



SY31-0457-6

IBM System/34  
5340 System Unit  
Maintenance Manual



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This manual contains maintenance information that will be used by the customer engineer who installs and maintains the IBM System/34. Most maintenance on System/34 is performed using this maintenance manual and the System/34 MAPs (maintenance analysis procedures). Additional information about this service method is in Section 01-100 *How to Use the System/34 MAPs and Maintenance Manual*.

Customer engineers using this manual are assumed to have been trained on System/34 as described in the 5340 Technical Service Letter (TSL).

The 5340 *System Unit Theory Diagrams Manual* has a list of abbreviations and a glossary that gives the meaning of words and abbreviations used in this maintenance manual.

There are several DANGER and CAUTION messages in this manual. You can use the blank lines below each message to translate it into your own words.

Note: This manual follows the convention that he means he or she.

### Related Publications

- *IBM System/34 Operator's Guide*, SC21-5158
- *IBM System/34 Functions Reference Manual*, SA21-9243
- *IBM System/34 5340 System Unit Theory Diagrams Manual*, SY31-0458
- *IBM System/34 5340 System Unit Parts Catalog*, S131-0632
- *IBM System/34 Installation and Modification Reference Manual: Program Products and Physical Setup*, SC21-7689
- *IBM System/34 System Data Areas and Diagnostic Aids Manual*, LY21-0049
- *IBM System/34 System Support Program Logic Manual: System*, LY21-0050
- *IBM System/34 1255 Attachment Feature Theory/Maintenance Manual*, SY31-0521

For systems that use the ideographic display work stations, see the following manuals:

- *IBM System/34 5340 System Unit Ideographic Feature Maintenance Manual Supplement*, SY09-1014
- *IBM System/34 5340 System Unit Ideographic Feature Theory Diagrams Manual Supplement*, SY09-1801
- *IBM System/34 Functions Reference Ideographic Feature Supplement (5255 Display Station Model 1)*, SA09-1632
- *IBM System/34 Functions Reference Ideographic Feature Supplement (5255 Display Station Model 2)*, SA09-1633

## **ELECTROMAGNETIC INTERFERENCE**

United States Federal Communications Commission (FCC) rules require IBM to publish the following information, which applies to each unit (including modems and terminals) described in this manual (hereafter called *equipment*).

**WARNING:** *This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manuals, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.*

### **Instructions Pursuant to FCC Part 15, Subpart J**

1. This equipment should not be installed less than 30 meters (98.5 feet) from radio or television receivers or their receiving antennas.
2. This equipment should not receive its power from branch circuits that also power radio or television receivers.

If this equipment cannot comply with the above distance limitation:

1. Turn the equipment and the receiver on. If no interference is apparent, no further action need be taken.
2. If interference occurs, reorient or relocate the equipment, the receiver, or both.
3. If interference still occurs, contact your IBM representative.

## Contents

01-000	INTRODUCTION TO MAINTENANCE	01
02-000	REFERENCE INFORMATION	02
05-000	POWER	05
07-000	5211 PRINTER ATTACHMENT	07
08-000	3262 PRINTER ATTACHMENT	08
09-000	62EH DISK DRIVE	09
10-000	62PC DISK DRIVE	10
11-000	WORK STATION ATTACHMENT	11
13-000	CE PANELS	13
15-000	PROCESSING UNIT	15
21-000	OPERATOR PANEL	21
23-000	33FD DISKETTE DRIVE	23
25-000	53FD DISKETTE DRIVE	25
27-000	72MD DISKETTE MAGAZINE DRIVE	27
30-000	MULTILINE COMMUNICATIONS ADAPTER	30
31-000	DATA COMMUNICATIONS (FIRST OR SECOND COMMUNICATIONS ADAPTER)	31
40-000	1255 MICR ATTACHMENT	40
45-000	INSTALLATION INSTRUCTIONS	45
80-000	ERROR INFORMATION	80
81-000	Main Storage Processor	81
82-000	Control Processor	82
83-000	Disk	83
84-000	Diskette	84
85-000	3262 and 5211 Printers	85
86-000	Work Station Controller	86
87-000	Display Station	87
88-000	5256 and 5225 Matrix Printers	88
89-000	Data Communications	89
99-000	SYSTEM/34 DIAGNOSTIC SERVICE GUIDE	99



Ensure that you understand and observe the safety precautions printed in the CE Safety Practices card that is used in the country where you work. A copy of the card that is used by customer engineers who work in the U.S. follows.

## CAUTION AND DANGER NOTICES

Throughout this manual, the word *DANGER* is used to inform you of an action that could cause you to receive an injury. The word *CAUTION* is used to inform you of an action that could damage the machine that you are working on, or affect the running of the customer program.

## DANGER AREAS OF SYSTEM/34

Observe the following danger conditions when working on the System/34:

- Be especially careful when working in areas of System/34 that contain parts that become hot during normal machine operation, areas where high voltage is present, and areas that have moving parts.
- Do not touch the diskette drive belt while the diskette drive is running.

## DANGER NOTICES

The following danger notices appear throughout this manual in the sections named:

**05-100 Power Introduction:** Set the circuit breaker (CB1) to Off if you want *all* voltages off. With the IPO switch turned off and CB1 on, AC line voltage is still present at the control supply and DC output voltages from the control supply are present at the A-A1 board, the operator panel, and the CE panel. Because of the charge on the capacitors in the arc-suppression networks across K1 and K2, a voltage is still present on all circuits supplied by the contactor points when K1 and K2 are de-activated (see paragraph 05-315).

**05-315 Power AC Box:** When K1 and K2 are de-activated, a voltage is still present in the circuits that are supplied by the points of the contactors. The voltage is present because of the charge on the capacitors in the arc-suppression networks across the points of the contactors.

**05-500 Immediate Power Off:** Set the circuit breaker (CB1) to Off if you want *all* voltages off. With the IPO switch turned off and CB1 on, AC line voltage is still present at the control supply and DC output voltages from the control supply are present at the A-A1 board, the operator panel, and the CE panel. Because of the charge on the capacitors in the arc-suppression networks across K1 and K2, a voltage is still present on all circuits supplied by the contactor points when K1 and K2 are de-activated (see paragraph 05-315).

**09-020 62EH Disk Enclosure Removal:** The disk enclosure weight is 12.5 kg (27 pounds). Clear a space for the disk enclosure before removing the disk enclosure from the machine.

**09-030 62EH Drive Motor Removal and Replacement:** CB1 must be off to remove AC voltage from ACTB3 and ACTB4.

**09-035 62EH Motor Start Relay Removal:** CB1 must be off to remove AC voltage from the motor start relay terminals.

**09-050 62EH Brake Assembly Adjustment:** Ensure that the disconnected wires are away from ACTB3 (lower drive) or ACTB4 (upper drive).

220 Vac is present on ACTB3 and ACTB4.

**09-120 62EH Cable and Card Locations:** 220 Vac is present on ACTB3 and ACTB4.

**10-020 62PC Subframe Removal:** The subframe/disk enclosure weight is 16 kg (35 pounds). Clear a space for the subframe/disk enclosure before removing the subframe/disk enclosure from the machine.

**10-030 62PC Disk Enclosure Removal:** The disk enclosure weight is 9 kg (20 pounds). Clear a space for the disk enclosure before removing the disk enclosure from the machine.

**10-080 62PC Motor Assembly Terminal Block Removal:** CB1 must be off to remove AC voltage from this circuit.

**10-090 62PC Card Gate Fan Assembly Terminal Block Removal:** CB1 must be off to remove AC voltage from this circuit.

**10-100 62PC Drive Motor Assembly Removal:** CB1 must be off to remove AC voltage from this circuit.

**10-130 62PC Card Gate Fan Assembly Removal:** CB1 must be off to remove AC voltage from this circuit.

**23-060 33FD Safety:** The drive motor case may be hot and may burn your hand. When the drive motor is operating, do not touch the drive motor case or the drive belt.

**23-170 33FD Drive Motor Removal:** The drive motor case may be hot and may burn your hand.

**23-170 33FD Drive Motor Replacement:** To prevent personal injury, position the two large square holes in the motor frame so the holes are under the bracket. The holes are large enough for a finger to go through.

**25-020 53FD Safety:**

1. The system supplies the alternating current and direct current power. Voltages are present on the connector terminals in the diskette drive when the drive motor is turning.
2. Motor and solenoid cases become hot after continuous use; wait enough time for parts to cool before servicing.

**25-490 53FD Head/Carriage Adjustment:** Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

**25-510 53FD Head/Carriage Replacement:** Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

**25-520 53FD Diskette Drive Solenoid and Bail Service Check:** Voltage is still present at the power connector when the diskette drive solenoid and bail are disconnected and power is on.

**25-530 53FD Solenoid and Bail Adjustment:** Voltage is still present at the power connector when the solenoid and bail are disconnected and power is on.

The solenoid case becomes hot after continuous use.

**25-540 53FD Solenoid and Bail Removal (Machines with Taper Pin Block):** Voltage is still present at the power connector when the solenoid and bail are disconnected and power is on.

**25-550 53FD Solenoid and Bail Removal (Machines without Taper Pin Block):** Voltage is still present at the power connector when the solenoid and bail are disconnected and power is on.

**25-600 53FD Diskette Drive Motor Removal:** The motor case becomes hot after continuous use.

**25-610 53FD Drive Motor Replacement (60 Hz motors):** To prevent personal injury, if your motor case has two large holes, position the two large holes in the motor frame so the holes are under the bracket. The holes are large enough for a finger to go through.

**25-690 53FD Stepper Motor Replacement:** Voltage is still present at the power connector when the stepper motor is disconnected and power is on.

**25-710 53FD Pulley and Clamp Replacement:** Voltage is still present at the power connector when the pulley and clamp are disconnected and power is on.

**25-840 53FD Phototransistor Amplifier Service Check:** Voltage is still present at the power connector when the phototransistor amplifier is disconnected and power is on.

**27-020 72MD Safety:**

1. The system supplies the alternating current and direct current power. Voltages are present on the connector terminals in the diskette drive when the drive motor is turning.
2. Motor and solenoid cases become hot after continuous use; wait enough time for parts to cool before servicing.

**27-200 72MD Removal and Replacement:** The 72MD unit weight is 18 kg (40 pounds).

**27-295 72MD Carriage Bed Orient Adjustment:** Voltage is still present at the power connector when the drive motor power cable is disconnected and power is on.

**27-600 72MD Head/Carriage Service Check:** Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

**27-605 72MD Head/Carriage Adjustment:** Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

**27-610 72MD Head/Carriage Removal and Replacement:** Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

**27-615 72MD Head/Carriage Stepper Motor Reinstallation:** Voltage is still present at the power connector when the head/carriage stepper motor is disconnected and power is on.

**27-620 72MD Head/Carriage Pulley and Clamp Reinstallation:** Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

**27-690 72MD Index Sense PTX Output Service Check:** Voltage is still present at the power connector when the drive motor power cable is disconnected and power is on.

**27-800 72MD Driver Board Output to Picker/Cam Stepper Motor Service Check:** Parts of the driver board become hot after continuous use.

**27-805 72MD Driver Board Output to Carriage Bed Stepper Motor Service Check:** Parts of the driver board become hot after continuous use.

**27-845 72MD Carriage Bed Stepper Motor Control Card Signal Output Check:** Parts of the driver board become hot after continuous use.

**27-850 72MD Picker/Cam Stepper Motor Control Card Signal Output Check:** Parts of the driver board become hot after continuous use.

**30-360 Line Plate Adjustment:** Voltage is present on the line plate from the telephone lines.

**31-320 Line Plate Adjustment:** Voltage is present on the line plate from the telephone lines.

**80-210 Power Distribution for ESD:** Disconnect the line cord before checking the screws holding the line cord.

**99-041 Diagnostic Supervisors; Concurrent Maintenance:** If you are performing maintenance on the printer, have the operator take the printer offline to prevent the printer from being activated by an external source.

## CE SAFETY PRACTICES CARD

### CE SAFETY PRACTICES

All Customer Engineers are expected to take every safety precaution possible and observe the following safety practices while maintaining IBM equipment:

1. You should not work alone under hazardous conditions or around equipment with dangerous voltage. Always advise your manager if you MUST work alone.
2. Remove all power, ac and dc, when removing or assembling major components, working in immediate areas of power supplies, performing mechanical inspection of power supplies, or installing changes in machine circuitry.
3. After turning off wall box power switch, lock it in the Off position or tag it with a "Do Not Operate" tag, Form 229-1266. Pull power supply cord whenever possible.
4. When it is absolutely necessary to work on equipment having exposed operating mechanical parts or exposed live electrical circuitry anywhere in the machine, observe the following precautions:
  - a. Another person familiar with power off controls must be in immediate vicinity.
  - b. Do not wear rings, wrist watches, chains, bracelets, or metal cuff links.
  - c. Use only insulated pliers and screwdrivers.
  - d. Keep one hand in pocket.
  - e. When using test instruments, be certain that controls are set correctly and that insulated probes of proper capacity are used.
  - f. Avoid contacting ground potential (metal floor strips, machine frames, etc.). Use suitable rubber mats, purchased locally if necessary.
5. Wear safety glasses when:
  - a. Using a hammer to drive pins, riveting, staking, etc.
  - b. Power or hand drilling, reaming, grinding, etc.
  - c. Using spring hooks, attaching springs.
  - d. Soldering, wire cutting, removing steel bands.
  - e. Cleaning parts with solvents, sprays, cleaners, chemicals, etc.
  - f. Performing any other work that may be hazardous to your eyes. REMEMBER - THEY ARE YOUR EYES.
6. Follow special safety instructions when performing specialized tasks, such as handling cathode ray tubes and extremely high voltages. These instructions are outlined in CEMs and the safety portion of the maintenance manuals.
7. Do not use solvents, chemicals, greases, or oils that have not been approved by IBM.
8. Avoid using tools or test equipment that have not been approved by IBM.
9. Replace worn or broken tools and test equipment.
10. Lift by standing or pushing up with stronger leg muscles - this takes strain off back muscles. Do not lift any equipment or parts weighing over 60 pounds.
11. After maintenance, restore all safety devices, such as guards, shields, signs, and grounding wires.
12. Each Customer Engineer is responsible to be certain that no action on his part renders products unsafe or exposes customer personnel to hazards.
13. Place removed machine covers in a safe out-of-the-way place where no one can trip over them.
14. Ensure that all machine covers are in place before returning machine to customer.
15. Always place CE tool kit away from walk areas where no one can trip over it; for example, under desk or table.
16. Avoid touching moving mechanical parts when lubricating, checking for play, etc.
17. When using stroboscope, do not touch ANYTHING - it may be moving.
18. Avoid wearing loose clothing that may be caught in machinery. Shirt sleeves must be left buttoned or rolled above the elbow.
19. Ties must be tucked in shirt or have a tie clasp (preferably nonconductive) approximately 3 inches from end. Tie chains are not recommended.
20. Before starting equipment, make certain fellow CEs and customer personnel are not in a hazardous position..
21. Maintain good housekeeping in area of machine while performing and after completing maintenance.

**Knowing safety rules is not enough.  
An unsafe act will inevitably lead to an accident.  
Use good judgment - eliminate unsafe acts.**

### ARTIFICIAL RESPIRATION

#### General Considerations

1. Start Immediately - Seconds Count  
Do not move victim unless absolutely necessary to remove from danger. Do not wait or look for help or stop to loosen clothing, warm the victim, or apply stimulants.
2. Check Mouth for Obstructions  
Remove foreign objects. Pull tongue forward.
3. Loosen Clothing - Keep Victim Warm  
Take care of these items after victim is breathing by himself or when help is available.
4. Remain in Position  
After victim revives, be ready to resume respiration if necessary.
5. Call a Doctor  
Have someone summon medical aid.
6. Don't Give Up  
Continue without interruption until victim is breathing without help or is certainly dead.

#### Rescue Breathing for Adults

1. Place victim on his back immediately.
2. Clear throat of water, food, or foreign matter.
3. Tilt head back to open air passage.
4. Lift jaw up to keep tongue out of air passage.
5. Pinch nostrils to prevent air leakage when you blow.
6. Blow until you see chest rise.
7. Remove your lips and allow lungs to empty.
8. Listen for snoring and gurglings - signs of throat obstruction.
9. Repeat mouth to mouth breathing 10-20 times a minute. Continue rescue breathing until victim breathes for himself.



Thumb and  
finger positions



Final mouth-to-  
mouth position