO LARGE - MAXIMUM ALLOWABLE VALUE SUBSTITUTED.	Informative message.	None.	EXINIT
Q PARAMETER TOO SMALL - MINIMUM ALLOWABLE VALUE SUBSTITUTED.	Informative message.	None.	EXINIT
QAC ERROR ENCOUNTERED.	Explanatory dayfile message indicating why QFTLIST or QALTER aborted. QAC returned an unexpected error code.	Inform site analyst.	QFTLIST
QALTER COMPLETE.	Informative message indicating that QALTER operation is finished.	None.	QFTLIST
QDUMP ABORTED.	An error has been detected which is not processed by QDUMP error processing. Attempts to correct the situation have been made, but discretion should be used in continuing use of QDUMP.	Inform site analyst. Check the dayfile for other error messages to determine the cause of the abort.	QDUMP
QDUMP COMPLETE.	Informative message indicating the specified operation has been completed.	None.	QDUMP
QF LENGTH ERROR filename.	A length error was detected while dequeuing file filename.	Inform site analyst.	QFM
QFF UNABLE TO INTERLOCK MST	Self-explanatory.	Inform site analyst	QFM
QFM BUFFER TOO SMALL.	The buffer for reading the system sector is fewer than 100B words long.	Increase buffer size and retry.	QFM
QFM EOI BAD ON ATTACHED FILE.	The EOI sector cannot be found on the specified file.	Inform site analyst.	QFM
QFM ERROR ON ERRNNN FILE.	While getting the file, *QFM* detected an error and converted the file to locked common file *ERRNNN*.	Check file, cleanup, and retry.	QLOAD
QFM FILE ALREADY ATTACHED.	The specified file is already attached to the control point.	None.	QFM
QFM FILE ALREADY ATTACHED.	You tried to create a file that already exists.	Specify a different file name.	QFM

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
QFM FILE IGNORED filename.	The file was ignored because it had an incorrect origin or type code. It could indicate a bad IQFT file.	Verify that valid origin or file type code is being used.	QFM
QFM FOT FULL.	Family cannot be defined in the system since the family ordinal table is full.	A level 0 deadstart is required to create space in the FOT.	QFM
QFM I/O SEQUENCE ERROR.	Action was requested on a busy file.	Wait until file is not busy and retry.	QFM
QFM ILLEGAL REQUEST.	One of the following. - Specified function was incorrect or undefined. - Job did not have SSJ= entry point. - Auto recall bit was not set.	Verify that valid QFM request is being made.	QFM
QFM ILLEGAL USER ACCESS.	The user tried to perform an operation for which he is not validated (for example, attempting to run a system origin job from nonsystem origin).	Ensure accuracy of command or macro or determine proper validation requirements.	QFM
QFM INTERLOCK ERROR.	Track interlock could not be set because of conflict.	Inform site analyst.	QFM
QFM IQFT INTERLOCK ABORT.	The utility aborted while trying to set a new IQFT file on the device.	Inform site analyst.	QFM
QFM NO IQFT TRACK AVAILABLE.	Space is not available to create an IQFT file while initializing the device.	Inform site analyst.	QFM
QFM RANDOM ADDRESS ERROR	Error in converting a dayfile random address.	Inform site analyst.	QFM
QFM SYSTEM SECTOR ERROR.	An error occurred while the system sector was being read.	Inform site analyst.	QFM
QFM TRACK MISMATCH.	The file about to be purged is not the same file that was previously attached. The first track in the FST does not equal the one from the DULL word.	Inform site analyst.	QFM
QFT FULL DETECTED BY QFM.	When called to assign a file to mass storage, QFM returned status indicating that the QFT was full.	Check output file to determine which files were not loaded. Retry when system is not as busy.	QLOAD
QFT LIMIT ON LOAD.	The calculated QFT threshold has been reached.	Check listing to determine which files were not loaded. Retry when the system is not as busy.	QLOAD
QFT/LOCAL FNT IS FULL.	The FNT became full during processing of the requeue function and all files could not be requeued.	Inform site analyst.	QFM
QFT THRESHOLD LIMIT.	The QFT has reached the limit allocated for queued files. No more queued files can be activated until some of these files are released.	Retry when system is not as busy.	QREC QMOVE
QFTLIST/QALTER ABORTED.	The system aborted QFTLIST or QALTER.	Inform site analyst.	QFTLIST
QLOAD ABORTED.	Job was dropped by operator or aborted because of a system error.	Check the dayfile for other error messages to determine the cause of the abort.	QLOAD
QLOAD - nnnn ACTIVE FILES LOADED.	Informative message indicating the number of active files loaded.	None.	QLOAD
QLOAD - nnnn ERRxxx FILES CREATED.	Informative message indicating the number of queued files that could not be processed because of write parity errors on mass storage. The files in error have been renamed to the file ERRxxx and will remain assigned to the control point as locked common files.	Inform site analyst to locate and flaw the tracks in error.	QLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
QLOAD - nnnn FILES IGNORED.	Informative message indicating the number of files ignored during the load operation.	None.	QLOAD
QLOAD - nnnn FILES LISTED.	Informative message indicating the number of files listed.	None.	QLOAD
QLOAD - nnnn INACTIVE FILES LOADED.	Informative message indicating the number of inactive files loaded.	None.	QLOAD
QLOAD OPERATION COMPLETE.	Informative message indicating completion of QLOAD.	None.	QLOAD
QLOAD TERMINATED	QLOAD aborted and the abort processing was terminated either by the operator or because of a system error.	Check dayfile for the cause.	QLOAD
QMOVE ABORTED.	An error has been detected which is not processed by QMOVE error processing. Attempts to correct the situation have been made, but discretion should be used in continuing use of QMOVE.	Inform site analyst. Check the dayfile for other error messages to determine the cause of the abort.	QMOVE
QMOVE COMPLETE.	Informative message indicating completion of QMOVE.	None.	QMOVE
QREC COMPLETE.	K display message indicating completion of QREC.	None.	QREC
QREC/QLIST ABORTED.	This message occurs if QREC aborts for any reason.	A level 0 deadstart may be needed to recover lost queued files.	QREC
QUEUE FILE ASSIGN ERROR.	Attempt to force a device assignment for the queued file being loaded resulted in the file being assigned to the wrong equipment.	Check output for files processed.	QLOAD
QUEUE FILE UTILITY COMPLETE.	Informative message indicating utility has completed.	None.	QFSP
QUEUE STATUS INDEFINITE.	QREC, QDUMP, or QMOVE has not been able to finish necessary file processing after an error or error exit. The status of IQFTs and queued files is unknown.	Inform site analyst. A level 0 (initial) deadstart is recommended.	QREC QDUMP QMOVE
nnnn QUEUED FILES INTERLOCKED.	Informative message indicating the number (nnnn) of interlocked files created on the destination device because of unrecoverable write errors which occurred on that device. The names of these files are of the form ERRxxx, where xxx is a three-digit sequence number from 001 through 999.	None.	QMOVE
QUEUES UNRECOVERABLE THIS DEVICE.	This message is issued in conjunction with the following message. DNdn FM familyname MS ERROR. (for QREC) or IQFT FILE ERROR DN dn FAMILY familyname. (for QDUMP/QMOVE) Refer to the appropriate message for device information.	None.	QREC QDUMP QMOVE
RANDOM INDEX ERROR.	The random disk address of the permit sector is in error (error log and dayfile message).	Inform site analyst.	PFM
RD AND UI/UN NOT ALLOWED.	The RD and UI/UN parameters in the PFDUMP command are mutually exclusive.	Correct and retry.	PFS
RDF DATE BEFORE PURGE DATE.	Release processing was not performed because the RDF file was created before the last purge date.	Create a new RDF file and retry.	ASVAL
RDF FILE ERROR - BAD RECORD LENGTH.	The RF parameter specifies an incorrect or wrong file, or there is an internal error in ASVAL or PFDUMP. The run is aborted.	Correct RF parameter and retry.	ASVAL
RDF FILE ERROR - MISSING HEADER.	The RF parameter specifies an incorrect or wrong file, or there is an internal error in ASVAL or PFDUMP. The run is aborted.	Correct RF parameter and retry.	ASVAL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
RDF FILE ERROR - UNIDENTIFIED DATA.	Informative message indicating that a record type other than the known types was encountered. The run continues.	Inform site analyst.	ASVAL
RDPFC, ERROR IDLE, DN dv.	RDPFC skipped device dv because of an error idle on the device.	Clear the error idle and rerun job.	MAC2
RDPFC, PF UTILITY ACTIVE, DN dv.	RDPFC skipped device dv because a permanent file utility was active on it.	Rerun job after the utility is done.	MAC2
READ ERROR - FILE DUMPED.	During a mass storage read an error occurred with error processing indicated, the file was dumped.	Check file and correct.	QDUMP QMOVE
READ ERROR - FILE IGNORED.	During a mass storage read an error occurred with no error processing indicated, the file is ignored.	Inform site analyst and check file for accuracy.	QDUMP QMOVE
READ PARITY ERROR. filename STAGING ERROR, JSN=jsn, FM=familyname, UI=userindex, CSU=id, MST=n, VSN=vsn, ASA=addr, STRM=s.	The staging of file filename was aborted because of a read parity error. All jobs attempting to attach this file will be aborted or given an error response.	Retrieve the file from a dump tape if a backup copy is available. Run ASVAL to identify other files, if any, that are affected by this error. Remove and reassign the cartridge. Refer to Error Conditions and Corrective Action section.	EXSTGE
READING filename userindex.	Informative message indicating name of the file that is currently being read from the archive tape and the user index under which the file is stored.	None.	PFCOPY PFLOAD
RECORD NOT FOUND.	Output file message indicating that the record name specified in a READ directive was not found in the specified file.	Correct and rerun.	DSDI
RECORD NOT FOUND.	Error was encountered during the building of the system library. An attempt was made to place a nonexistent routine on an alternate system device. Deadstart processing halts when this error is detected.	Attempt another deadstart. If the error persists, inform site analyst.	SYSEDIT
REFORMAT COMPLETE.	Dayfile message indicating reformat run successfully completed.	None.	MODVAL
RELEASE DATE USED = n.	Informative message indicating that the release date value used by ASMOVE is n.	None.	ASMOVE
RELEASE TIME USED = n.	Informative message indicating that the release time value used by ASMOVE is n.	None.	ASMOVE
REMOVABLE DEVICE/NO ACTIVE DAYFILES.	The device specified by K display parameters is a removable device and the option selected is termination of an active dayfile. Active dayfiles are not allowed to reside on removable devices.	Enter new device using the K display.	DFTERM
REPLACE ERROR.	The same file was found twice during a catalog search. This error can occur for APPEND or REPLACE commands or macros after a file is found and purged and the catalog search is continued (error log and dayfile message).	Inform site analyst.	PFM
REQUESTED MEMORY NOT FOUND.	Output file message indicating that the EPB directive was entered and no extended memory/PP buffer was found in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
REQUESTED RESTORATION NOT FOUND.	The SYSEDIT value specified by the R parameter is greater than the current level.	Correct the value specified by the R parameter to a value less than the current SYSEDIT change level.	SYSEDIT

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
REQUIRED FL EXCEEDS JOB MAX.	ASVAL needs more field length than allowed to complete processing.	Increase the maximum field length for the job.	ASVAL
RESCAN CATALOG TRACK FOR STAGED FILES. ENTER K. GO - CONTINUE RESCAN. K. SKIP - SCAN NEXT CATALOG TRACK.	PFDUMP has reached its limit of non-productive rescans of a catalog track waiting for files to be staged from MSS. If the SKIP option is selected, messages will be issued identifying all files that were not dumped.	Described in message.	PFDUMP
RESET DISK SPACE RELEASE INHIBIT DATES.	Informative output file message indicating that PFDUMP will enter the date and time of the dump into the inhibit date/time field of the master device. (SD parameter specified).	None.	PFDUMP
RESIDENT CENTRAL LIBRARY EMPTY.	No resident central library was found in the EDD file.	None.	DSDI
RESTORING ADDRESSES S/N=serialn.	Console message indicating that the pack is currently undergoing restoration of the address fields. Here, serialn is the actual pack serial number read.	Do not drop the control point while this message is displayed.	FORMAT
S/N MISMATCH - serialn JOB ABORTED.	Console message indicating that FORMAT was terminated due to a mismatch between the serial number specified by the P parameter of the FORMAT command and the serial number recorded on the pack. Here, serialn is the serial number read from the pack.	Enter correct serial number with the P parameter of the FORMAT command.	FORMAT
SCRIPTS CANNOT FOLLOW TASK DEFINITIONS.	K display message indicating that the format of the session file is incorrect; tasks must follow sessions.	Put task definitions after session records.	STIMULA
SDF INSTALLATION COMPLETE.	Informative message indicating that system deadstart file installation is complete.	None.	INSTALL
SECURITY CONFLICT.	An attempted operation within the job would have resulted in a violation of security access levels or categories. The cause is described in the immediately preceding dayfile message.	Correct and retry.	1AJ
SELECTED CUBE NOT ASSIGNED AS EXPECTED. NUMBER PROCESSED = n.	One of the cubicles is not available for the assignment specified by a directive to ASLABEL. However, n cubicles were assigned.	Correct directive to ASLABEL and retry.	ASLABEL
SELECTED CUBE NOT EMPTY. NUMBER PROCESSED = n.	One of the cubicles to be removed by the RB directive to ASLABEL is not empty. However, n cubicles were removed.	Specify a different cubicle and retry.	ASLABEL
SELECTED CUBE NOT UNASSIGNED. NUMBER PROCESSED = n.	One of the cubicles to be added by the AB directive to ASLABEL is already assigned. However, n cubicles were added.	Specify a different cubicle and retry.	ASLABEL
SELECTED DEVICE NOT MASS STORAGE.	The EST ordinal specified on the MST directive was not that of a mass storage device.	Correct and rerun.	DSDI
SELECTOR MOTION ERROR. DESTAGE RESTARTED.	A file destage operation was restarted using a different cartridge because of a hardware problem.	Inform customer engineer.	EXDEST
SEQUENCING BAD AFTER ADDRESS nnnnnn IN RECORD TYPE x.	Records of type x are not continuously located in ascending order on the dump file. This error occurred after line address nnnnnn.	Correct error and try again.	NDA
SETTING PF ACTIVITY COUNT.	PFDUMP or PFCAT is waiting for PFU to increment the permanent file device activity count before starting catalog processing. This message should be displayed for a few seconds only.	Inform site analyst if message is displayed for an extended period of time.	PFDUMP PFCAT
SETTING UTILITY INTERLOCK.	PFLOAD is waiting for PFU to set the permanent file utility interlock on a device before loading it. When no other utility (such as PFLOAD or MSI) is active on the device and permanent file activity on the device ceases, PFLOAD continues automatically.	Wait for other utility to complete.	PFLOAD

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
SL NOT SPECIFIED CORRECTLY.	The SL parameter on the ASUSE command was not a number from 0 through 16.	Correct SL parameter and retry.	ASUSE
SLL ARGUMENT ERROR.	One of the following conditions occurred. - An incorrect function code was passed to routine SLL. - The parameter address passed to routine SLL was out of range. - The request word address passed to routine SLL was out of range.	Inform site analyst.	SLL
SLVi ABNORMAL - xxx.	MSSSLV on mainframe i has encountered an abnormal error condition in routine xxx.	Inform site analyst.	EXSLV
SLVi ACTIVE, EXEC xxxx.	The current status of MSSEXEC according to MSSSLV on mainframe i, where xxxx is ACTIVE, IDLE, or INACTIVE.	None.	EXSLV
SLVi - ERROR TERMINATION (1).	While MSSSLV on mainframe i was reading the master-to-slave communications file MTOSPFN, an I/O error occurred which prevented further MSSSLV processing.	Purge file MTOSPFN and reinitialize MSSEXEC and all MSSSLV programs.	EXSLV
SLVi - IDLED DOWN.	Informative message indicating that MSSSLV on mainframe i terminated normally in response to an operator IDLE command.	None.	EXSLV
SLVi, MTOSPFN xxxx.	MSSSLV on mainframe i attempted to attach or read the master-to-slave communication file MTOSPFN. xxxx is the status of the attempt and is one of the following. - OK. - ATTACH PROBLEM. - LENGTH PROBLEM. - NO MID MATCH.	If xxxx is OK, no action is required. If xxxx is LENGTH PROBLEM, purge MTOSPFN and reinstall MSSSLV and MSSEXEC using identical values for NUMRB, MAXSLV, and NUMSLV in common deck COMEIPR and for RBSIZE in common deck COMAMSS. If xxxx is ATTACH PROBLEM or NO MID MATCH, idle MSSEXEC (if currently running), and reinitialize it.	EXSLV
SLVi, STOMNOi xxxx.	MSSSLV on mainframe i attempted to establish access to the slave-to-master communication file STOMNOi. The status of this attempt is indicated by xxxx, which can be one of the following. - OK. - ATTACH PROBLEM. - BUSY. - DEFINE PROBLEM.	If xxxx is not OK, analyze error and try again. Ensure that the link device is configured as a direct access permanent file device.	EXSLV
SPECIFIED CHANNEL IS IN USE.	The user tried to load controlware on a channel that was down and assigned to a maintenance user.	Retry the LOADBC command after the maintenance user has finished and has released the channel.	LOADBC
ST NOT SPECIFIED CORRECTLY.	The ST parameter was specified without an equals sign in a directive to ASDEBUG.	Specify ST correctly and retry.	ASDEBUG
STATUS/CONTROL REGISTERS NOT FOUND.	Output file message indicating that the S/C register record was not found in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
STIMULATION COMPLETE.	Informative dayfile message indicating that stimulation is complete.	None.	STIMULA
SU NOT SPECIFIED CORRECTLY.	The SU parameter on the ASUSE command was not a number from 0 through 16 or was less than the SL parameter.	Correct SU parameter and retry.	ASUSE
SUBSYSTEM NOT FOUND.	Output file message indicating that the requested subsystem was not found in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
SYNTAX ERROR, ASDEBUG ABORT.	The ASDEBUG command or directive is syntactically incorrect.	Correct command or directive and retry.	ASDEBUG

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
SYNTAX ERROR - ASLABEL ABORT.	The ASLABEL command or directive is syntactically incorrect.	Correct command or directive and retry.	ASLABEL
SYNTAX ERROR IN DIRECTIVE.	One of the directives to ASDEBUG is syntactically incorrect.	Correct directive and retry.	ASDEBUG
SYNTAX ERROR IN LID.	An incorrect separator was present, no parameter was specified, or there were not three characters specified.	Correct and reenter K display input.	QFSP
SYSEDIT ARGUMENT ERROR.	An error was detected on the SYSEDIT command.	Correct error and retry.	SYSEDIT
SYSTEM DAYFILE PROCESSED.	The system dayfile dump is complete.	None.	DAYFILE
SYSTEM EDIT COMPLETE - CHANGE n.	Informative message indicating the change level and completion of SYSEDIT.	None	SYSEDIT
SYSTEM ERROR.	A software or hardware system error occurred.	Inform site analyst immediately.	MODVAL PFM
SYSTEM FILE ERROR IN CLD.	Error was encountered during the building of the system library. Disk resident overlay (OVL) or absolute (ABS) program is not formatted correctly. Deadstart processing halts when this error is detected.	Redeadstart at a different tape density or use another tape unit or a different deadstart tape. If the error persists, inform the site analyst.	SYSEDIT
SYSTEM FILE ERROR IN DIRECTORY.	System file error occurred during the building of the system library. Start of the system library was not found. Deadstart processing halts when this error is detected.	Redeadstart at a different tape density or use another tape unit or a different deadstart tape. If the error persists, inform the site analyst.	SYSEDIT
SYSTEM FILE ERROR IN PLD.	System file error occurred during the building of the system library. Disk resident PP program or central memory resident PP program is not formatted correctly. Deadstart processing halts when this error is detected.	Redeadstart at a different tape density or use another tape unit or a different deadstart tape. If the error persists, inform the site analyst.	SYSEDIT
SYSTEM FILE ERROR IN RCL.	Error was encountered during the building of the system library. Central memory resident overlay (OVL) or absolute (ABS) program is not formatted correctly. Deadstart processing halts when this error is detected.	Redeadstart at a different tape density or use another tape unit or a different deadstart tape. If the error persists, inform the site analyst.	SYSEDIT
SYSTEM FILE ERROR IN RPL.	Error was encountered during the building of the system library. Central memory resident overlay (OVL) or absolute (ABS) program is not formatted correctly. Deadstart processing halts when this error is detected.	Redeadstart at a different tape density or use another tape unit or a different deadstart tape. If the error persists, inform the site analyst.	SYSEDIT
SYSTEM LIBRARY CHANGE ILLEGAL.	Informative dayfile message indicating that the caller does not have permission to modify the system. You attempted to change the system library on a secured system without having security administrator privileges.	None.	SLL
SYSTEM NOT IN ENGR MODE.	The system must be in engineering mode when the LOADBC command is entered.	Enter the ENGR command to place the system in engineering mode. Refer to the NOS 2 Operator/Analyst Handbook.	LOADBC
SYSTEM PROLOGUE NOT FOUND.	Although a system prologue was defined, it could not be accessed.	The site should either delete the prologue definition or create a prologue file.	CHARGE

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
SYSTEM SECTOR ERROR.	The system sector of an indirect access permanent file contains an error (error log and dayfile message).	Inform site analyst.	PFM
SYSTEM SECTOR ERROR - FILE IGNORED.	*QFM* returned an error in the system sector.	Inform site analyst.	QDUMP QMOVE
TABLE OVERFLOW ON INPUT.	Dayfile message indicating that too many flaw entries were available in the input stream; the flaw limit is 157 flaws.	Correct and rerun.	FORMAT
TAPE ERROR - GO,JSN/DROP,JSN.	An error was encountered while QDUMP was writing to the dump tape.	To continue job, enter GO,jsn. To terminate dump, enter DROP,jsn. Mount another tape and retry QDUMP.	QDUMP
TASK PERCENTAGE UNEQUAL TO 100.	K display message indicating that the total task percentages for all tasks defined do not add up to 100.	Correct task definitions in the session file.	STIMULA
xxxxxx TERMINATED.	Dayfile xxxxxx has been terminated (issued to system and control point dayfiles).	None.	SFM
TIME LIMIT UP.	Dayfile message indicating that the total time limit on the CYCLE. command has passed.	Input can again be accepted by the simulator.	SCRSIM
TOO MANY BITS SPECIFIED.	Dayfile message indicating that more bits were specified than can be held in the area, line, or byte given.	Correct and reenter.	SCRSIM
**** TOO MANY CHARACTERS IN VALUE.	Output file message indicating that the value for a directive consists of too many characters.	Rerun using legal value.	PROFILE
TOTAL VALIDATION ERRORS = n.	Informative message indicating that ASVAL found n validation errors.	None. However, n can be used as the FX parameter on subsequent ASVAL runs, if catalog repair processing is desired.	ASVAL
TRACK ALREADY ASSIGNED.	The track byte for the IQFT file in the DULL word in the MST is already assigned.	Inform site analyst.	QFM
TRACK LIMIT.	No allocatable tracks remain on your permanent file equipment (error log and dayfile message).	Inform site operator.	PFM
TRACK LIMIT - FILE IGNORED.	When returning a queued file to source device a track limit was encountered.	Inform site analyst.	QDUMP QMOVE
TRACK LIMIT ON SDF DEVICE.	The device selected to be a deadstart device does not have enough space to accomodate the deadstart file.	Use another device.	1IS
TRANSLATING SESSION FILE.	STIMULA is converting the scripts into an internal format.	None.	STIMULA
TRANSLATING STIMULATOR OUTPUT	DEMUX is translating the stimulator output and copying it to a scratch file.	None.	DEMUX
UCP CALL ERROR. DETAIL STATUS=nnn (optional).	There is an ASVAL or MSSEXEC internal error. Detail status is the UCP response code.	Inform site analyst.	ASVAL
UNABLE TO ATTACH MRF, FM=familyname.	File MOVCOM could not be attached.	Purge MOVCOM and rerun ASMOVE to create a new file.	EXDEST
UNABLE TO CONNECT WITH EXEC.	MSSEXEC is not running at this time.	Rerun the utility when MSSEXEC is running.	ASMOVE ASDEBUG
UNABLE TO DEFINE filename.	An error was encountered during an attempt to define file filename under the user's familyname and user index.	Ensure that an indirect access file named filename does not exist and that no direct access file named filename is in use and retry.	ASDEBUG

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
UNABLE TO DEFINE COMMUNICATION FILE.	File MOVCOM does not exist and cannot be defined by ASMOVE.	Submit a Programming System Report (PSR) with supporting material.	ASMOVE
UNABLE TO OPEN CATALOG.	The MSF catalog does not exist or is busy.	Correct the command or wait until the MSF catalog is not busy.	ASUSE
UNABLE TO OPEN CSUMAP.	The CSU map does not exist or is busy.	Correct the command or wait until the CSU map is not busy.	ASUSE
UNABLE TO READ MRF, FM=familyname.	A read error was encountered on the move request file, MOVCOM.	Purge MOVCOM and rerun ASMOVE to create a new file.	EXDEST
UNABLE TO REATTACH CSUMAP.	An error was encountered during an attempt to reattach a CSU map. The CSU map is closed.	Inform site analyst.	MAPACC
UNABLE TO REATTACH MSF CATALOG.	An error was encountered during an attempt to reattach an MSF catalog. The MSF catalog is closed.	Inform site analyst.	CATACC
UNCORRECTABLE RMS ERROR.	An error was detected when reading the EOI.	Retry operation.	DFTERM
UNCORRECTABLE RMS ERROR.	An irrecoverable rotating mass storage error was detected during an I/O operation.	Inform site analyst.	QFM
UNDEFINED ORIGIN TYPE.	The two character origin type is not defined.	Correct and retry.	MODVAL
UNDEFINED SERVICE CLASS.	The two character service class is not defined.	Correct and retry.	MODVAL
UNKNOWN ACCESS LEVEL NAME.	The job specified an undefined access level name.	Reenter the command with the correct access level name.	MLSEXEC MSI PFS RESEX PFILES
****UNKNOWN ACCESS LEVEL NAME.	K display indicating the access level name selected is not a defined name.	Correct and retry.	QREC QLOAD QDUMP QMOVE QFTLIST QALTER
UNRECOGNIZABLE DIRECTIVE.	Output file message indicating that the directive entered was not a valid DSDI input directive.	Correct and rerun.	DSDI
UNRECOGNIZABLE LABEL.	The cartridge label to be repaired is of unknown type.	Retry the FX directive to ASLABEL without specifying the FM parameter, or use ASDEBUG to read the streams from the cartridge in order to analyze the label.	ASLABEL
UNRECOVERABLE ERROR CONDITION OCCURRED.	Dayfile message indicating that operation was terminated due to a nonrecoverable error.	Refer to the general and detailed status described in the output listing for the specific error condition. If this condition occurs, it is extremely probable that the pack and/or disk drive is unusable in its present condition.	FORMAT
UNRECOVERABLE READ ERROR.	The cartridge label cannot be read because of a faulty MST or cartridge.	Retry after cleaning or repairing the MST, relabel the cartridge, or discard the cartridge.	ASLABEL
UNRECOVERABLE WRITE ERROR.	The cartridge label cannot be written because of a faulty MST or cartridge.	Retry after cleaning or repairing the MST, or discard the cartridge.	ASLABEL

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
UNRECOVERABLE WRITE ERROR. DESTAGE RESTARTED.	A file destage operation was restarted using a different cartridge because a write error was encountered when the cartridge label was being rewritten.	Inform customer engineer. If the affected cartridge can be identified, remove it and try to relabel it. Refer to Error Conditions and Corrective Action in section 3.	EXDEST
UNRECOVERED PARITY ERROR - filename ENTER K.GO - CONTINUE ON NEW REEL. K.END - ABORT DUMP. K.DISABLE - CONTINUE ON ONE FILE.	An irrecoverable parity error was encountered on archive tape during PFDUMP operations. If GO is selected, the system will attempt to logically complete the current tape reel and request the next reel to continue on. If this is not possible, PFDUMP will abort just as if END was entered. The DISABLE option is displayed only if both the archive and verify files are active. If selected by the operator, the dump will continue on the remaining good file.	Described in message.	PFDUMP
UPDATE COMPLETE.	Dayfile message indicating update run successfully completed.	None.	MODVAL
**** UPDATE NOT ALLOWED BY INQUIRE.	Entry of update directives is rejected during K display inquire of a user name.	Request K display update of user name if update is desired.	MODVAL
UPDATE UTILITY CONTROL DATE.	Informative output file message indicating that PFLOAD will update the utility control date/time field in the PFC for all files loaded. This will ensure they are included on the next incremental dump. (UD parameter specified).	None.	PFLOAD
UPDATING username.	Message displayed at line 1 of control point indicating that the user name is being updated.	None.	MODVAL
USER INDEX userindex B PURGED.	Output file message indicating that the files under user index userindex were purged during a REFORMAT run.	None.	MODVAL
USER INDEX NOT ON DEVICE.	Permanent files for the user index currently being cataloged do not reside on the device being cataloged.	Retry utility and specify the correct combination of user index and device number.	PFCAT
**** USER INDEX PREVIOUSLY DEFINED.	More than one user name has been assigned to a user index with the UI identifier. MODVAL disregards this user name entirely unless the CV parameter (suppression of automatic creation of system and library user indexes) has been selected. In that case, the duplication is flagged on the output file and processing continues normally.	Rerun the job or correct the new validation file so that only one user name is assigned to any user index.	MODVAL
nnn USER INDICES PURGED.	Dayfile message indicating that all files under nnn user indices were purged via the reformat option. This can occur only with a system origin job.	None.	MODVAL
**** USER NAME ALREADY EXISTS.	You attempted to create a user name that already exists. Your line of input is disregarded.	None.	MODVAL
USER NAME NOT FOUND.	Output file message indicating that an attempt was made to delete (or inquire or update from the K display) a nonexistent user name. If entered from the K display, the line of input on which the error occurred is disregarded; otherwise, that particular user name is disregarded.	Correct input directives and rerun job, or correct new validation file, if necessary.	MODVAL
USER NOT SYSTEM ORIGIN.	The user who entered the LOADBC command did not have system origin privileges.	Enter the LOADBC command from the console.	LOADBC

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
USER NUMBER INVALID.	User name cannot be converted to user index correctly.	Reenter parameters and specify correct user name, or site analyst must create a new user name.	PFS
**** USER NUMBER LIMIT.	An attempt was made to validate more than 4095 user names for the specified charge and project number entry.	Rerun with a maximum of 4095 user names under one charge/project entry.	PROFILE
USER PROLOGUE NOT FOUND.	Although a user prologue was defined, it could not be accessed.	The user should either delete the prologue definition or create a prologue file.	CHARGE
V, D, XI OPTION VIOLATED.	The specified directive to ASDEBUG requires only one of the three parameters V, D, or XI to be specified.	Correct directive and retry.	ASDEBUG
V, FO, XI OPTION VIOLATED.	The specified directive to ASDEBUG requires only one of the three parameters V, FO, or XI to be specified.	Correct directive and retry.	ASDEBUG
VALIDATING SB=subfamuly CSU=id.	Informative message indicating that ASVAL is validating the MSF catalog for the specified subfamily and the CSU map for CSU id.	None.	ASVAL
VALIDATION DENIED - DEVICE NOT FOUND.	CVL returned a response indicating that a NAD on the specified channel could not be found in the EST.	Correct channel parameter and retry.	LOADBC
VALIDATION DENIED - DEVICE ON OR IN USE.	CVL returned a response indicating that the NAD controlware could not be loaded because the NAD was turned on or was being used by a maintenance user.	Either turn off the NAD, or wait until the maintenance user has returned the NAD. Retry.	LOADBC
VERIFYING ADDRESSES S/N=serialn.	Console message indicating that a read-only pass is being made across the pack. This message is displayed after successfully fetching the factory-recorded data and flaw maps or after successfully restoring the address fields, if the V (verify) option was specified on the FORMAT command. Here, serialn is the actual pack serial number read.	None.	FORMAT
VSN = vsn. FAMILY = familyname. SUBFAMILY = subfamily. CSU = id. X = x. Y = y. UNEXPECTED CSU, X, Y, FAMILY OR SUBFAMILY.	Corresponding fields in the cartridge label and CSU map entry do not match. The values from the cartridge label are shown in the message.	Remove the cartridge from the output drawer. If the cartridge is to be restored, correct the RS directive and retry. If the cartridge is to be removed, retry the RM directive, specifying the lost cartridge (LT) option.	ASLABEL
VSN ALREADY IN CSUMAP.	A cartridge being added from the input drawer has a scratch or manufacturer's label and a vsn which is already assignd in the CSU map. Because all cartridges have unique vsns, the CSU map entry is probably obsolete.	Remove incorrect CSU map entry, using steps described in section 3: Removal of Faulty or Missing Cartridges.	ASLABEL
VSN NOT FOUND.	The vsn specified in the directive to ASDEBUG is not contained in the CSU map.	Correct vsn and retry.	ASDEBUG
VSN NOT FOUND IN CSUMAP.	The vsn specified in the RM directive to ASLABEL or in the label of the cartridge being restored is not contained in the CSU map.	Correct directive and retry.	ASLABEL
VSN OPTION VIOLATED.	One of the following. - V=vsn cannot be used with the directive specified. - V=vsn was not specified but is required with the directive specified. - V=vsn cannot be used with at least one of the other parameters specified. - V alone cannot be used with a directive to ASDEBUG.	Correct error and retry.	ASLABEL ASDEBUG

MESSAGE	SIGNIFICANCE	ACTION	ROUTINE
VSN or X-Y NOT IN SUBFAMILY.	The specified vsn or X and Y coordinates correspond to a cubicle which is not assigned to a subfamily, as required by this directive.	Obtain the correct vsn or X and Y coordinates from an ASUSE report, and retry the directive.	ASDEBUG
WAIT FOR CATALOG INTERLOCK.	Informative message indicating that permanent file requests are currently active. PFDUMP will automatically continue when the interlock on the catalog track is successfully obtained.	None.	PFDUMP
WAIT FOR MSS FILE STAGING.	PFDUMP is waiting for files to be staged from MSS.	None.	PFDUMP
WAIT FOR MSS INTERLOCK.	PFDUMP is waiting for the MSS executive to release the MSFCAT files so that they can be dumped.	None.	PFDUMP
WAIT FOR PF UTILITY ON est.	PFDUMP or PFCAT is waiting for a permanent file utility (such as PFLOAD or MSI) to complete processing on equipment with EST ordinal est. The waiting utility continues automatically when the other utility completes.	Wait for utility to complete.	PFDUMP PFCAT
WAITING FOR EXEC.	MSSEXEC is temporarily delaying the processing of ASVAL requests.	None.	ASVAL
WAITING FOR FILE filename.	Informative message indicating that ASVAL is waiting for MSSEXEC to return a CSU map or an MSF catalog.	None.	ASVAL
WAITING - GLOBAL INTERLOCK.	Informative message indicating that another deadstart file installation is in progress on the selected device.	None.	1IS
WORD ADDRESS NOT FOUND.	Output file message indicating that a word address requested was not found in the specified record in the EDD file.	Ensure that the dump file contains meaningful information.	DSDI
WPE UNRECOVERED - ABORT.	Operator has aborted PFDUMP operation by entering K.END in response to UNRECOVERED PARITY ERROR message, or PFDUMP was unable to continue after the operator entered K.GO.	Retry PFDUMP operation using a different tape.	PFDUMP
WRITING SUMMARY.	Informative K display message indicating that the summary report is being generated.	None.	PFCAT
X,Y OPTION VIOLATED.	An incorrect X,Y combination was specified by the XI and YI parameters in a directive to ASLABEL.	Correct XI,YI parameters and retry.	ASLABEL
XI, YI OPTION VIOLATED.	One of the following. - XI and YI parameters were required but were not specified. - XI and YI were not specified together. - Either the XI or YI parameter was not a legal value.	Correct XI and/or YI parameters and retry.	ASDEBUG
1IS - ILLEGAL REQUEST.	1IS was called with an incorrect function request.	None.	1IS

GLOSSARY B

Abort

To terminate a program, job, or job step when an error condition (hardware or software) exists from which the program or computer cannot recover.

Access Category

Refer to File Access Category, Job Access Category Set, and System Access Categories.

Access Code

A hardware/software security code assigned to each NAD on the network. A NAD may communicate only with other NADs having matching codes.

Access Level

A property of each file, job, and equipment on a secured system that is used to indicate the sensitivity of information in the file or job, or the sensitivity of information that can be processed by the equipment. On a secured system, there are up to eight access levels corresponding to increasing levels of sensitivity, you are authorized to access some or all of those levels. Refer also to Equipment Access Levels, File Access Level, Job Access Level, and System Access Levels.

Access Level Limits

Refer to Job Access Level Limits.

Account Dayfile

A dayfile that provides a history of system usage over the life of the account dayfile. It provides information necessary for accurate billing and system usage analysis.

Address

The location of a word in memory. The location is designated by number or symbolic name.

AFD Utility

A dayfile dumping utility that dumps all or selected parts of the account dayfile to produce a listing.

Allocation Unit (AU)

A name that is given to each of the 16 data streams that make up a cartridge.

AP

The application permission.

Application

Refer to Application Program.

Application Interface Program (AIP) Trace Utility

A utility that produces a trace file of the messages transferred between IAF and NAM. The information contained in this trace can be useful in tracking network problems and in debugging application programs.

Application Program

A program resident in a host computer that provides an information storage, retrieval, and/or processing service to a remote user via the data communication network and the Network Access Method. Application programs use the system control point feature of NOS to communicate with the Network Access Method.

In the context of network software, an application program is not an interactive job, but rather a terminal servicing facility that provides terminal users with a specific processing capability such as remote job entry from batch terminals, transaction processing, entry and execution of interactive jobs, and so forth. For example, the standard CDC interactive facility IAF makes terminal input and output appear the same to an executing program as file input and output; IAF is a network application program, but the executing program using IAF is an interactive job.

Archive Files

A dump of permanent files accumulated on mass storage that are dumped as a whole or in part to a backup tape (or other type of backup medium) to protect the files from loss in case of a device malfunction or to free a device for temporary use during preventive maintenance.

asa

The alternate storage address.

ASCII

American National Standard Code for Information Interchange. The standard character set and code used for information interchange between systems. It is a 7-bit code representing a prescribed set of 128 characters.

ASDEBUG Utility

A utility that allows the analyst to update appropriate entries in the CSU maps and/or MSF catalogs and thereby resolve inconsistencies reported by the ASVAL utility. ASDEBUG can also be used to copy data from selected MSF files or cartridges to disk.

ASDEF Utility

A utility that creates the system files (CSU maps and MSF catalogs) that are necessary for MSS processing.

ASLABEL Utility

A utility that manages cartridge assignment and cubicle allocation in a cartridge storage unit.

ASMOVE Utility

A utility that manages disk and mass storage facility residence. ASMOVE determines which files to leave on disk, which files to release from disk and move to MSF, and which files should reside both on disk and on MSF.

AST

Refer to Available Stream Table.

ASUSE Utility

A utility that reads data in the MSF catalogs and CSU maps and produces reports on the availability of space on MSF cartridges and the allocation of cubicle space within a CSU.

ASVAL Utility

A utility that either performs release processing or reports on problems with the current MSS system files.

Attach

The process of making a direct access permanent file accessible to a job by specifying the proper permanent file identification and passwords.

AU

Refer to allocation unit.

Auto Recall

The act of a program releasing control of the CPU until a requested function is complete. Refer to Recall.

Auxiliary Device

A mass storage device that is not part of a permanent file family. Auxiliary devices can contain direct or indirect access permanent files.

Available Stream Table (AST)

A table that contains information used by the allocation algorithm to select the cartridges on which a file will reside.

Backup Tape

Refer to Archive Files.

BASIC

Beginner's All-purpose Symbolic Instruction Code is an elementary programming language available to the user. Also, a subsystem that uses the BASIC compiler.

Batch Job

The instructions and data that are submitted as a complete unit without further intervention on your part. The job can be punched on cards or created and submitted from a terminal.

Beginning-of-Information (BOI)

The start of the first programmer record in a file is known as the beginning-of-information. System information, such as tape labels on sequential files or indexes, does not affect the beginning-of-information.

Binary File

A noneditable file that contains a precompiled program.

Bit

An abbreviation of binary digit. It is a single digit, 0 or 1, in a binary number, and also represents the smallest unit of information. A central memory word (one storage location) contains 60 bits.

Byte

A group of bits. Unless prefixed (for example, a 6-bit byte), the term implies 8-bit groups. When used for encoding character data, a byte represents a single character.

Cartridge

A component of the MSF. The cartridge consists of a plastic housing that encloses a strip of magnetic tape on which data is stored under program control.

Cartridge Storage Unit (CSU)

A device that includes storage cells (cubicles) for 2052 cartridges and a selector that moves cartridges among the mass storage transport, the cubicles, and the input/output drawers of the CSU.

Catalog Image Record (CIR)

A record written at the beginning of the archive file on which the permanent files are dumped for each incremental dump. When a file is loaded, this CIR information is placed in the permanent file catalog of the device being loaded.

Catalog Track

A track on a user's master device containing the catalog entries that define and specify the location of each permanent file created by that user. Users are assigned by groups to catalog tracks according to user index and number of catalog tracks on the master device.

Central Memory (CM)

The main storage device whose storage cells (words) can be addressed by a computer program and from which instructions and data can be loaded directly into registers. The instructions can be executed and the data can be manipulated from these registers.

Central Memory Resident (CMR)

The low address area of central memory reserved for tables, pointers, and subroutines necessary for operation of the operating system. It is never accessible to a user's central processor program. The remainder of central memory is allocated by monitor to jobs as they are selected on a priority basis for execution.

Charge Number

An alphanumeric identifier the installation uses to allocate charges to individual users for system usage.

CIO

Combined Input/Output. System routine that performs NOS I/O.

CMRDECK

The central memory resident deck.

COBOL

COmmon Business Oriented Language. This higher-level language simplifies the programming of business data applications.

Command

A sequence of words and characters that call a system routine to perform a job step. The command must conform to format specifications and end with either a period or a right parenthesis. A command is sometimes called a control statement.

Communication Line

A complete communication circuit between a terminal and its network processing unit.

Communication Line Adaptor (CLA)

Hardware that provides the interface between NPUs and modems.

Communications Control Program (CCP)

A portion of the network software that resides in a 255x series network processing unit. This software can include such routines as the terminal interface program.

COMPASS

COMPrehensive ASsembly System. The standard assembly language used with CYBER 170, CYBER 70, and 6000 Computer Systems. Also, the command used to assemble a program written in the COMPASS assembly language.

Control Point

The portion of central memory that is assigned to a job. When a job is allocated a portion of central memory, it becomes eligible for assignment to the central processor for execution.

Control Point Number

The number of the control point to which a job is assigned, while the job resides in central memory. The actual number of control points is an installation parameter. Before the job can execute, each central processor program must be assigned to a control point.

Control Statement

Refer to Command.

Controlware

A special type of software that resides in a peripheral controller. The controlware defines the functional characteristics of the controller.

Coupler

A component of the MSF. The coupler interfaces between the peripheral processor and the mass storage adapter.

cpi

The characters per inch.

cps

The characters per second.

CSU Map

A direct access permanent file that contains information indicating how cubicles in a CSU are assigned to a family and identifying the cartridges that reside in the CSU.

CTI

The common test and initialization.

Dayfile

A chronological file created during job execution which forms a permanent accounting and job history record. Dayfile messages are generated by operator action or when commands are processed. A copy of the dayfile is printed with the output for each job. You must explicitly request it in an interactive job.

DDP

The distributive data path.

Deadstart

The process of initializing the system by loading the operating system library programs and any of the product set from magnetic tape or disk. Deadstart recovery is reinitialization after system failure.

Debug Log File Processor (DLFP)

A processor that analyzes trace files produced by the application interface program trace utility.

Default

A system-supplied option used when you do not supply the option.

Device Access Table (DAT)

A table that contains the logical description (family name/pack name and device number) of each mass storage device (shared or nonshared) which is accessible by any machine in an extended memory multimainframe complex.

Device Index Table (DIT)

A table that is used to determine device usage in an independent shared device multimainframe complex.

Device Mask

An eight-bit quantity that identifies the group of users who have the particular device as their master device; that is, it identifies the device that contains their file catalogs, all their indirect access files, and possibly some or all of their direct access files.

DFD Utility

A dayfile dumping utility that dumps all or selected parts of the system dayfile to produce a listing.

DFLIST Utility

A utility that generates a printer listing of all permanent files created by the DFTERM utility.

DFTERM Utility

A utility that terminates an active or inactive dayfile and retains it as a direct access permanent file for later use.

Direct Access File

A NOS permanent mass storage file that can be attached to the your job. All changes to this file are made on the file itself rather than a temporary copy of the file (compare with Indirect Access File).

DIS (Job Display)

A system peripheral processor program similar to system display (DSD) that provides communication between a job in central memory and the operator at the console, and permits the operator to control execution of the program through the console keyboard.

Display Code

A 6-bit character code set that represents alphanumeric and special characters.

DSD (System Display)

The operating system program that provides communication between the operator and the system by accepting control information typed on the console keyboard and by displaying to the operator information pertinent to all jobs known to the system. DSD is permanently assigned to peripheral processor 1.

DSDI Utility

A deadstart dump interpreter utility that is called by a batch command to convert selected portions of the binary information on an express deadstart dump file into reports to be listed.

Dump NAD Memory (DMPNAD)

A utility that reads the NAD memory and formats the data into an output file.

EDD Utility

Utility that may be run at deadstart time after a system malfunction has occurred. It generates the express deadstart dump file on magnetic tape.

ELD Utility

A dayfile dumping utility that dumps all or selected parts of the error log dayfile to produce a listing.

End of Chain Flag (EOC)

A flag that identifies the last allocation unit in a chain of allocated data streams in the MSF catalog.

End-of-File (EOF)

A boundary within a sequential file, but not necessarily the end of a file that can be referenced by name. The actual end of a named file is defined by EOI. For labeled tape, EOF and EOI (denoted by the EOF1 label) are the same. For multifile tape files, EOF and EOI do not correspond. In the product set manuals, an end-of-file is also referred to as an end-of-partition.

End-of-Information (EOI)

The end of data on a file. Information appearing after this point is not considered part of file data. In card decks, a card with a 6/7/8/9 multiple punch in column 1. On mass storage devices, the position of the last written data. On labeled tape, it is the EOF1 label. CYBER Record Manager defines end-of-information in terms of file residency and organization.

End-Of-Record (EOR)

An indicator that marks the end of a logical record. Also referred to as end-of-section.

Entry Point

A location within a program or procedure that can be referenced from other programs. Each entry point has a unique name with which it is associated.

Equipment Access Levels

A range of access levels specified for each equipment on a secured system. In order for a file to be stored or output on a given equipment, the file's access level must be within the equipment access levels for that equipment.

Equipment Status Table (EST)

A list of all peripheral devices connected to the system. Each table entry indicates the status of a particular device.

Error Flag

A character or bit that signals the occurrence or presence of an error.

ESM

The extended semiconductor memory.

EST Ordinal

The number designating the position of an entry within the equipment status table (EST) established at each installation. Devices are identified in operator commands by EST ordinals. The EST ordinal is sometimes referred to as equipment number.

Exchange Package

A table that contains information used during job execution. It is printed as part of the output when a job aborts.

Executing Job Table (EJT)

A central memory resident table that contains a 4-word entry for all executing jobs including interactive service class jobs. It is used to control jobs that are executing at a control point and jobs that are rolled out. Every executing job in the system has an EJT entry.

Execution

An input job is in execution after it is selected by the operating system and assigned to a control point. A job remains in execution until terminated, but it can be temporarily swapped or rolled out by the operating system.

Express Deadstart Dump (EDD) File

File that is generated on magnetic tape by the express deadstart dump utility. This file contains a dump of memory, executing exchange packages, hardware registers, and controller memory.

Extended Core Storage (ECS)

ECS provides optional additional memory. ECS contains 60-bit words; it has a large amount of storage and fast transfer rates. ECS can be used only for program and data storage, not for program execution. Special hardware instructions exist for transferring data between central memory and ECS.

Extended Memory

An extension to central memory which is physically located outside of the machine. Formerly referred to as Extended Core Storage (ECS) or Large Central Memory (LCM).

Facility Interface Program (FIP)

A program consisting of routines and buffers that are loaded into each application program's field length. This program is the interface between the application program and RHF.

Family Device

A mass storage permanent file device associated with a specific system. A family may consist of 1 to 63 logical devices. Normally, a system runs with one family of permanent file devices available. However, additional families may be introduced during normal operation. This enables users associated with the additional families to access their permanent files via the alternate family.

Family Name

Name of the permanent file storage device or set of devices on which all of your permanent files are stored. When you request a permanent file, the system looks for it on this family (group) of devices. Usually a system has only one family of permanent file devices, but it is possible to have alternate families in the system. You may have to specify which family you are using when you log in. Your family name is given to you by your employer, instructor, or computer center personnel.

Family Ordinal Table (FOT)

A table that maintains the relationship between family ordinals and family names.

FAT

The fast attach table.

fba

The first byte address.

Field Length

The area in central memory allocated to a particular job; the only part of central memory that a job can directly access. Also the number of central memory words required to process a job.

File

A collection of information referred to by a file name (from one through seven alphanumeric characters). You can create a file at the terminal or retrieve a file from permanent file storage for use during a terminal session.

File Access Category

A property of a permanent file used by the creator of the file on a secured system to restrict access of the file to a particular group of users. A secured system supports up to 32 access categories, and you are authorized to use some, all, or none of those categories. Refer also to System Access Categories.

File Access Level

A property of each file on a secured system used to indicate the sensitivity of information contained on the file. A file is assigned the current job access level by default when it is created or stored; the file creator may specify any access level for that file that is within the set of access levels valid for the job, the system, the file creator, and (for interactive jobs) the communication line to the host mainframe. If you access a file on a secured system, you must be validated for the access level of the file. Refer also to Access Level, Job Access Level, and Job Access Level Limits.

File and Cartridge Table (FCT)

Table that has an entry for each cubicle assigned to the subfamily from a given CSU.

File Category

Each permanent file is assigned a category of private, semiprivate, or public.

File Count

A maximum number of permanent files allowed each user.

File Environment Table (FET)

A table within a program's field length through which the program communicates with operating system input/output routines. One FET exists for each file in use by the program.

File Name Table (FNT)

A system-managed table that contains the local file name, the file type and other job control information. All active files in the system have an FNT entry.

File Status Table (FST)

A system-managed table that contains information pertaining to the file's location on mass storage and other job control information. Each active file in the system has an FST entry. See also File Name Table.

Flag

A character or bit that signals the occurrence or presence of a particular condition.

FLPP

A first level peripheral processor.

FORTRAN

FORmula TRANslation, a higher-level language consisting of symbols and statements that can be used to create a program closely resembling mathematical notation. This program must be translated (compiled) into machine language before it can be executed.

Full Dump

A full dump copies all files in the system or those cataloged on a specified device.

Function Processor

A system CPU or PP program that the user can call by placing a request in location RA+1. Function processors perform input/output, local and permanent file manipulations, and so on.

fwa

The first word address.

Head of Chain Flag (HOC)

Flag that identifies the first allocation unit in a chain of allocated data streams in the MSF catalog.

Header

A word or set of words at the beginning of a block, record, file, or buffer which contains control information for that unit of data.

Host

A computer that executes an application.

Inactive Queued File Table (IQFT)

A table of file entries that have been removed from the queued file table. An IQFT file is on each mass storage device on which one or more inactive queued files reside.

Incremental Dump

An incremental dump copies those permanent files modified after a specified date. Each incremental dump writes a catalog image record at the beginning of the archive file on which the permanent files are dumped.

Incremental Load

An incremental load builds up an accumulation of the most recently modified versions of the files extracted from the archive files for loading. A series of archive files is read in the reverse order of creation. The CIR is read and checked against the archive files. If a file matches an entry on the CIR, that file is a candidate for loading.

Indirect Access File

A NOS permanent file that you access by making a temporary copy of the file (GET or OLD command). You create or alter it by saving or substituting the contents of an existing temporary file (REPLACE or SAVE command).

Input

Information flowing upline from terminal to host.

Input File

The system-defined file which contains the entire job the user submits for processing. It is also known as the job file.

Input Queue

A set of input files waiting to be assigned to control points by the operating system.

Interactive Facility (IAF)

An application that provides a terminal operator with interactive processing capability. The interactive facility makes terminal input/output and file input/output appear the same to an executing program.

Interactive Job

A job initiated from an interactive terminal.

Interactive Transfer Facility (ITF)

A network application that allows you to connect your interactive terminal to a remote CYBER 200 computer system linked to your host mainframe by a loosely coupled network.

IOU

Input/output unit (models 815, 825, 835, 845, 855, 865, and 875). IOU is a collection of all PPs, PP channels, and related hardware.

Job

All activity associated with a terminal session from login to logoff.

Job Access Level

On a secured system, each job has an access level. This is the default access level that is assigned to files that are created or stored in the job. A job's initial access level is the lower access level limit for the job. The job's access level is automatically raised to the access level of any file from which information is read. You can also change job access level. Refer also to Job Access Level Limits.

Job Access Level Limits

An upper limit and a lower limit that determine the range of access levels that are valid for a particular job on a secured system. All files used in a given job must have an access level within the job's access level limits.

Job Sequence Name (JSN)

The unique, system-defined name assigned to every executing job or queued file. The JSN is a string of four alphabetic characters.

Job Status

A job attribute kept in the job's executing job table (EJT) entry. It is used by the system to determine if a job is rolled in or rolled out. If the job is rolled out, job status indicates why it was rolled out.

Keyword

A symbol used within a command which identifies a specific function. It is one of the the predefined words.

Large Central Memory Extended (LCME)

A type of extended memory that is an option available for model 176. Refer to Extended Memory.

lba

The last byte address.

LCME

Refer to Large Central Memory Extended.

LDLIST Utility

A utility that generates a printer listing of queued files present on a dump tape produced by the QDUMP utility.

LISTPPM Utility

A PIP dump analyzer program that converts all available PIP dump binary records on th PIP memory dump file into a report to be listed in byte format.

Load File Generator (LFG)

A utility program that reformats communications control program files for subsequent use by the Network Supervisor of NAM to load network processing units.

Load Sequence

A sequence of load operations which encompasses all of the loader's processing from the time that nothing is loaded until the time execution begins. It includes initialization, specification of specified loader requests, and completion of load.

Local Configuration File (LCF)

Binary file created by the Network Definition Language Processor from source text. LCF must be present if NAM is used.

Local File

Any file that is currently associated with a job. Local files include all temporary files and attached direct access files.

Local File Name

The file name assigned to a file while it is local (assigned) to a job. The name is contained in the local file name table.

Local NAD

380-170 NAD connected to the host mainframe using a channel and configured in the EST.

Login

The procedure used to gain access to the system.

Logout

The procedure used to end a terminal session.

Loosely Coupled Network (LCN)

A network of physically connected computer systems. The LCN environment allows jobs, data files, and messages to be transmitted from one computer system to another.

lpi

The lines per inch.

lwa

The last word address.

Machine Identification (MID)

The identifier that associates a specific machine with its access to a shared device.

Machine Recovery Table (MRT)

A table that provides the information needed to recover the mass storage space and interlocks of a machine that shares a mass storage device.

Machine Recovery Utility (MREC)

A utility that clears interlocks held by the machine to be deadstarted which have not been cleared by CPUMTR. It also recovers mass storage space on a shared device that is currently not accessible because of a machine interruption.

Macro

A sequence of source statements that are saved and then assembled whenever needed through a macro call.

MAINLOG Utility

A dayfile dumping utility that dumps all or selected parts of the binary maintenance log dayfile to produce an output file in binary format.

Maintenance Logging Transfer Utility (MLTF)

A utility that controls logging NAD error logs into the binary maintenance log.

Maintenance Register

Hardware register used in error detection, logging, and recovery procedures. Maintenance registers are used on models 865 and 875 instead of status/control registers. Refer to Status/Control (S/C) Register.

MAP III

The Matrix Algorithm Processor III.

Mass Storage

A magnetic disk or extended memory that can be accessed randomly as well as sequentially.

Mass Storage Adapter (MSA)

A component of the MSF. The adapter interfaces between the coupler and the mass storage transport or the cartridge storage unit.

Mass Storage Device

An extended memory or disk unit which has defined logical attributes such as family, file residency, and so on.

Mass Storage Facility (MSF)

A hardware product that is a large capacity on-line mass storage device. MSF is a cost effective extension to the disk file storage system and an alternative to conventional magnetic tape storage.

Mass Storage Subsystem (MSS)

MSS is the product consisting of the MSF hardware, the CYBER coupler, the diagnostics, and the operational software. MSS stores data on MSF and moves it to disk upon request for access by an authorized user.

Mass Storage Table (MST)

A table that contains an entry for each logical device in the configuration of mass storage devices currently available to the system.

Mass Storage Transport

A component of the MSF. MST has storage positions for five cartridges: one being read or written, two queued for reading or writing, and two queued for storage by the selector into the CSU.

Master Device

A mass storage device that contains your permanent file catalog entries; all your indirect access files; and all, part, or none of your direct access files.

MMF

The multimainframe.

MODVAL

A validation file manager that creates and manages the VALIDUs file.

MSC

The mass storage cartridge.

MSF Catalog

A disk-resident direct access permanent file that contains information describing which streams of each cartridge assigned to a particular subfamily are allocated to MSF files and which streams are available for allocation.

MSSEXEC Program

The main processing program that controls MSS activities, such as destaging files from disk to MSF, purging unneeded MSF files, labeling or relabeling cartridges, updating CSU maps, and updating MSF catalogs.

MSSSLV Program

A program that runs on each slave mainframe and comunicates with the MSSEXEC program to retrieve files from MSF in response to ATTACH requests by jobs running on the slave mainframes.

Multimainframe Operation

An operation that provides mechanisms by which more than one computer can share mass storage devices.

Multimainframe System

A network of physically and logically connected computer systems.

Multiplex Loop Interface Adapter (MLIA)

The hardware portion of the multiplex subsystem which controls the multiplex loops (input and output) as well as the interface between the NPU and the multiplex subsystem.

NETLOG

A program that uses the network configuration file to determine which remote NADs should be logged.

Network

An interconnected set of network elements consisting of a host and one or more NPUs and terminals.

Network Access Device (NAD)

The primary element in a loosely coupled network. Each NAD connects a computer system to the network.

Network Access Method (NAM)

A software package that provides a generalized method of using a communications network for switching, buffering, queuing, and transmitting data. NAM is a set of interface routines used by a terminal servicing facility for shared access to a network of terminals and other applications, so that the facility program does not need to support the physical structures and protocols of a private communication network.

Network Configuration File (NCF)

A network definition file in the host computer, containing information on the network elements and permissible linkages between them. The status of the elements described in this file is modified by the NPU operator in the course of managing the network. This is a NOS direct access permanent file.

Network Definition Language (NDL) Processor

The network software module that processes an NDL program as an off-line batch job to create the network definition files and other NDL program output.

Network Description File (NCTF)

A file that must be present if the transaction facility is used. The file is prepared by the site analyst.

Network Driver (NDR)

A program that executes in a dedicated peripheral processor unit. It communicates with the network access devices using a host computer data channel, and is the interface between RHF and the communication network.

Network Load File (NLF)

An output file generated by the load file generator utility for use by the Network Supervisor.

Network Processing Unit (NPU)

The collection of hardware and software that switches, buffers, and transmits data between terminals and host computers.

Network Terminal

A terminal that communicates with the operating system through the network.

Network Validation Facility (NVF)

A portion of the network software, written as a NAM application program. The network validation facility performs application validation and all connection validation processing and supports login dialog with the terminal user.

Nonincremental Load

A nonincremental load does no CIR checking and uses only parameter options specified on the PFLOAD call, if any, to select candidates for loading.

NOS

The network operating system.

NPU Dump Analyzer (NDA)

A utility program that produces a readable printout from the NPU dump files.

Object Code

The machine language version of a program that has been translated (compiled) from source code written in a higher-level language.

Operating System

The set of system programs that controls the execution of computer programs and provides scheduling, error detection, input/output control, accounting, compilation, storage assignment, and other related services.

Order Dependent

Used to describe items that must appear in a specific order.

Order Independent

Used to describe items that need not appear in any specific order. Parameters, particularly those with keywords, may be order-independent.

Output

The information flowing downline from host to terminal.

Output File

The system-defined file that contains the output from job processing. It is also known as the print or punch file.

Parameter

A variable that is given a specific value for a particular purpose or process.

Partial Dump

A partial dump copies permanent files according to any specified options, except those defining a full or incremental dump.

Password

A name or word you enter during login to provide extra security for your user name. A unique password ensures that no one else can log into the system with your user name and access your files. Your password is given to you by your employer, instructor, or computer center personnel.

Peripheral Interface Package (PIP)

The interface package between the PPU of the CYBER computer and the network application.

Peripheral Processor (PP)

The hardware unit within the host computer that performs physical input and output through the computer's data channels.

Permanent File

A mass storage file that is cataloged by the system so that its location and identification are always known to the system. Permanent files cannot be destroyed accidentally during normal system operation. They are protected by the system from unauthorized access according to privacy controls specified when they are created.

Permanent File Catalog (PFC)

A 16-word entry that the system maintains and uses to determine attributes of a permanent file.

Permanent File Family

The permanent files that reside on the family devices of a specific system.

Permanent File Manager (PFM)

PFM identifies the master device and catalog track information when a user submits a job.

Permanent File Supervisor (PFS)

The PFS processes parameters in utility commands and loads the correct processing overlays.

Permanent File Utility (PFU)

A utility that manages the catalogs, permits, data allocation on a device, and the data transfer between the device and the overlay.

Permission Mode

A mode of operation that a user is allowed for a particular permanent file, such as write, modify, append, read, and so forth.

PFATC Utility

A utility that produces a cataloged directory of file information derived from an archive file previously created by the PFDUMP utility.

PFCAT Utility

A utility that produces a cataloged directory of file information derived from catalog tracks on a master device.

PFCOPY Utility

A utility that extracts files from an archive file and copies them to one or more files at a control point.

PFDUMP Utility

A utility that dumps permanent files to an archive file. Dumps can be reloaded by the PFLOAD utility and can be accessed by the PFATC and PFCOPY utilities for cataloging and copying.

PFLOAD Utility

A utility that loads archived files produced by the PFDUMP utility back into the permanent file system. The load can reestablish the permanent file system exactly as it was at the time of the dump, or can load only a desired subset of files on the archive file.

Physical Record Unit (PRU)

The amount of information transmitted by a single physical operation of a specified device. For mass storage files, a PRU is 64 central memory words (640 characters); for magnetic tape files, the size of the PRU depends upon the tape format. A PRU that is not full of user data is called a short PRU; a PRU that has a level terminator but no user data is called a zero-length PRU.

Post Radix

A letter following a numeral that indicates the base numbering system.

PPS

The peripheral processor subsystem.

PPU

The peripheral processor unit.

Primary File

A temporary file created with the OLD, NEW, LIB, (interactive jobs only), or PRIMARY command. The primary file is assumed to be the file on which most system operations are performed unless another file is specified. There can be only one primary file associated with your job.

PROBE Utility

A utility that traps and measures particular interval events in the system. PROBE generates a report from the data collected by the system.

Procedure

A user-defined set of instructions that can be referenced by name. The instructions consist of procedure directives and system commands.

Procedure File

A file containing one or more procedures.

PROFILa File

A system file that controls user accounting.

Program Initiation Control Block (PICB)

A sequence of commands that initiates load and dump operations.

Programmable Format Control

Spacing and format control for 580 line printers provided by the use of software and a microprocessor instead of a carriage control format tape.

Project Epilogue

A program that is executed automatically at the end of an account block for which its related charge and project numbers are in effect. An epilogue program can be used to output resource usage information to a terminal user or a user's dayfile or to save information about the terminating account block on a permanent file for tracking by the master user.

Project Number

An alphanumeric identifier that may be required at your installation for accounting and billing to a specific project. If it is required, the project number is entered during the login procedure. It is given to you by personnel at your installation.

Project Proloque

A program that is executed automatically at the beginning of an account block after its related charge and project numbers are validated, but before any user program processing begins. A proloque program can be used as a convenience to users of a project number to access project files or output messages to the user. It can also be used to perform further validation on a user before allowing use of a charge and project number or to restrict use of a project number to a single application executed as a proloque.

Public Auxiliary Device

An auxiliary device that is available for access by all validated users knowing the correct pack name. Additional validation is required to create or replace files on an auxiliary device.

QALTER Utility

A utility that displays, lists, and/or alters routing and other information about active queued files. It selects files for processing according to a variety of user specified criteria. QALTER can also purge selected files from the system.

QDUMP Utility

A utility that dumps selected queued files from a single device, a family of devices, or all devices on the system. These queued files can be dumped either to tape or to mass storage. QDUMP also provides a listing of all files dumped with information about each file processed.

QFTLIST Utility

A utility that displays and/or lists routing and other information about active queued files. Its operation is similar to that of QALTER, except file alteration or purging is not allowed.

QLIST Utility

A utility that lists inactive queued files, which may include all inactive queued files in the system or a selected subset based on options specified when the utility is called.

QLOAD Utility

A utility that processes the dump files generated by QDUMP or other utilities using the same format. QLOAD can selectively load the queued files from these dump files. QLOAD can also list the contents of a dump file without loading any files.

QMOVE Utility

A utility that moves queued files from one mass storage device to another. It also produces a listing of all files moved with information about each file processed.

QREC Utility

A utility that dactivates or activates selected queued files and purges selected inactive queued files.

Queue File Supervisor Program (QFSP)

A program that provides control for the queue file utilities.

Queued File Table (QFT)

A central memory resident table that contains a four-word entry for all active input and output queue files.

Random Access

An access method by which any record in a file can be accessed at any time. Random access applies only to mass storage files with an organization other than sequential. Refer to Sequential Access.

Recall

The state of a program when it has released control of the central processor until a fixed time has elapsed (periodic recall) or until a requested function is completed (auto recall). Recall is a system action request as well as an optional parameter of some file action requests.

Record

A unit of information. In CYBER Record Manager and its language processors, a record is a unit of information produced by a single read or write request. Eight different record types exist within CRM. The user defines the structure and characteristics of records within a file by declaring a record format.

Release Data File (RDF)

A file created by PFDUMP that identifies those MSF-resident files that are pointed to by PFC entries at the time of the dump.

Remote Batch Job

A job submitted from a remote batch terminal.

Remote Host Facility (RHF)

A central processor program that executes at a system control point. It performs data buffering and switching, and is the intermediary between application programs and the network.

Remote NAD

Any 380 NAD accessible to a local NAD using a loosely coupled network trunk.

Removable Device

A rotating mass storage device that can be physically detached from the RMS drive.

Resident Central Library (RCL)

An area in central memory resident that central library routines specified by the *CM directive reside.

Resident Peripheral Library (RPL)

An area in central memory resident that peripheral library routines specified by the *CM directive reside.

RHF Configuration File Generation (RCFGEN)

A utility that reads configuration definition statements to create a permanent file which RHF uses for the network description and access.

Rollout

The removal of jobs from central memory to mass storage before execution is complete, so the control point and central memory can be assigned to another job. A job is rolled out when it is waiting for an external event, when its control point and/or central memory is needed by a higher priority job, or when it exceeds its central memory time slice.

Rollout File

A file containing a job (and system information) that has been temporarily removed from the main processing area of the system.

Rotating Mass Storage (RMS)

A disk storage device.

SCP

The system control point.

Screen Management Facility (SMF)

A subsystem which alters the performance characteristics of the Full Screen Editor (FSE). The absence or presence of SMF is not detectable by the user of FSE. Performance can be optimized by disabling SMF for small mainframes and interactive workloads, and by enabling SMF for large configurations and heavy workloads.

Secondary Mask

An eight-bit quantity used to identify groups of users who can place direct access files on a particular device.

Secured System

A system in which a mandatory security mechanism has been enabled during deadstart. A secured system protects information by enforcing restrictions based on access levels and access categories, and restricts many sensitive system functions to security administrators.

Security Adminstrator

A secured system prevents users and operators from performing certain functions that could result in the unauthorized disclosure or modification of information. These functions can only be performed by a person who is designated a security administrator. A security administrator is always authorized to access the highest level of information stored on the system. This person performs functions in the areas of installation, user validation, system operation, and system maintenance.

Security Unlock Status

This status of the system console applies only to a secured system and must be set by a security administrator. The console must be in security unlock status in order for the security administrator to perform certain functions that are restricted on a secured system.

Sequential Access

A method in which only the record located at the current file position can be accessed. Refer to Random Access.

Sequential (SQ) File

A file in which records are accessed in the order in which they occur. Any file can be accessed sequentially.

Service Class (SC)

An attribute associated with a queued file or executing job. Service class determines how the system services the job.

Single Error Correction Double Error Detection (SECDED)

A hardware technique that detects and corrects single bit errors in memory. Double bit errors are detected by not corrected.

SMF

Refer to Screen Management Facility.

Source Code

Code input to the computer for later translation into executable machine language instructions (object code).

Special File Supervisor (SFS)

A program that provides routines, table management, data manipulation, and I/O processing for special system jobs.

Status/Control Register Simulator (SCRSIM)

A program that enables the user to set status/control register bits in order to aid in the testing of error logging and error recovery procedures.

Status/Control (S/C) Register

A hardware register used in error detection, logging, and recovery procedures. This register is present on all CYBER 170 Computer Systems. For models 865 and 875, the S/C register is a hardware register used in error detection, logging, and recovery procedures. This register is present on all CYBER 170 Computer Systems. For models 865 and 875, the S/C register is replaced by a maintenance register. Refer to Maintenance Register.

Stimulator

A collection of central memory and peripheral processor programs that enters a hypothetical work load into the system to analyze the effects of such a load on response time and system reliability.

Subfamily

Each permanent file family consists of eight subfamilies, subfamily 0 though subfamily 7. The lower 3 bits of the user index identify the subfamily to which a user belongs.

System Access Categories

On a secured system, a set of access categories are set during level 0 deadstart. This set may consist of some, all, or none of the 32 possible access categories. While the system is running in security mode, you may only use access categories that are within the set of system access categories.

System Access Levels

On a secured system, a range of access levels is set during level 0 deadstart. This range may contain some or all of the eight possible access levels. While the system is running, users may only use access levels that are within the range of system access levels.

System Deadstart File (SDF)

A file that is a copy of the deadstart tape that resides on a rotating mass storage deadstart device. When the system is deadstarted from disk, this file is read to generate copies of the running system.

System Library (SYSLIB)

The collection of tables and object language programs that reside in central memory or on mass storage and are necessary for running the operating system and its product set.

System Resource Unit (SRU)

A unit of measurement of system usage. The number of SRUs includes the central processor time, memory usage, and input/output resources used for a given job.

Temporary File

A file associated with a job that is not a permanent file. Temporary files no longer exist when the user logs off the system or releases the files.

Timed/Event Rollout

A condition in which an executing job has been temporarily removed from central memory but will be rolled back into central memory when a specified event (such as a file is no longer busy) or a specified time period has elapsed.

TRACER Utility

A utility that monitors the system's activity and gathers data periodically for statistical analysis of the system.

Track Link

An address of the next track that is a logical continuation of a file.

Track Reservation Table (TRT)

A table that describes the physical layout of data on a device and is the key to allocating information on the device.

Transaction Facility (TAF)

An application program that provides the transaction terminal with access to a data base. A terminal using TAF can enter, retrieve, and modify information in the data base.

Trunk Control Unit (TCU)

The hardware part of a network access device (NAD) that interfaces with a network trunk.

UDT

A unit descriptor table.

UEM

Refer to Unified Extended Memory.

Unified Extended Memory

A type of extended memory that is available as an option for models 815, 825, 835, 845, and 855. UEM differs from other types of extended memory in that it is a portion of central memory and not a separate memory unit. Refer to Extended Memory.

Unsecured System

A system in which the multilevel security mechanism has not been enabled during deadstart. The restrictions based on access levels and access categories are not enforced on an unsecured system.

User Index

A unique 17-bit identifier that is associated with each user name. The user index is used by the permanent file manager to identify the device and catalog track for the user's permanent files.

User Job Name (UJN)

A one- to seven-character alphanumeric name you specify to replace the system defined JSN for a queued file or executing job.

User Name

A name given to you by your employer, instructor, or computer center personnel. Your user name has certain resources and privileges assigned to it. When you log in, you specify your user name to identify yourself to the system, so that it knows that you are an authorized user and what resources you are entitled to use. Your user name also represents a specific catalog in the permanent file system. All files you make permanent are associated with your user name and this catalog.

Validation File

A file that contains validation information for all users (user names, passwords, resources allowed, and so on).

VALIDUs File

A system file used to control user validation.

VALINDs File

A system file used to control user indexes.

Volume Serial Number (VSN)

A one- to six-character identifier that identifies the volume of magnetic tape to the system.

Word

A group of bits (or 6-bit characters) between boundaries imposed by the computer system. A word is 60 bits in length. The bits are numbered 59 through 0 starting from the left. A word is also composed of five 12-bit bytes, numbered 0 through 4 from the left.

Working File

A temporary file currently assigned to a job.

Write Mode

A mode that allows a user to write, modify, append, read, execute, or purge the file (modify permission applies only to direct access files).

Zero-Length PRU

A PRU that contains system information, but no user data. Under NOS, a zero-length PRU defines EOF.

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