IBM

Personal Computer Hardware Reference Library

Hardware Maintenance and Service

Graphics Printer
Compact Printer

6139651

Personal Computer Hardware Reference Library

Hardware Maintenance and Service

Graphics Printer

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CAUTION
This product is equipped with a UL-listed and CSA-certified plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

Preface

The *Hardware Maintenance and Service Graphics Printer* manual is the publication used to isolate and repair any failure of a Field Replaceable Unit (FRU) in your printer.

The diagnostic section of the *Hardware Maintenance and Service Graphics Printer* manual must be used in conjunction with the system *Hardware Maintenance and Service* manual. This printer manual assumes that you were directed to the diagnostic section by the "Problem Isolation Charts" in the *Hardware Maintenance and Service* manual. It is also assumed that you are familiar with "Problem Isolation Charts" (PICs). If you need instructions on how to use the PICs refer to the system *Hardware Maintenance and Service* manual.

This manual is divided into seven sections.

Section 1 "Introduction" contains a general description of your printer.

Section 2 "Introduction to Diagnostic Aids" explains the diagnostic aids that are available for the Graphics Printer.

Section 3 "Problem Isolation Charts" provides step-by-step instructions that aid in locating the failing FRU.

Section 4 "Locations" is used to find a part or FRU in the printer.

Section 5, "Removals, Replacements, and Adjustments" provides the information to complete the repair activity.

Section 6, "Switch Settings" is used to set the switches on the Control Circuit card.

Section 7, "Parts Catalog" contains illustrations and part numbers for the individual FRUs.

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SECTION 1. INTRODUCTION

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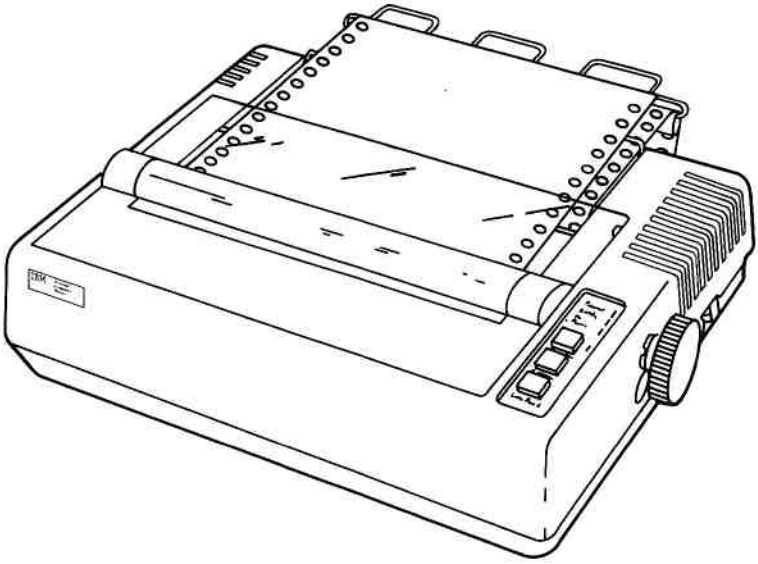
Graphics Printer Description

The IBM Personal Computer Graphics Printer is a table-top, wire matrix printer. It attaches to a parallel adapter through a standard printer cable, which has a 25-pin connector on the computer end and a 36-pin connector on the printer end.



The following are features of the Graphics Printer:

- 80 characters-per-second print speed
- Extended character sets
- 80 characters per line
- 9-wire print head
- 9-by-9 dot matrix

CAUTION
This product is equipped with a UL-listed and CSA-certified plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

SECTION 2. INTRODUCTION TO DIAGNOSTIC AIDS

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Introduction

This section explains the diagnostic aids that are available for the Graphics Printer: Problem Isolation Charts (PICs), and the Advanced Diagnostics diskette and the printer self-test. The diagnostic aids are used to troubleshoot printer problems.

This manual supplements the system *Hardware Maintenance and Service* manual. If you are having a problem with your printer, follow the procedures in that manual until you are instructed to turn to this manual.

Problem Isolation Charts

The PICs will help you to isolate a problem to the failing field replaceable unit (FRU).

Advanced Diagnostics Diskette

The Advanced Diagnostics diskette has tests that check the functions of the Graphics Printer and adapters. If any problem is detected, the diagnostic test stops and an error code appears.

Power-On Self Test

Each time you switch the Graphics Printer on, it checks itself. The print head returns to the left margin and the Power, Ready, and Online lights come on. If a problem is detected, the test stops and you then use the appropriate PIC. (If the No Paper light is on and the printer beeps, the printer is out of paper.)

Graphics Printer Self Test

The Graphics Printer has internal diagnostic tests. To run the self test, do the following steps.

1. Set the printer and system power Off.

2. Insert forms in the printer.

3. Press and hold the Line Feed button while you set the printer Power switch to On. (To stop the test before it is finished, set the printer Power switch to Off.)

   Note: This test takes up to 10 minutes.

SECTION 3. PROBLEM ISOLATION CHARTS

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Printer Entry

This is the entry point for using the Graphics Printer PIC. You have entered this PIC because you were directed here by one of the PICs in the system *Hardware Maintenance and Service* manual. You may have a 140X error code or an undetermined problem with your IBM Personal Computer Graphics Printer. The printer is assumed to be plugged into a functional wall outlet.

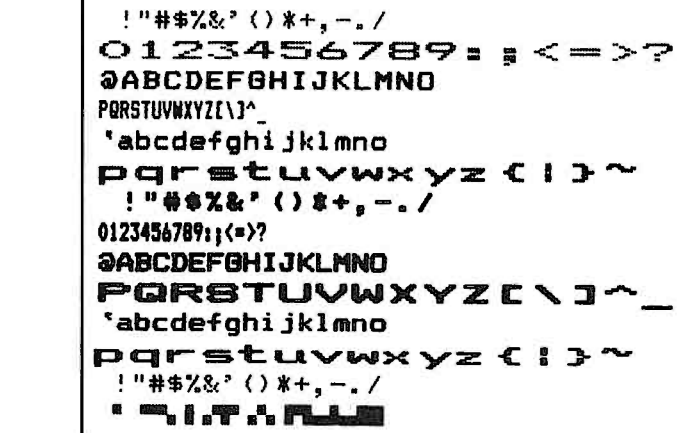
Notes:

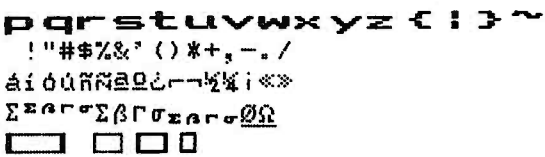
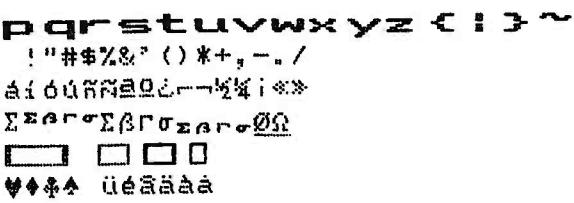
Graphics Printer 1400

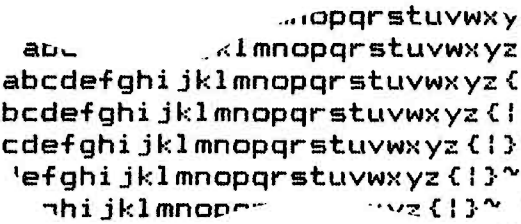
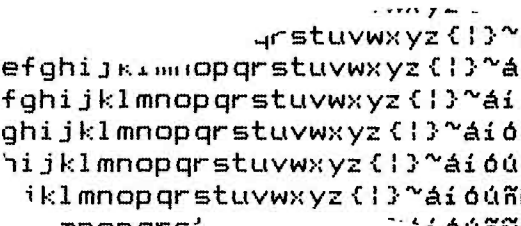
You have entered this PIC because your system has a 14XX error code or you have identified a problem with your Matrix or Graphics Printer.

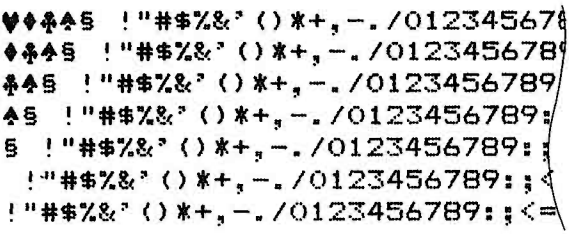
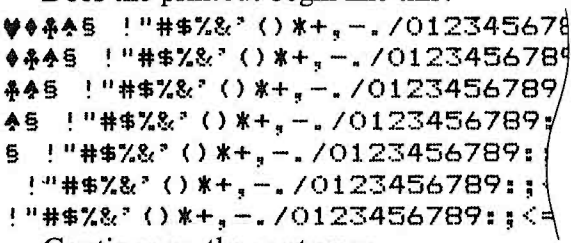
Error Description	Diagnostic Action
1400 Printer Entry	**1.** Set the printer Power switch to Off. Verify that the forms are properly inserted. Move the print head to the leftmost position. Set the printer Power switch to On. Are the Power, Ready and Online lights on? **YES:** Go to Step 2. **NO:** Go to page 3-1400-34, "Control Panel," and do each step until you find the failing FRU. **2.** Press the Online button. Does the Online light go out? **YES:** Go to Step 3. **NO:** Go to page 3-1400-34, "Control Panel."

Error Description	Diagnostic Action
1400 Printer Entry	**3.** Press the Line Feed and Form Feed buttons. Do the forms advance when you press each button? **YES:** Go to Step 4. **NO:** Do the forms advance when you press either button? **YES:** Go to page 3-1400-34, "Control Panel." **NO:** Go to page 3-1400-22, "Forms Do Not Advance," and do each step until you find the failing FRU. **4.** Remove all forms. Press the Online button. Does the alarm sound and the No Paper light go on? **YES:** Set the Power switch to Off. Reinsert the forms. Set the Power switch to On. Go to Step 5. **NO:** Go to page 3-1400-34, "Control Panel."

Error Description	Diagnostic Action
1400 Printer Entry	**5.** Load the Advanced Diagnostics program, if not already loaded. Is option 14 missing from the Installed Devices menu? **YES:** Go to Step 6. **NO:** Select option 14. Does the printer print? **NO:** Go to Step 6. **YES:** Compare the printout with the following samples. IBM Matrix Printer 

Error Description	Diagnostic Action
1400 Printer Entry	Step 5 Continued. IBM Graphics Printer Character Set 1  IBM Graphics Printer Character Set 2  Did your printout match any sample? **YES:** Go to page 3-1400-9, "Failure Symptom." If a symptom still exists, go to the corresponding page and do each step until you find the failing FRU. **NO:** Go to Step 6.

Error Description	Diagnostic Action
1400 Printer Entry	**6.** Set the Power switch on the printer and system unit to Off. Disconnect the Printer Cable from the printer and system unit. Do the Offline Diagnostic Test (see page 3-1400-42). Does the printer print? **NO:** Go to page 3-1400-18, "No Printing," and do each step until you find the failing FRU. **YES:** Compare the printout with the following samples. IBM Matrix Printer  IBM Graphics Printer Character Set 1 

Error Description	Diagnostic Action
1400 Printer Entry	IBM Graphics Printer Character Set 2  Did your printout match any sample? **YES:** Go to Step 7. **NO:** Go to page 3-1400-9, "Failure Symptom." If a symptom still exists, go to the corresponding page and do each step until you find the failing FRU. **7.** Check the first line of the Offline Diagnostic Test printout. Does the printout begin like this?  Continue on the next page.

Error Description	Diagnostic Action
1400 Printer Entry	**YES:** Go to Step 8. **NO:** The first line of the printout shows that the printer defaults to a character set that does not support all of the international characters. Is the international character set required? **YES:** Remove the top cover (see Section 5). Is position 7 of DIP switch 1 set to On? (see Section 4). **YES:** Replace the logic card. **NO:** Remove the plastic cover from DIP switch 1. Set position 7 to On. Install the plastic cover on the DIP switch. Install the printer top cover, then go to Step 6. **NO:** Go to Step 8.

Error Description	Diagnostic Action
1400 Printer Entry	**8.** Insert the Advanced Diagnostics diskette and set the Power switch on the expansion unit (if attached) and the system unit to On. Advance to the menu where you select the options to test. Is the printer adapter missing? **YES:** Replace the printer adapter (see Section 5). **NO:** Do the diagnostic tests for the printer adapter installed. Did the diagnostic tests finish without any errors? **YES:** Go to Step 9. **NO:** Replace the adapter (see Section 5). **9.** Check all pins of the printer cable, pin to pin, for shorts or opens (see Section 4). Any shorts or opens? **YES:** Replace the Printer Cable. **NO:** Go to Power Supply Check (220/240 Volt or 120 Volt). If the Power Supply checks OK, replace the control cards in the printer.

Error Description	Diagnostic Action
Power Supply Check 220/240 Volt	1. Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Set the printer Power switch to On. Measure the resistance between the voltage terminals on the power cord. **DANGER** **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE EXTREME CAUTION IN THIS AREA.** Is the resistance 40 to 50 ohms? **YES:** Go to Step 3, page 3-1400-15. **NO:** Unplug the power cord from the printer. Measure the resistance between the two lower pins of the ac socket at the rear of the printer. Is the resistance 40 to 50 ohms? **YES:** Replace the printer power cord. **NO:** Check for an open fuse (see Section 4). Is the fuse open? Continued on the next page.

Error Description	Diagnostic Action
Power Supply Check 220/240 Volt	**YES:** Replace the fuse (see Section 5). Set the printer Power switch to Off. Plug the printer power cord into the printer and the outlet. Set the printer Power switch to On for 1 minute. Does the fuse open? **YES:** Go to Step 2 on page 3-1400-14. **NO:** The problem is solved. **DANGER** **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE EXTREME CAUTION IN THIS AREA.** **NO:** Measure the resistance between the wires in positions 1 and 4 of the transformer-primary power connector (see Section 4). Is the resistance 40 to 50 ohms? **YES:** Replace the fuse-filter card (see Section 5). **NO:** Replace the power transformer (see Section 5).

Error Description	Diagnostic Action
Power Supply Check 120 Volt	**1.** Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Set the printer Power switch to On. Measure the resistance between the voltage terminals on the Power cord. Is the resistance 2 to 12 ohms? **YES:** Go to Step 3. **NO:** Check for an open fuse (see Section 4). **DANGER** **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE EXTREME CAUTION IN THIS AREA.** Is the fuse open? **YES:** Replace the fuse (see Section 5). Set the printer Power switch to Off. Plug the printer power cord into the outlet. Set the printer Power switch to On for 1 minute. Does the fuse open? **YES:** Go to Step 2. **NO:** The problem is solved. **NO:** Continue on the next page.

Error Description	Diagnostic Action
Power Supply Check 120 Volt	**NO:** Measure the resistance on the primary side of the power transformer (see Section 4). Is the resistance approximately 12 ohms? **DANGER** **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE EXTREME CAUTION IN THIS AREA.** **YES:** Replace the fuse-filter card (see Section 5). **NO:** Replace the power transformer (see Section 5).

Error Description	Diagnostic Action
Power Supply Check 120 Volt	**2.** Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Replace the fuse (see Section 5). Disconnect the power transformer connector from the fuse-filter card (see Section 4). Plug the printer power cord into the outlet. Set the printer Power switch to On for 1 minute then Off. Unplug the printer power cord from the outlet and check for an open fuse. Is the fuse open? **DANGER** **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE EXTREME CAUTION IN THIS AREA.** **YES:** Replace the fuse-filter card (see Section 5). **NO:** Replace the power transformer (see Section 5).

Error Description	Diagnostic Action
Power Supply Check 120 Volt	3. Disconnect CN2 (see Section 4). Plug the printer power cord into the outlet. Set the printer Power switch to On. Measure the voltages on the plug side of CN2 (see the chart below). **DANGER** **LINE VOLTAGES ARE PRESENT ON THE AC FILTER, CIRCUIT BOARD, AND THE TRANSFORMER.** Be careful when measuring secondary voltages.

Color	+ Lead	- Lead	Min. Voltage	Max. Voltage
Gray	CN2-1	CN2-2	7.6 Vac	10.4 Vac
Orange	CN2-3	CN2-4	19.5 Vac	26.5 Vac
Red	CN2-5	CN2-6	8.1 Vac	10.9 Vac
Blue	CN2-7	CN2-8	13.0 Vac	17.6 Vac

Are the voltages within range?

YES: Go to Step 4.
NO: Replace the power transformer (see Section 5).

Error Description	Diagnostic Action
Power Supply Check 120 Volt	**4.** Set the printer Power switch to Off. Connect CN2 (see Section 4). Set the Power switch to On then measure the voltages at CN3 (see Section 4), as shown in the chart below. Use the ground pin on the driver circuit card. **DANGER** **LINE VOLTAGE IS PRESENT ON THE AC FILTER CIRCUIT BOARD AND TRANSFORMER.** Be careful when measuring DC voltages. Are + 5 and + 14 Vdc within range? **YES:** Go to Step 5. **NO:** Replace both control cards (see Section 5).

Pin No.	Min. Voltage	Max. Voltage
CN3-16	4.5 Vdc	5.5 Vdc
CN3-20	11.0 Vdc	15.4 Vdc

Error Description	Diagnostic Action
Power Supply Check 120 Volt	**5.** Measure the + 24 Vdc (use the ground pin on the driver circuit card). Is + 24 Vdc present? **YES:** The power supply checks good. If you still have a problem go to page 3-1400-9,"Failure Symptom." **NO:** Go to Step 6. **6.** Using the 60-volt scale, measure the DC voltages at pins CN6-1 and CN6-2 of control circuit card (use the DC ground pin on the driver circuit card for the common lead). Subtract the lower reading from the higher. Is the difference 0.5 to 0.9 Vdc? **YES:** Replace both control cards (see Section 5). **NO:** Replace the heat sink/power transistor assembly (see Section 5).

Pin No.	Min. Voltage	Max. Voltage
CN3-18	21.6 Vdc	26.4 Vdc

Error Description	Diagnostic Action
No Printing	**1.** Does the print head carriage move back and forth normally when attempting to print? **YES:** Go to page 3-1400-27, "Rows of Print Dots Missing." **NO:** Go to Step 2. **2.** Set the printer Power switch to Off. Check for a loose or broken carriage belt. Replace if broken, adjust if loose (see Section 5). **3.** Remove the ribbon cartridge. Turn the knob on the cartridge to check for jamming. Replace the cartridge if it is jammed. **4.** Check the print head for broken wires. Replace the print head if the wires are damaged (see Section 5). **5.** Move the print head assembly and check for smooth mechanical movement. Is the movement smooth? **YES:** Go to Step 6. **NO:** Check for worn or broken gears in the carriage drive assembly. Are any gears worn or broken? Continue on the next page.

Error Description	Diagnostic Action
No Printing	**YES:** Replace the carriage drive assembly (see Section 5. **NO:** Replace the print mechanism assembly (see Section 5). **6.** Set the printer Power switch to On and move the print head to the leftmost position. Then, while moving the print head to the center of the print line, check that the voltage at CN6-20 on the driver circuit card (see Section 4), shifts from an up level (approximately + 5 Vdc) to a down level (approximately 0 Vdc). Use the ground pin on the driver circuit card for the common lead. Is there an Up level to a Down level meter deflection. **YES:** Go to Step 7. **NO:** Is there a constant down level? **YES:** Go to page 3-1400-10, "Power Supply Check", (220/240 Volt or 120 Volt). If the power supply checks OK, replace the left margin sensor (see Section 5). **NO:** Continue on the next page.

Error Description	Diagnostic Action
No Printing	**NO:** Set the printer Power switch to Off. Check continuity from CN6-20 (driver circuit card) to terminal 1 of the left-margin sensor, and from CN6-15 to terminal 2 of the left-margin sensor (see Section 4). Is either line open? **YES:** Replace the print mechanism assembly (see Section 5). **NO:** Replace the left-margin sensor (see Section 5). **7.** Check for a meter deflection from an up level (approximately + 5 Vdc) to a down level (approximately 0 Vdc) on pin CN6-19 on the driver circuit card (see Section 4) while applying slight left or right pressure to the print head to the next detented position. Use the driver circuit card ground pin for the common lead. Does the meter deflect from an up level to a down level? **YES:** Go to Step 8. **NO:** Is there a constant up level? Continue on the next page.

Error Description	Diagnostic Action
No Printing	**YES:** Replace the print mechanism assembly (see Section 5). **NO:** Check for + 5 Vdc at CN5-18 (see Section 4). Is there + 5 Vdc? **YES:** Replace the print mechanism assembly (see Section 5). **NO:** Go to page 3-1400-10, "Power Supply Check", (220/240 Volt or 120 Volt). **8.** Set the printer Power switch to Off. Measure the resistance between pin CN6-13 (driver circuit card), and pins CN6-21, 22, 23 and 24 (stepper motor coils) on the cable end. Is the resistance approximately 45 ohms? **YES:** Replace the control card (see Section 5). **NO:** Replace the print mechanism assembly (see Section 5).
Print Head Carriage Not Moving	Go to page 3-1400-18, "No Printing."

Error Description	Diagnostic Action
Forms Do Not Advance Overprinting Forms Jamming Or Tearing	**1.** Check the position of the forms feeding into the printer. The forms path must be parallel to the printer sides. Reposition the forms for parallel feeding. **2.** Remove any obstructions from the forms path (jagged edges on the forms box, torn paper in the print mechanism, and the like). **3.** Inspect the left and right forms tractors for: —Poor positioning —Loose covers —Loose lock levers —Worn springs —Broken feed pins Replace the left or right forms tractors if damaged (see Section 5). **4.** Check for a loose or broken carriage belt, and for broken cogs on the belt. Adjust if loose or replace it if broken (see Section 5). **5.** Inspect the print head for broken wires. Replace it if the wires are damaged (see Section 5). **6.** Check the print-head gap adjustment. Adjust if out of tolerance (see Section 5).

Error Description	Diagnostic Action
Forms Do Not Advance Overprinting Forms Jamming Or Tearing	**7.** Check for a bent or pitted ribbon shield. Replace the shield if damaged (see Section 5). **8.** Check the platen for damage. Replace the print mechanism assembly if the platen is damaged (see Section 5). **9.** Set the printer Power switch to Off. Advance the forms by turning the Forms Advance knob. Check the intermediate gear for worn or broken teeth and replace the gears if damaged. Check the left and right tractors for broken feedpins. Replace the tractors if the feedpins are broken (see Section 5). **10.** Measure the resistance on the form-feed motor coils between pin CN6-14 and pins CN6-25, 26, 27, and 28 on the driver circuit card (see Section 4). Is the resistance 45 ohms? **YES:** Check for + 24 Vdc at CN3-18 (see Section 4). Is there + 24 Vdc? **YES:** Replace both control cards (see Section 5). **NO:** Go to page 3-1400-10, "Power Supply Check", (220/240 Volt or 120 Volt). **NO:** Replace the print mechanism assembly (see Section 5).

Error Description	Diagnostic Action
Ribbon Jammed	1. Remove the ribbon cartridge. Try printing to verify that the print head carriage works normally. If the carriage fails, see page 3-1400-18, "No Printing." 2. Advance the ribbon by hand and check for binding. Replace the ribbon cartridge if the ribbon is binding. 3. Check the carriage drive assembly for worn or broken ribbon drive gears. Replace the assembly if the gears are damaged (see Section 5). 4. Check for a bent ribbon shield; replace if necessary (see Section 5). 5. Check the print head for broken or binding wires. Replace the print head if the wires are broken or binding (see Section 5).

Error Description	Diagnostic Action
Printing Too Light Poor Print Quality	**1.** Check that the ribbon has enough ink and is not damaged. Replace the cartridge if needed. **2.** Advance the ribbon by hand and check the ribbon cartridge for binding. Replace it if binding occurs. **3.** Visually check for worn or broken ribbon drive gears, replace the carriage drive assembly if it is damaged (see Section 5). **4.** Check for a bent ribbon shield and replace as necessary (see Section 5). **5.** Check the print head for broken or binding wires. Replace the print head if wires are broken or binding (see Section 5). **6.** Verify that the print-head gap is 0.6 to 0.65 mm (0.024 to 0.026 in.) with the lever in the center position (see Section 5). **7.** Check the print head for loose mounting (see Section 5). **8.** Check the platen, print-head carriage shafts, and print mechanism frame for looseness or damage. Replace the print mechanism if needed (see Section 5).

Error Description	Diagnostic Action
Smudged Printing	1. Check and replace the ribbon cartridge if it: —Is jammed —Is seated improperly —Has excessive ink —Is oily or dirty 2. Check for a dirty, oily, or damaged platen. Replace the print mechanism if the platen is damaged (see Section 5). 3. Check for a dirty print head or print wires. Clean as needed. 4. Check for a dirty or bent ribbon shield; replace the shield if it is damaged (see Section 5). 5. Check the ribbon drive assembly for worn or broken ribbon drive gears; replace the assembly if required (see Section 5).
Uneven Printing	If the printing at the top or bottom of characters, or left or right of the print line is uneven, and no adjustments correct this, replace the print mechanism assembly (see Section 5).

Error Description	Diagnostic Action
Rows of Print Dots Missing or Random Print Dots missing	**1.** Check the ribbon for damage (folds, holes, tears). Replace the cartridge if the ribbon is damaged. **2.** Verify that the print-head gap is between 0.6 to 0.65 mm (0.024 to 0.026 in.) at the center position of the adjusting lever (see Section 5). **3.** Check the platen for damage. Replace the print mechanism if the platen is damaged (see Section 5). **4.** Check the print head for broken wires. If the wires are broken, replace the print head (see Section 5). **5.** Remove CN6 on the driver circuit card (see Section 4). Measure the resistance between pin CN6-10 (male side) and each head coil pin (CN6-1 to 9, male side). Is the resistance approximately 22 ohms? Continue on the next page.

Error Description	Diagnostic Action
Rows of Print Dots Missing or Random Print Dots Missing	**YES:** Replace both control cards (see Section 5). **NO:** Disconnect the print-head cable and check the resistance of pins 1 through 9 on the print-head cable (see Section 4). Is the resistance approximately 22 ohms? **YES:** Replace the print mechanism assembly (see Section 5). **NO:** Replace the print head (see Section 5).

Error Description	Diagnostic Action
Extra Print Dots	1. Do the "Offline Diagnostic Test" (see page 3-1400-42). Examine the / and Y characters for extra dots. 2. Remove CN6 on the driver circuit card (see Section 4). Measure the resistance between pin CN6-10 (male side) and each head coil pin (CN6-1 to 9, male side). Is the resistance approximately 22 ohms? **YES:** Go to Step 3. **NO:** Disconnect the print-head cable and measure the resistance from pins 1 through 9 on the print-head cable to common ground (see Section 4). Is the resistance approximately 22 ohms? **YES:** Replace the print mechanism assembly (see Section 5). **NO:** Replace the print head (see Section 5).

Error Description	Diagnostic Action
Extra Print Dots	**3.** Measure the resistance between pins CN6-1 to 9 (see Section 4) with respect to every other pin. Are any pins shorted together? **NO:** Replace both control cards (see Section 5). **YES:** Disconnect the print-head cable and recheck pins CN6-1 to 9 with respect to every other pin. Are any pins shorted together? **YES:** Replace the print mechanism assembly (see Section 5). **NO:** Replace the print head (see Section 5).

Error Description	Diagnostic Action
Printing Continues beyond End-of-Forms	1. Set the printer Power switch to Off. Check the continuity of the End-of-Forms switch from pin CN6-18 on the driver circuit card (see Section 4) to the ground pin on the driver circuit card (open when the forms are inserted, and shorted when the forms are removed). Replace the print mechanism assembly if the switch fails (see Section 5). 2. Check for + 5 Vdc at CN6-18 on the driver circuit card (see Section 4) with the forms inserted. If the voltage is 0 Vdc, check the power supply. Use the ground pin on the driver card.
Double-spacing or Abnormal Characters	Replace both control cards (see Section 5).

Error Description	Diagnostic Action
False End-of-Forms Alarm	**1.** Is the No Paper light off? **YES:** Go to Step 2. **NO:** Are the forms inserted properly? **YES:** Go to page 3-1400-31, "Printing Continues beyond End-of-Forms." **NO:** Insert the forms properly. **2.** Set the printer Power switch to Off then to On. Is the alarm still sounding? **YES:** Measure for + 10.5 to + 12.5 Vdc on pin 1 of the control panel (see Section 4). Is the voltage approximately +12 Vdc? **YES:** Replace both control cards (see Section 5). **NO:** Replace the control panel (see Section 5). **NO:** Do the "Offline Diagnostic Test" (see page 3-1400-42). Does the alarm sound? **YES:** Replace the print mechanism (see Section 5). **NO:** Go to page 3-1400-1, "Printer Entry", if a printer failure is still suspected.

Error Description	Diagnostic Action
Uneven Horizontal Spacing	**1.** Check for a loose print-head carriage belt; adjust the belt tension if needed (see Section 5). **2.** Check for a loosely mounted print head (see Section 5). **3.** Check for worn gears in the carriage drive assembly and replace the assembly if needed (see Section 5). **4.** Check for bent or binding carriage shafts; replace the print mechanism if needed (see Section 5).

Error Description	Diagnostic Action
Control Panel	1. Set the printer Power switch to On. Measure the voltages at CN3 as shown in the chart below. Use the ground on the driver circuit card.

Pin No.	Min. Voltage	Max. Voltage
CN3-16	4.5 Vdc	5.5 Vdc
CN3-20	11.0 Vdc	15.4 Vdc
CN3-18	21.6 Vdc	26.4 Vdc

Are all voltages correct?

YES: Go to Step 2.
NO: Go to page 3-1400-10, "Power Supply Check", (220/240 Volt or 120 Volt).

2. Set the printer Power switch to Off. Disconnect the Printer Cable at the printer. Insert the forms and set the Power switch to On.

   Are the Power, Ready, and Online lights on?

   YES: Go to Step 6.
   NO: Is the alarm sounding and is the No Paper light on?

   YES: Go to page 3-1400-32, "False End-of-Forms Alarm."
   NO: Go to Step 3.

Error Description	Diagnostic Action
Control Panel	**3.** Is the Power light on? **YES:** Go to Step 4. **NO:** Measure for approximately + 10 to + 12 Vdc at pin 9 on the control panel. Use pin 8 for ground (see Section 4). Is approximately + 12 Vdc present? **YES:** Replace the control panel (see Section 5). **NO:** Go to "Power Supply Check", (220/240 Volt or 120 Volt). **4.** Is the Online light on? **YES:** Go to Step 5. **NO:** Measure for approximately + 10 to + 12 Vdc at pin 1 on the control panel. Use the ground pin on the driver circuit card (see Section 4). Is approximately +12 Vdc present? **YES:** Replace both control cards (see Section 5). **NO:** Replace the control panel (see Section 5).

Error Description	Diagnostic Action
Control Panel	**5.** Is the Ready light on? **YES:** Go to Step 6. **NO:** Measure for approximately + 12 Vdc at pin 4 on the control panel. Use the ground pin on the driver circuit card for the ground lead (see Section 4). Is approximately + 12 Vdc present? **YES:** Replace the control cards (see Section 5). **NO:** Replace the control panel (see Section 5).

Error Description	Diagnostic Action
Control Panel	**6.** Set the printer Power switch to Off. Insert the forms under the End-of-Forms switch. Set the printer Power switch to On. Press the Online button. Is the Online light off? **YES:** Go to Step 7. **NO:** Measure for approximately + 4.0 to + 5.5 Vdc on pin 5 of the control panel. Use pin 8 for ground (see Section 4). Is approximately + 5 Vdc present? **NO:** Replace both control cards (see Section 5). **YES:** Press and hold the Online button. Measure 0 to + 1.5 Vdc on pin 5 of the control panel. Is approximately + 1.5 Vdc present? **YES:** Replace both control cards (see Section 5). **NO:** Replace the control panel (see Section 5).

Error Description	Diagnostic Action
Control Panel	7. Press the Line Feed button. Do the forms advance one line? **YES:** Go to Step 8. **NO:** Measure for approximately + 4.0 to + 5.5 Vdc on pin 7 of the control panel. Use pin 8 for ground (see Section 5). Is approximately + 5 Vdc present? **NO:** Replace both control cards (see Section 5). **YES:** Press and hold the Line Feed button. Measure 0 to + 1.5 Vdc on pin 7 of the control panel. Is approximately + 1.5 Vdc present? **YES:** Replace both control cards (see Section 5). **NO:** Replace the control panel (see Section 5).

Error Description	Diagnostic Action
Control Panel	**8.** Press the Form Feed button. Do the forms advance? **YES:** Go to Step 9. **NO:** Measure for approximately + 4.0 to + 5.5 Vdc on pin 6 of the control panel. Use pin 8 for ground (see Section 5). Is approximately + 5 Vdc present? **NO:** Replace both control cards (see Section 5). **YES:** Press and hold the Form Feed button. Measure 0 to + 1.5 Vdc on pin 6 of the control panel. Is approximately + 1.5 Vdc present? **YES:** Replace both control cards (see Section 5). **NO:** Replace the control panel (see Section 5).

Error Description	Diagnostic Action
Control Panel	**9.** Remove the forms from the printer. Press the Online button. Does the alarm sound? **YES:** Go to Step 10. **NO:** Measure for approximately + 5 Vdc from pin CN6-18 on the driver circuit card to the ground pin on the driver circuit card. Is approximately + 5 Vdc present? **YES:** Replace the print mechanism assembly (see Section 5). **NO:** Check that the voltage at pin 10 of the control panel pulses from 0 to + 12 Vdc. Use pin 8 for ground. Set the printer Power switch to Off and then On before measuring the voltage. It will pulse only eight times. Does the voltage pulse 0 to + 12 Vdc? **YES:** Replace the control panel (see Section 5). **NO:** Replace the control cards (see Section 5).

Error Description	Diagnostic Action
Control Panel	**10.** Does the No Paper light go On? **YES:** The control panel checks OK. Return to page 3-1400-1, "Printer Entry." **NO:** Measure for approximately + 10 to + 12 Vdc at pin 3 of the control panel. Is approximately + 12 Vdc present? **YES:** Replace both control cards (see Section 5). **NO:** Replace the control panel (see Section 5).

Offline Diagnostic Test

Description

The Offline Diagnostic Test is used to verify correct operation of the printer mechanism (motors, ribbon drive, printhead, and others) and print quality. A sample of the ripple patterns is shown below.

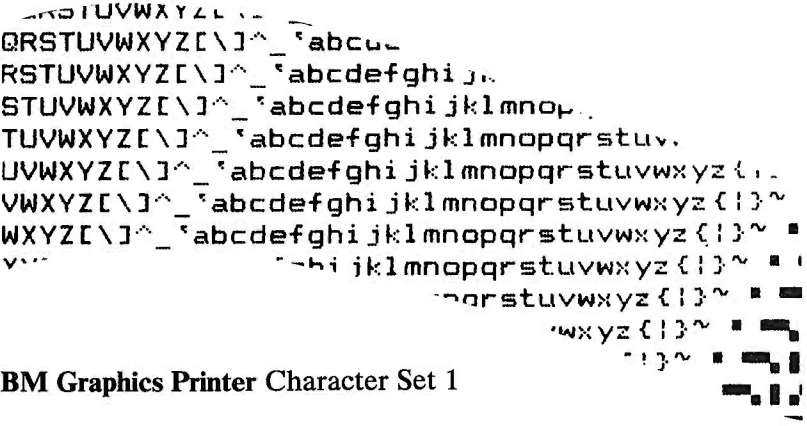
Operating Procedure

Press and hold the Line Feed button while you set the printer Power switch to On.

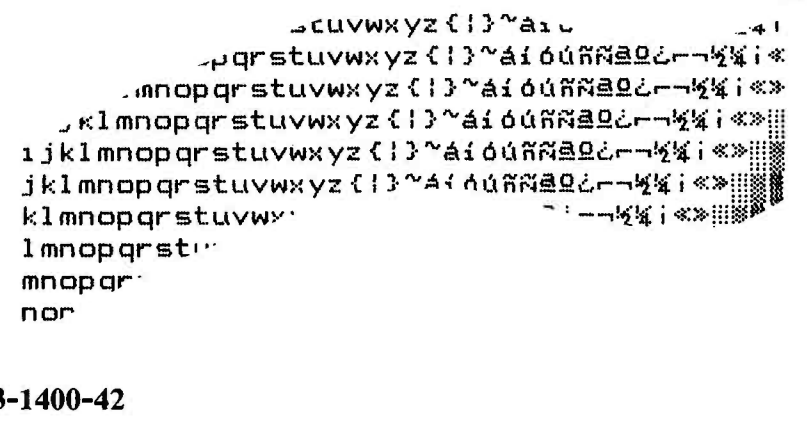
Note: This test takes up to 10 minutes.

To stop the test before it is finished, set the printer Power switch to Off.

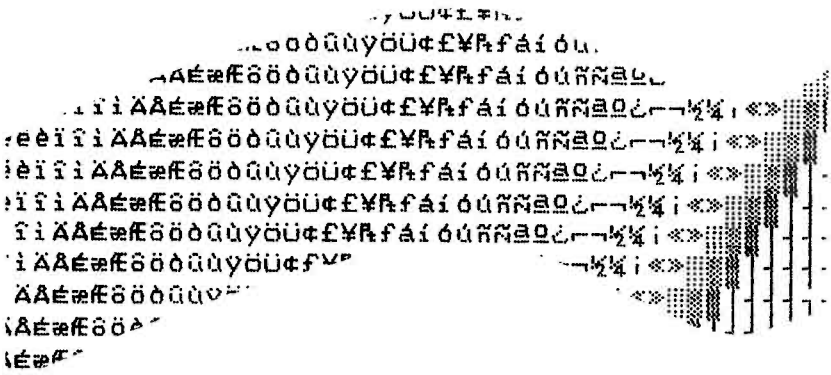
IBM Matrix Printer



IBM Graphics Printer Character Set 1



IBM Graphics Printer Character Set 2



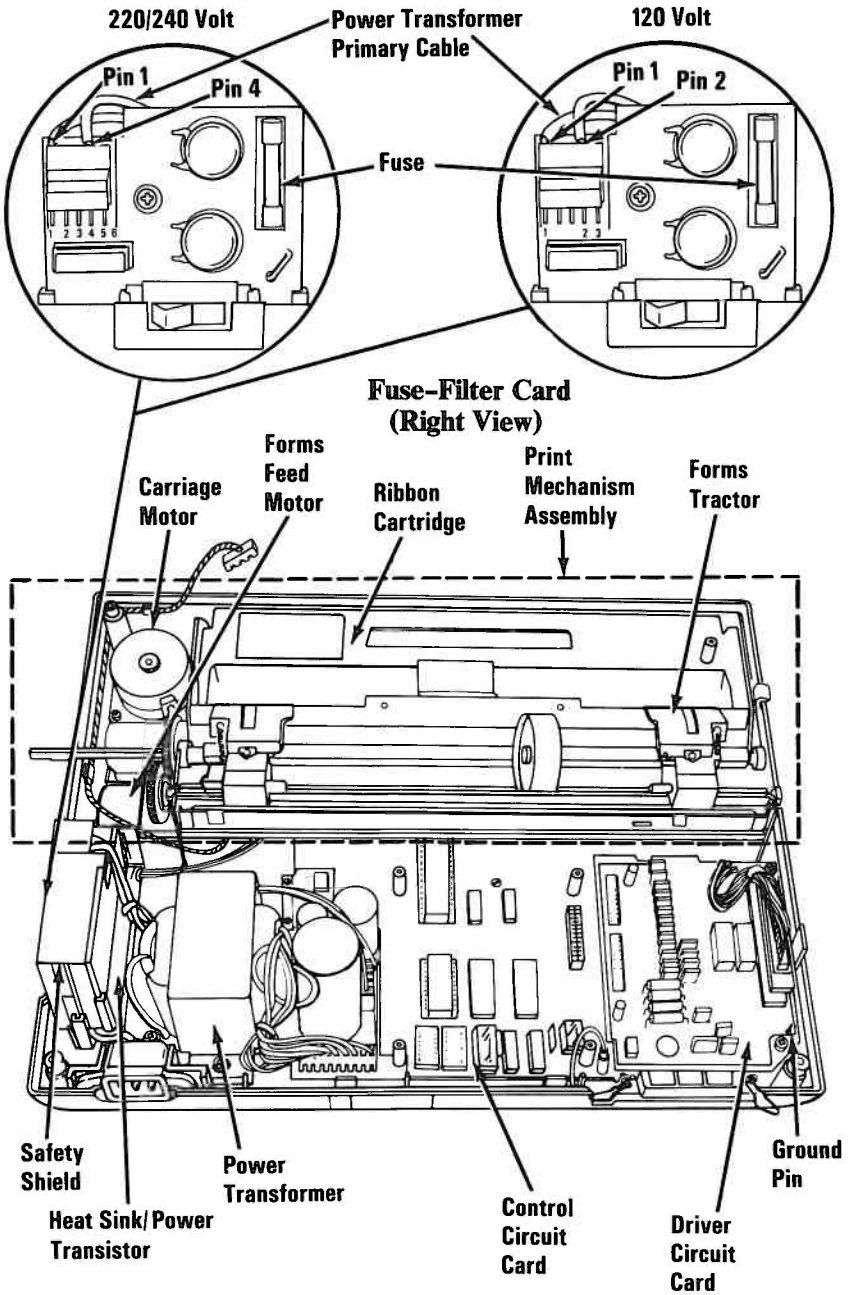
Notes:

SECTION 4. LOCATIONS

Contents

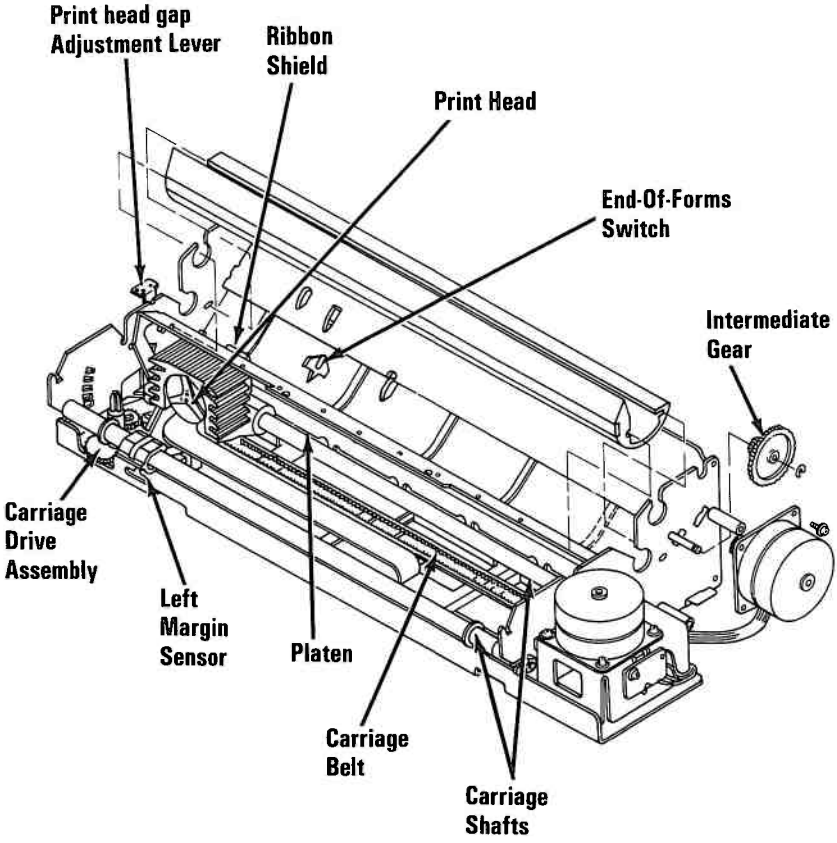
Notes:

Graphics Printer

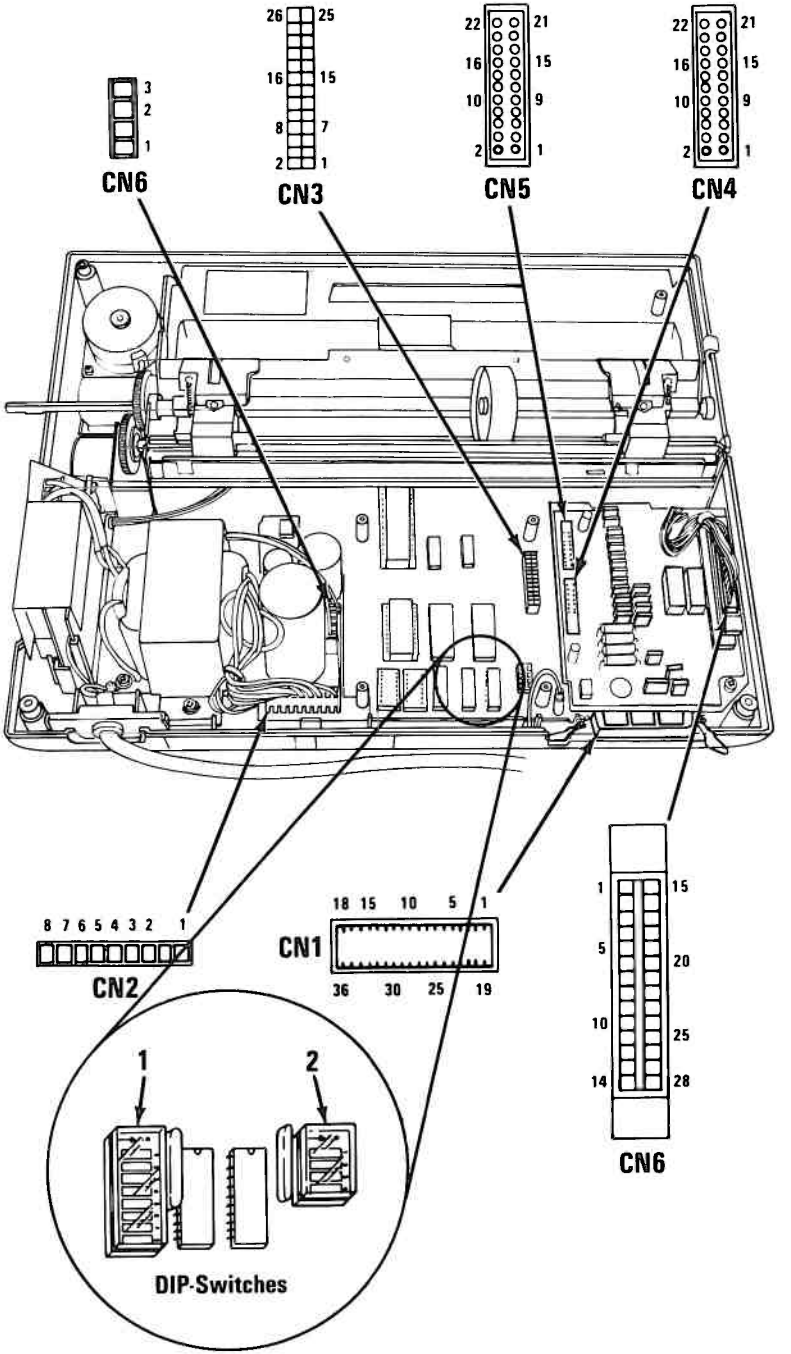


120 VAC Printers Have Attached Power Cord

Printer (Rear View)

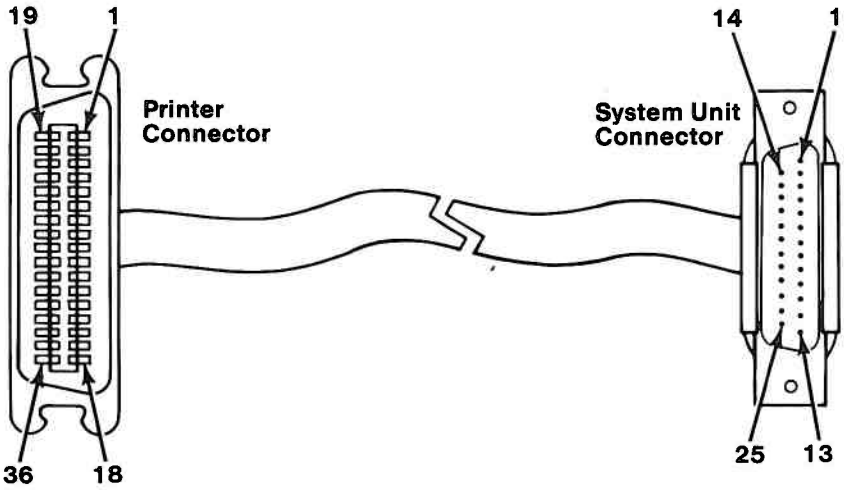


Print Mechanism Assembly (Front View)



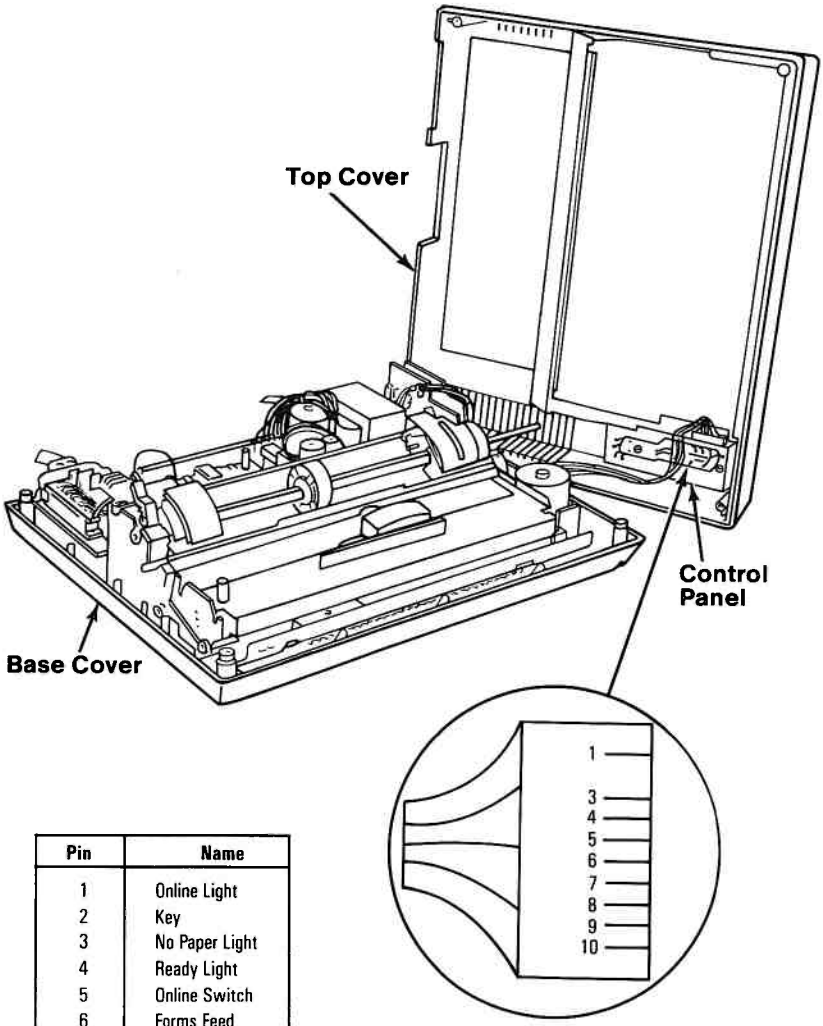
Printer Connectors

Printer (Rear View)



Printer Signal Cable

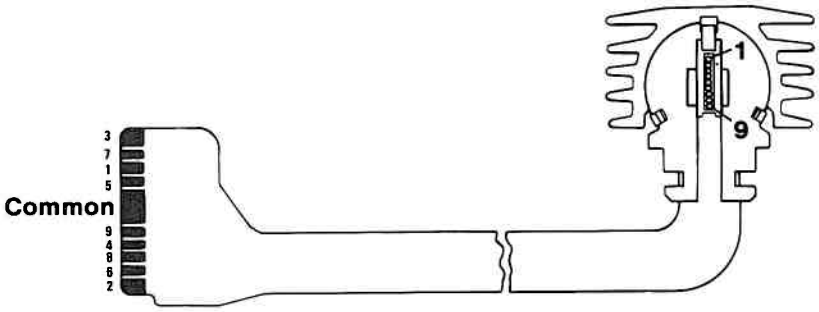
Printer Connector Pin Number	System Unit Connector Pin Number
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
32	15
31	16
36	17
33	18
19	19
21	20
23	21
25	22
27	23
29	24
30	25



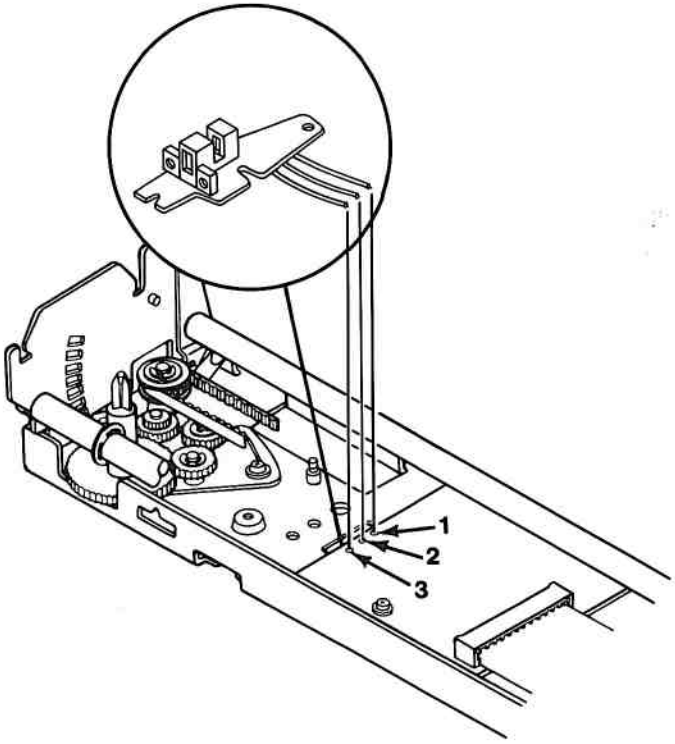
Pin	Name
1	Online Light
2	Key
3	No Paper Light
4	Ready Light
5	Online Switch
6	Forms Feed
7	Line Feed
8	Ground
9	+ 12 Vdc
10	Alarm

Control Panel Connector

Printer (Top View)

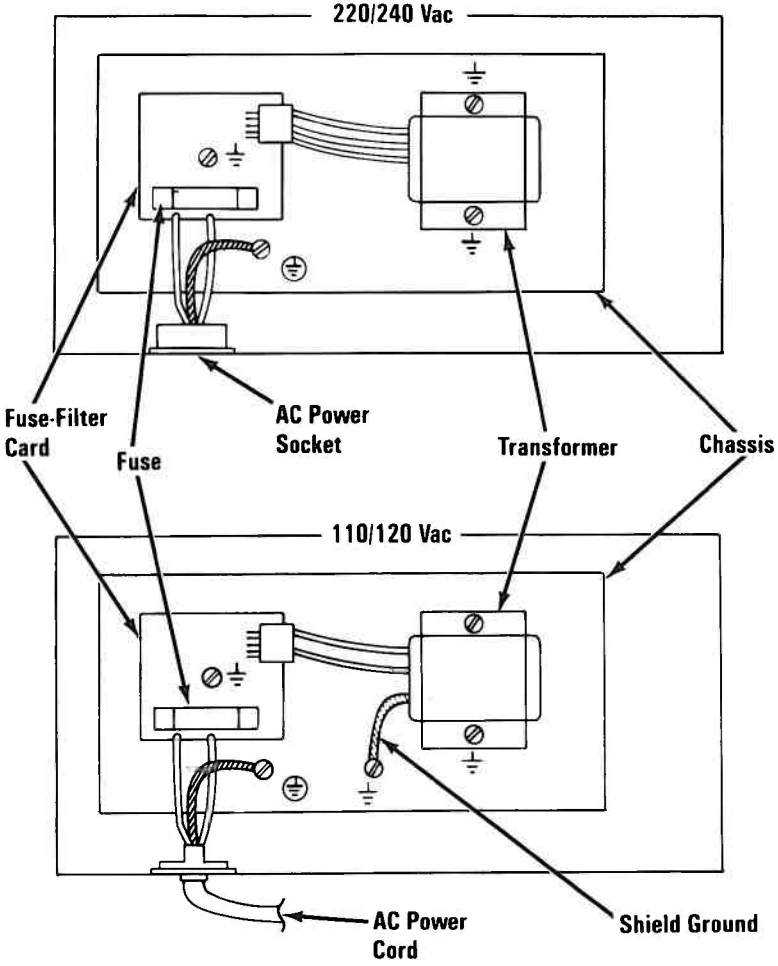


Print Head and Cable (Rear View)

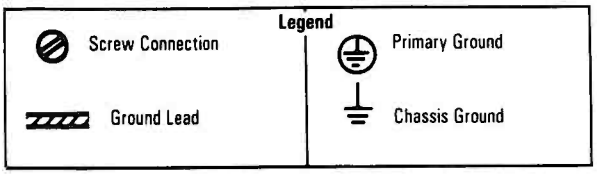


Left Margin Sensor (Front View)

Safety Ground Locations



Graphics Printer



Notes:

SECTION 5. REMOVALS, REPLACEMENTS, AND ADJUSTMENTS

Contents

Introduction

To use this section, locate the assembly you are servicing in the table of contents. Each removal, replacement, or adjustment for a field replaceable unit (FRU) is identified by a reference number. Reference numbers are located in the upper left hand corner of each page.

> **Note:** Usually there is a separate number for both the removal and the replacement procedure for each FRU .

When a step is explained fully by another procedure, you can refer back to that procedure by using the reference number in parenthesis. For example:

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.

2. Remove all forms.

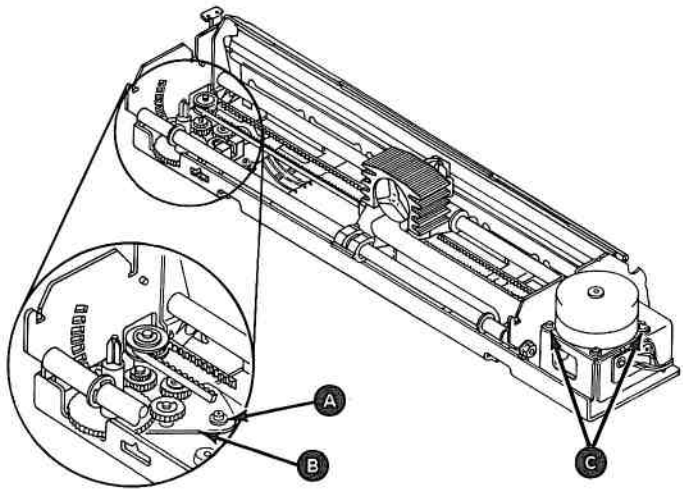
3. Remove the forms rack **(5640)**.

In the example, Step 3 refers you to procedure **5640** for instructions on removing the forms rack.

Graphics Printer

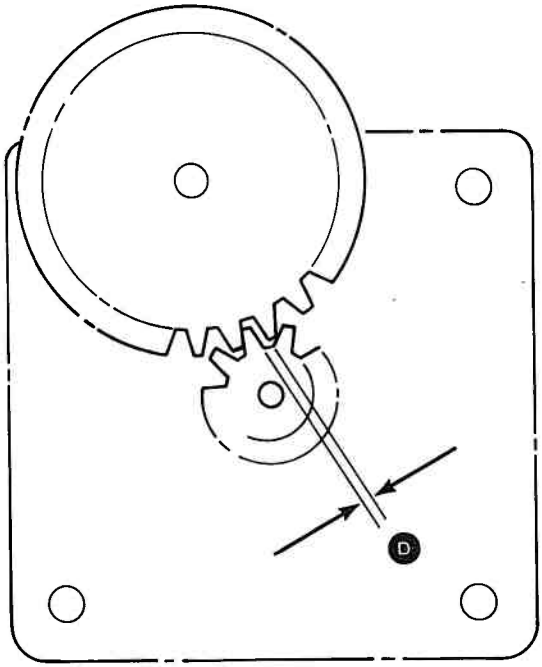
Carriage Belt Adjustment 5600

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Loosen the holddown screw (A) in the carriage drive assembly.
8. Tighten the belt by pivoting the carriage drive assembly (B) to the left.
9. Tighten the holddown screw.
10. Loosen the screws (C) in the carriage motor mounts. (artwork from 5-111)



11. Adjust the position of the carriage motor so the motor and drive gears mesh.

12. Adjust the gear backlash (D) for minimum clearance.

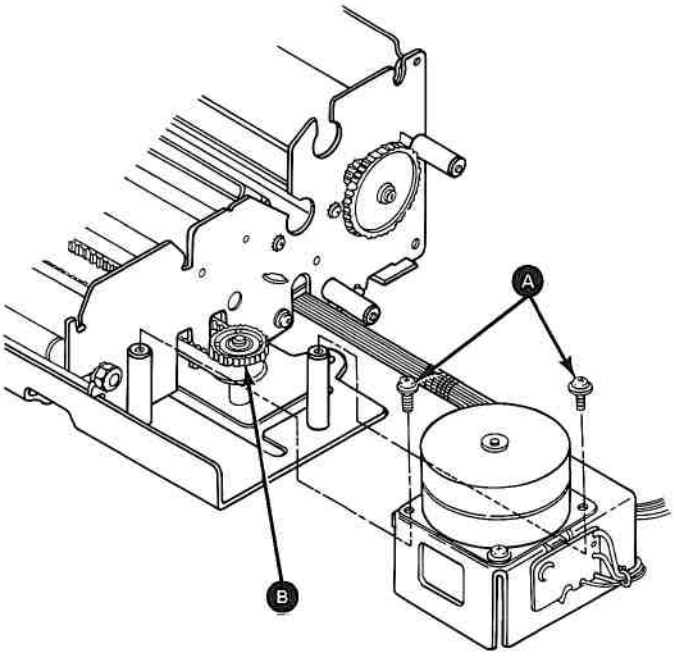


13. Tighten the motor-mount screws.

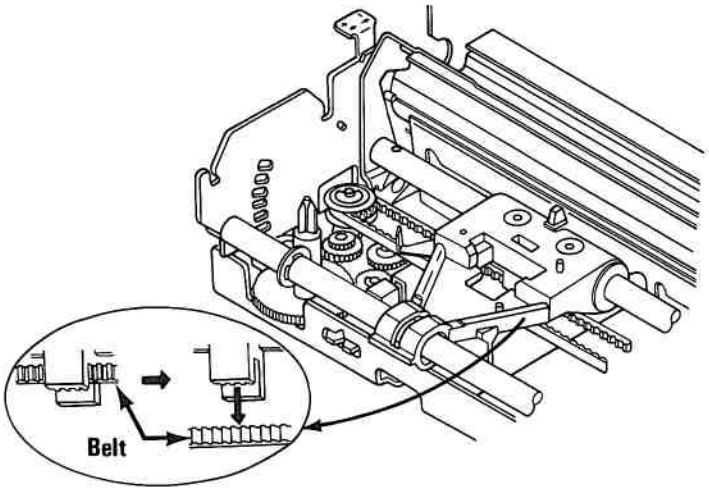
14. Move the print head back and forth and check that the gears operate with no binding.

Carriage Belt Removal 5601

1. Set the printer Power switch to Off, unplug the power cord from the outlet, and disconnect the Printer Cable.
2. Remove the forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Remove the left front and the right rear screws from the carriage motor mounts (A) .
8. Lift the motor away from the mounts to expose the belt pulley (B) .

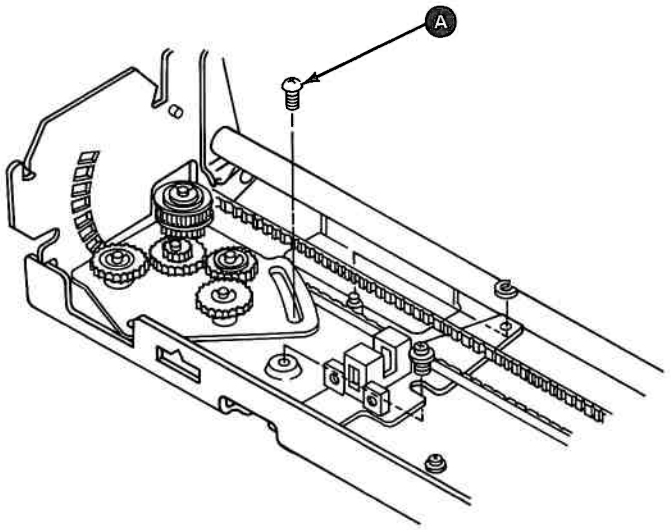


9. Pull the belt down and remove it from the clip underneath the print-head carriage.



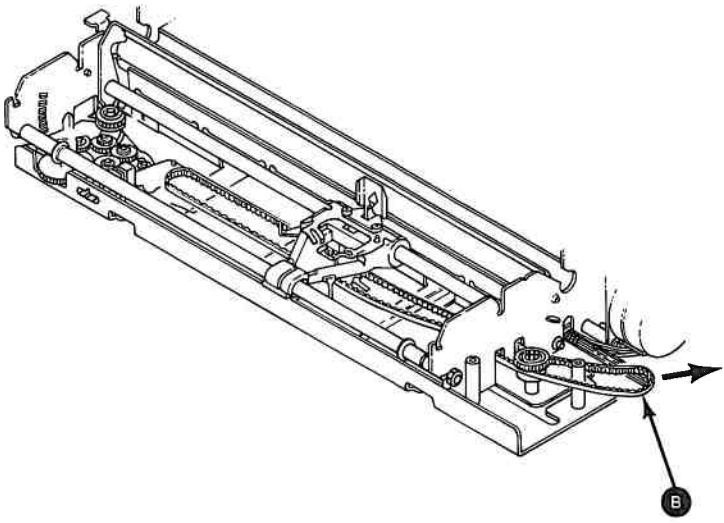
10. Loosen the screw in the slot of the carriage drive assembly (A) .

11. Pivot the carriage-drive assembly to the right.



12. Lift the belt off the pulley at each end.

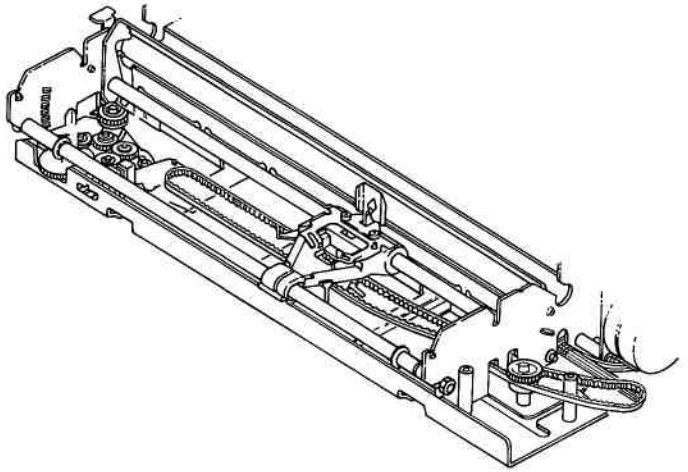
13. Guide the belt (B) through the opening in the right side of the print mechanism assembly frame.



Carriage Belt Replacement 5602

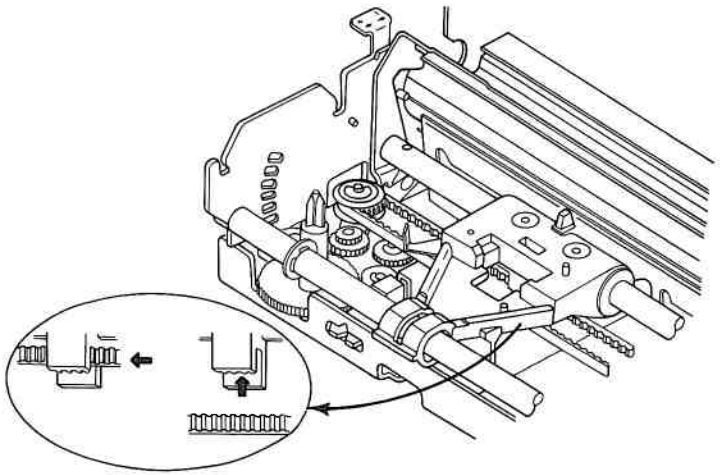
1. Insert the belt through the opening in the right side of the frame of the print mechanism assembly.

2. Guide the belt along the base toward the carriage drive assembly.



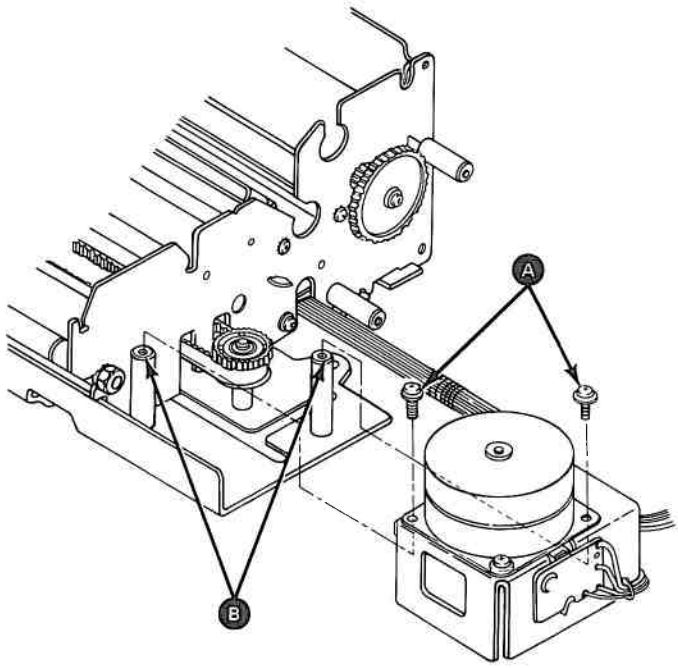
3. Place the belt onto the pulleys at both ends.

4. Insert the belt into the retaining clip under the print-head carriage.



5. Place the carriage motor onto the motor mounts (B) .

6. Install the screws (A) into the motor base (do not tighten).



7. Adjust the carriage belt **(5600)**.

8. Install the top cover **(5632)**.

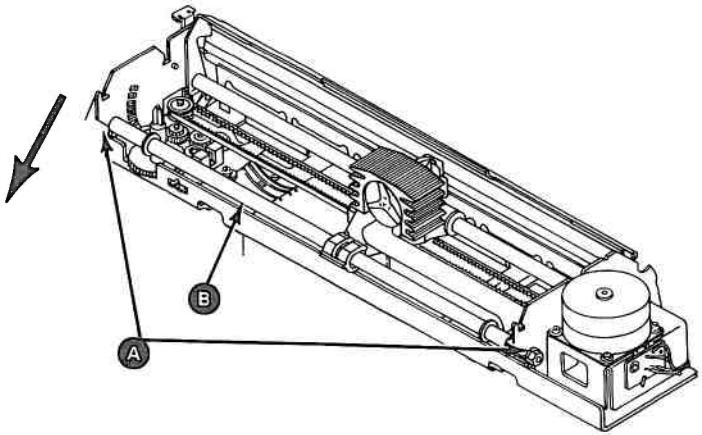
9. Install the ribbon cartridge.

10. Install the access cover **(5630)**.

11. Install the forms rack **(5640)**.

Carriage Drive Assembly Removal 5605

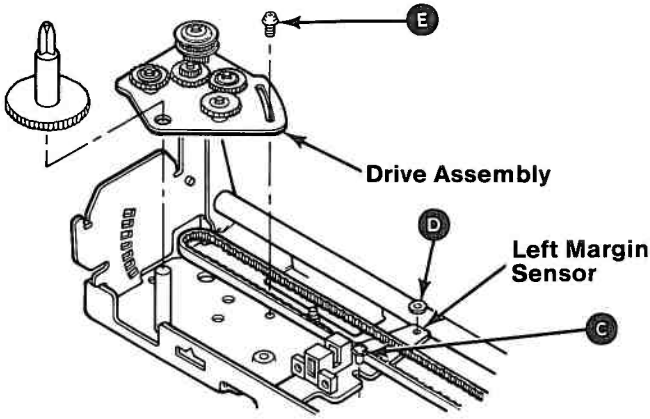
1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Move the carriage to the right side of the frame.
8. Loosen the nuts (A) on the carriage shaft (B) and pivot the left end of the shaft to the front.



9. Remove the screw (C) and clamp (D) from the left margin sensor.

10. Remove the carriage drive assembly retaining screw (E).

11. Pivot the carriage drive assembly clockwise, lift the belt off the drive pulley, lift the left margin sensor off the post, and lift the carriage drive assembly from the machine.



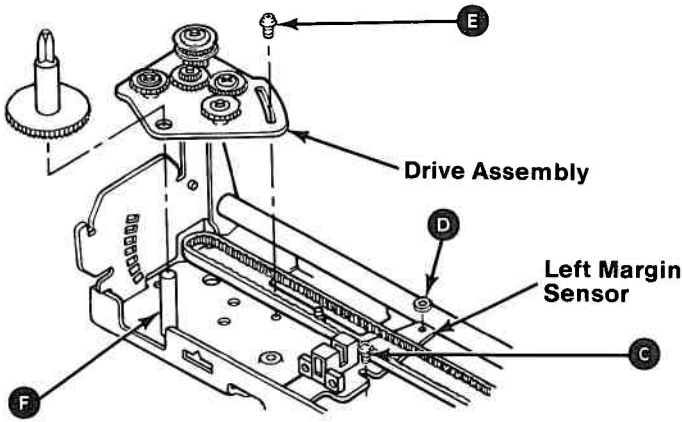
Carriage Drive Assembly Replacement 5605

1. Place the carriage drive assembly in position by inserting the post (F) through the pivot hole.

2. Install the carriage drive assembly retaining screw (E).

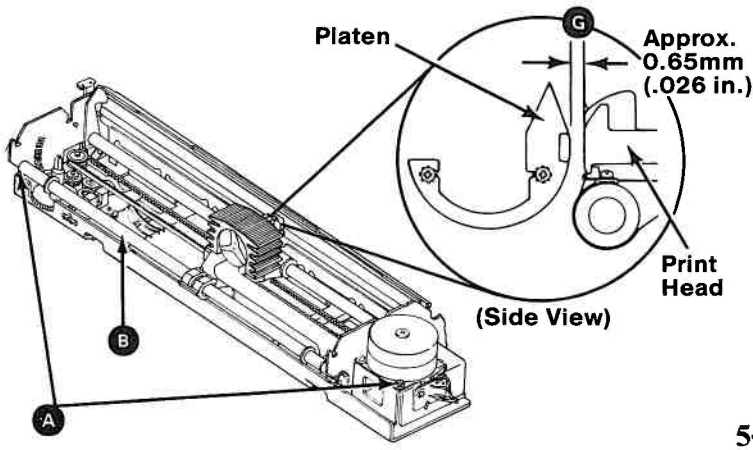
3. Install the left margin sensor, screw (C), and clamp (D).

4. Place the carriage belt over the drive pulley and adjust the belt **(5600)**.



5. Pivot the carrier shaft (B) into the slots on the frame. Tighten the nuts (A).

6. Check the print head gap (G) and adjust if necessary **(5682)**.



7. Adjust the left margin sensor **(5670)**.
8. Install the top cover **(5632)**.
9. Install the ribbon cartridge.
10. Install the access cover **(5630)**.
11. Install the forms rack **(5640)**.

Control Circuit Card Switch Settings 5615

Before replacing the control circuit card, check the printer dual-in-line (DIP) switch settings and be sure the problem is not caused by an improper switch setting.

Note: Switch 1-7 for the Graphics printer must be set for local requirements. This switch selects Table 1 or 2 below, and is factory set to Off for the U.S. and English speaking countries.

Functions and Conditions of Dip Switch No. 1

Graphics Printer

Switch No.	Function	On	Off	Factory Set
1-1	Not Applicable	–	–	On
1-2	CR	Print Only	Print & Line Feed	On
1-3	Buffer Full	Print Only	Print & Line Feed	Off
1-4	Cancel Code	Invalid	Valid	Off
1-5	Not Applicable	–	–	On
1-6	Error Buzzer	Sound	Does Not Sound	On
1-7	Character Generator	Table 2	Table 1	Off
1-8	Select In Signal	Fixed Internally	Not Fixed Internally	On

Matrix Printer

Switch No.	Function	On	Off	Factory Set
1-1	Not Applicable	–	–	On
1-2	CR	Print Only	Print & Line Feed	On
1-3	Buffer Full	Print Only	Print & Line Feed	On
1-4	Cancel Code	Invalid	Valid	Off
1-5	Delete Code	Invalid	Valid	On
1-6	Error Buzzer	Sound	Does Not Sound	On
1-7	Character Character	N.A.	Graphic Pattern Select	Off
1-8	Select In Signal	Fixed Internally	Not Fixed Internally	On

Functions and Conditions of Dip Switch No. 2

Graphics Printer

2-1	Form Length	12"	11"	Off
2-2	Line Spacing	1/8"	1/6"	Off
2-3	Auto Feed XT Signal	Fixed Internally	Not Fixed Internally	Off
2-4	1 in Skip Over Perforation	Valid	Not Valid	Off

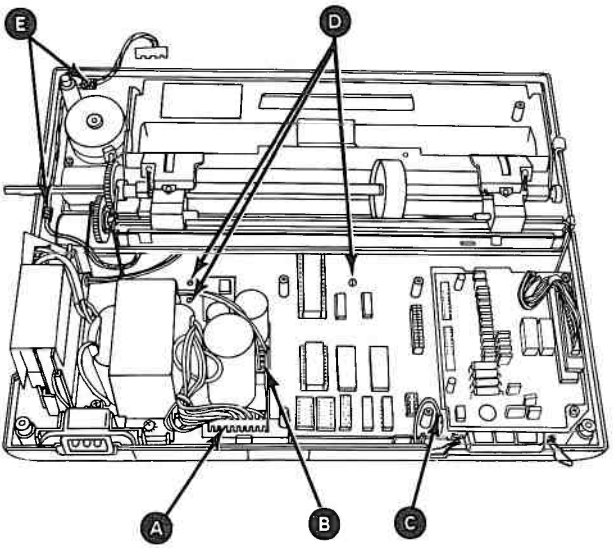
Matrix Printer

2-1	Not Applicable	–	–	On
2-2	Not Applicable	–	–	On
2-3	Auto Feed XT Signal	Fixed Internally	Not Fixed Internally	Off
2-4	Coding Table Select	N.A.	Standard	Off

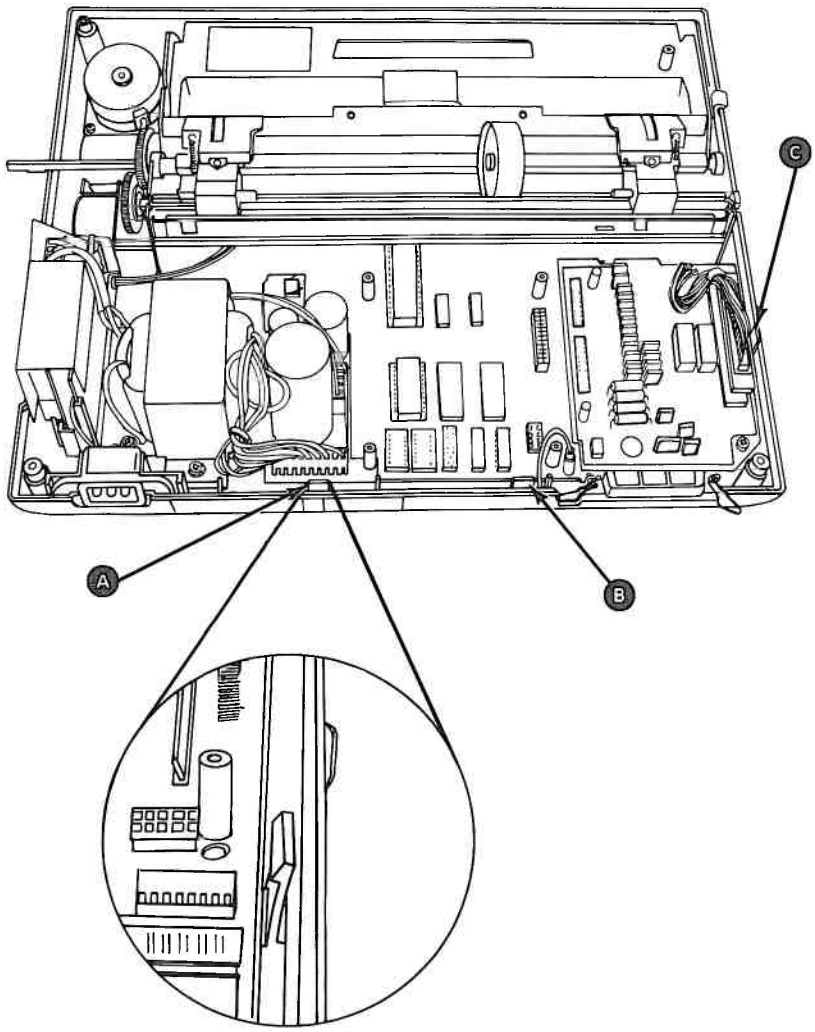
Control Circuit Card Removal 5616

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Remove the driver circuit card **(5620)**.

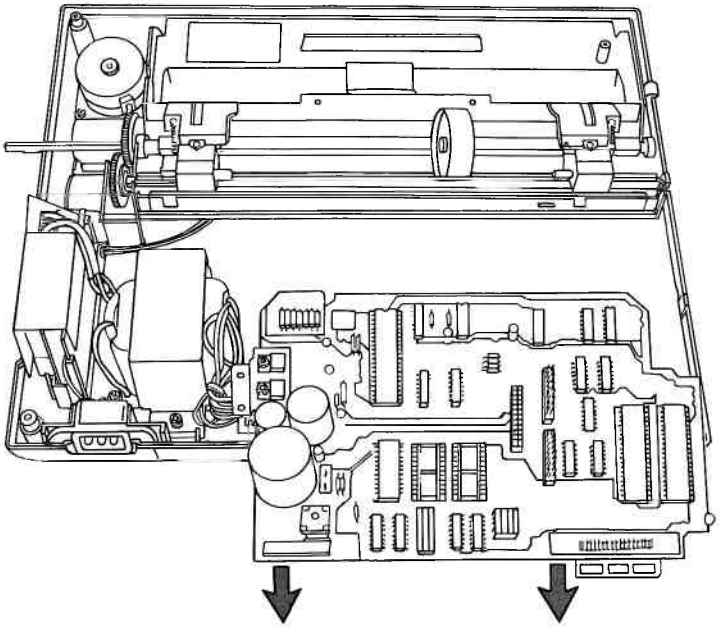
7. Unplug connector CN2 (A) .
8. Unplug connector CN6 (B) .
9. Unplug the ground wire (C) .
10. Remove the three screws (D) .
11. Pull the control panel cable from under the retaining clips (E) .



12. Press the three tabs (A) , (B) , and (C) and lift the card clear of the tabs.

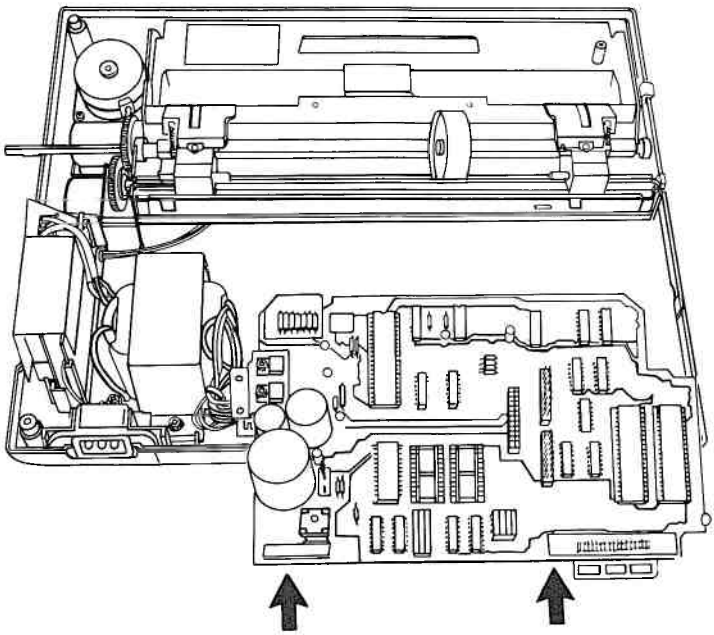


13. Lift the control circuit card clear of the six posts. Carefully pull the card away from the print mechanism assembly.



Control Circuit Card Replacement 5617

1. Guide the control circuit card into the open area behind the print mechanism assembly.



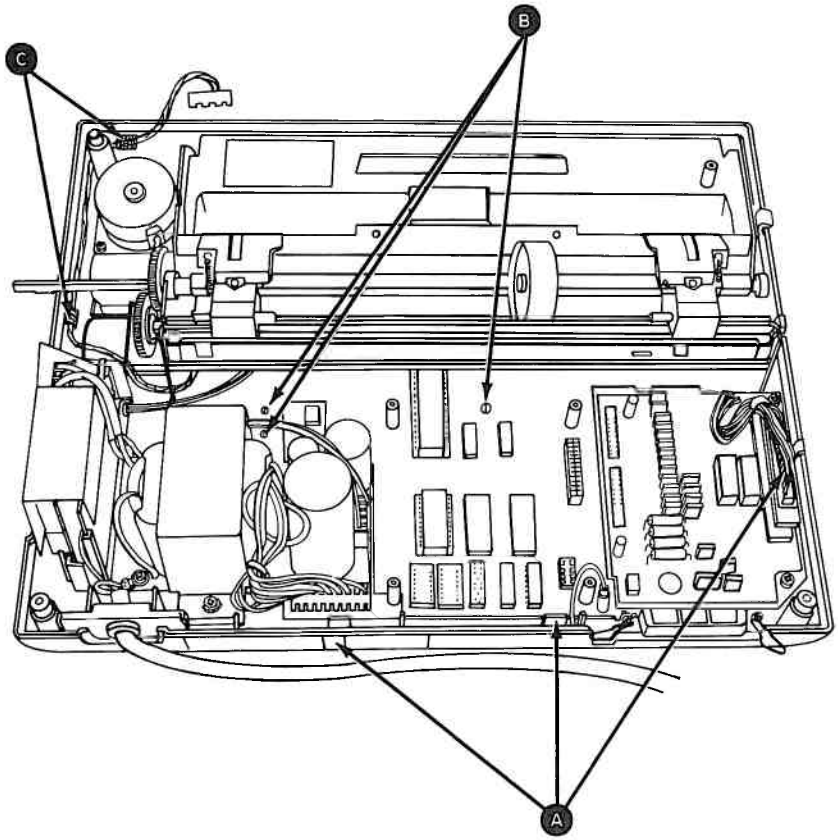
2. Align the six holes in the control circuit card with the six posts in the base cover.

3. Lower the control circuit card onto the base cover and snap the three retaining tabs (A) into place.

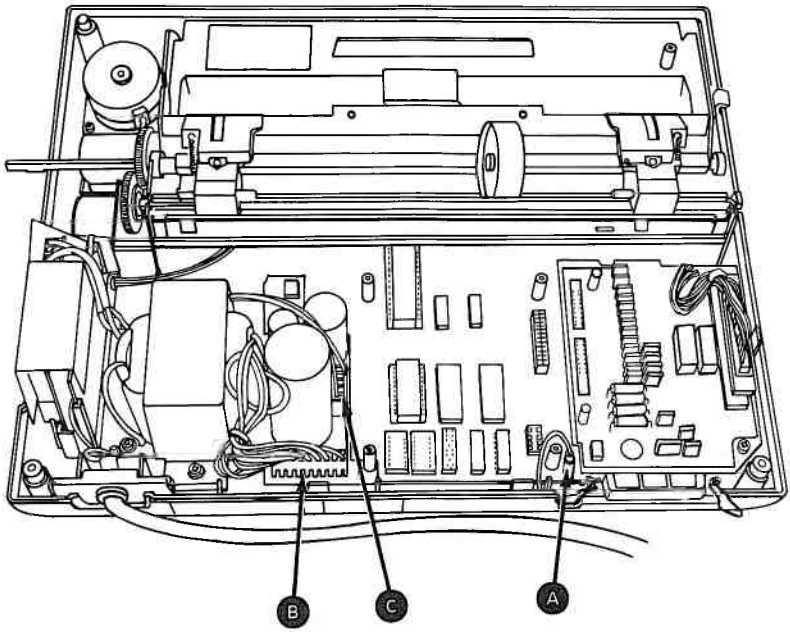
4. Install the three holddown screws (B) .

5. Guide the control panel cable along the right side of the base cover and around to the front.

6. Place the control panel cable under the two retaining clips (C) .



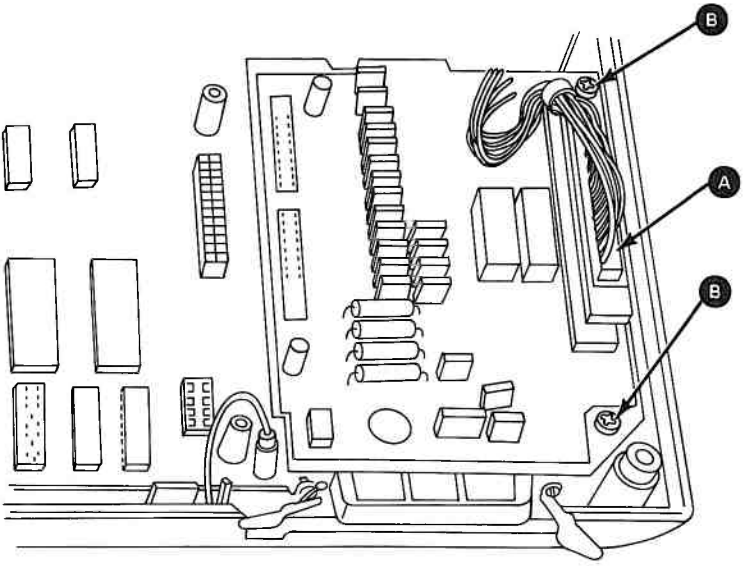
7. Connect the ground wire (A) .
8. Install connector CN2 (B) .
9. Install connector CN6 (C) .



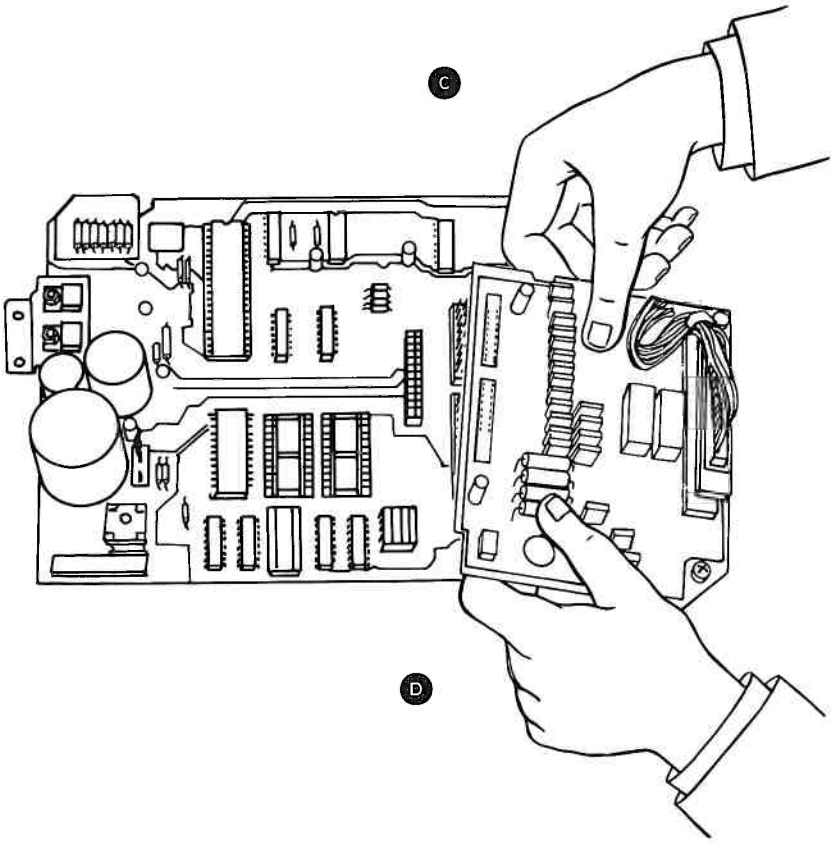
10. Install the driver circuit card **(5621)**.
11. Install the top cover **(5632)**.
12. Install the access cover **(5630)**.
13. Install the forms rack **(5640)**.

Driver Circuit Card Removal 5620

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Unplug connector CN6 (A) .
7. Remove the two screws (B) .



8. Disconnect the driver circuit card from the control circuit card at CN4 and CN5. Lift at Ⓒ , then at Ⓓ .



Driver Circuit Card Replacement 5621

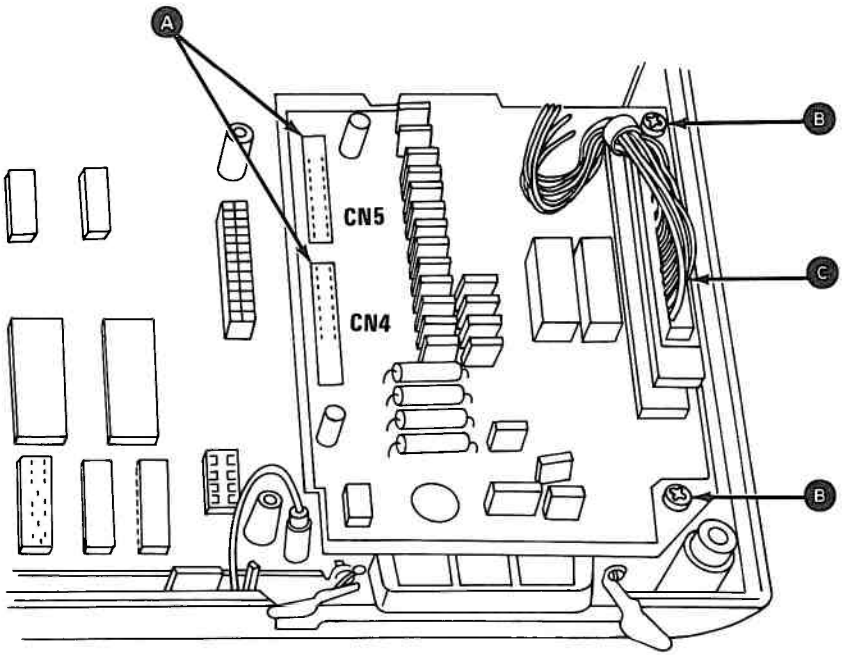
1. Align connectors CN4 and CN5 (A) on the bottom of the driver circuit card with connectors CN4 and CN5 on the control circuit card.

   Warning: Connectors CN4 and CN5 are not keyed. Verify proper alignment before applying power to prevent damage to the circuit card.

2. Connect the driver circuit card to the control circuit card by pressing down firmly on the connectors. Be sure to guide connector CN6 cable into the slot on the left front edge of the driver circuit card.

3. Install the two screws (B) .

4. Install connector CN6 (C) .



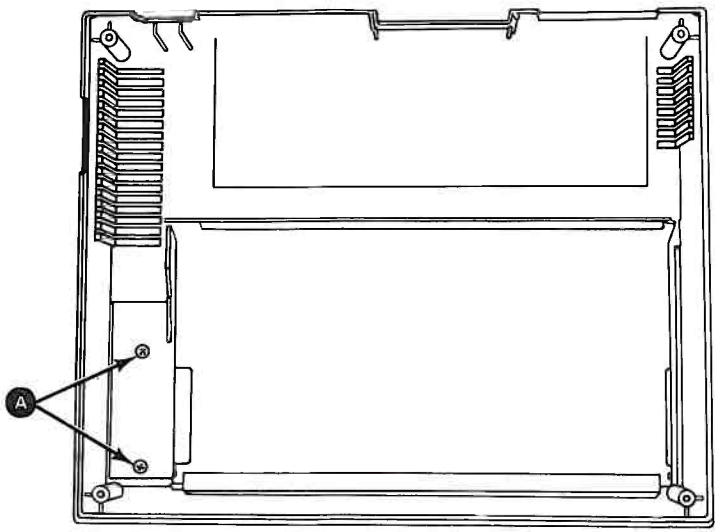
5. Install the top cover **(5632)**.

6. Install the access cover **(5630)**.

7. Install the forms rack **(5640)**.

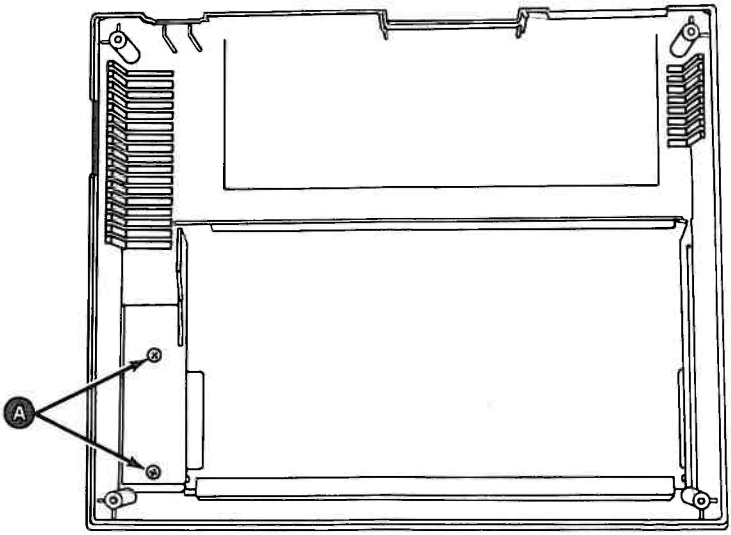
Control Panel Removal 5625

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Invert the top cover.
7. Remove the two screws (A) from the underside of the top cover.
8. Lift the control panel from the top cover.



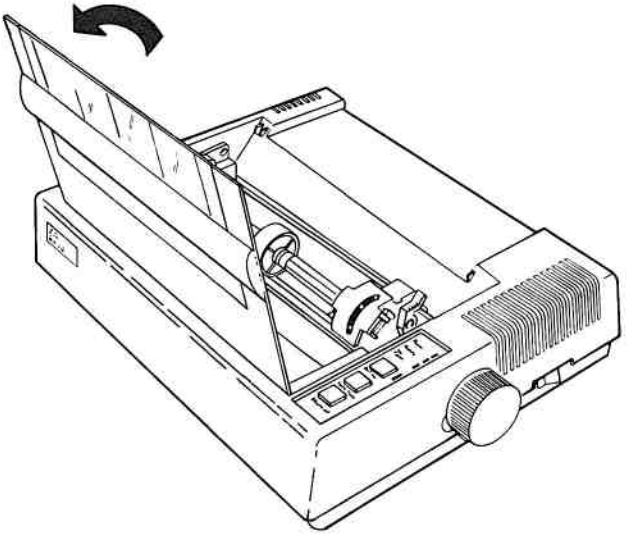
Control Panel Replacement 5626

1. Insert the control panel into the top cover.
2. Install two screws (A) .
3. Install the top cover **(5632)**.
4. Install the access cover **(5630)**.
5. Install the forms rack **(5640)**.

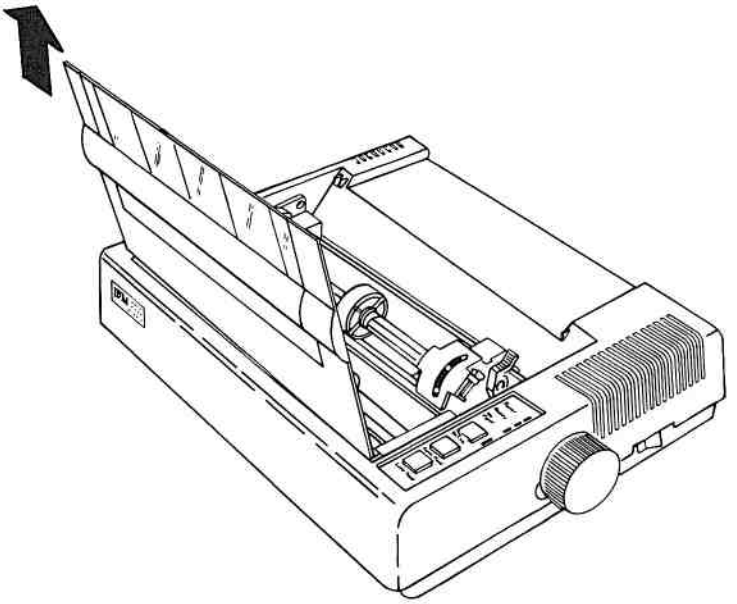


Access Cover Removal 5630

1. Raise the access cover.

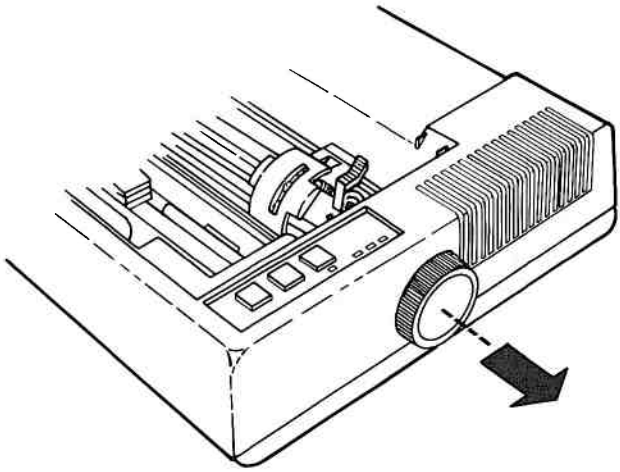


2. Lift the cover from the base as shown.



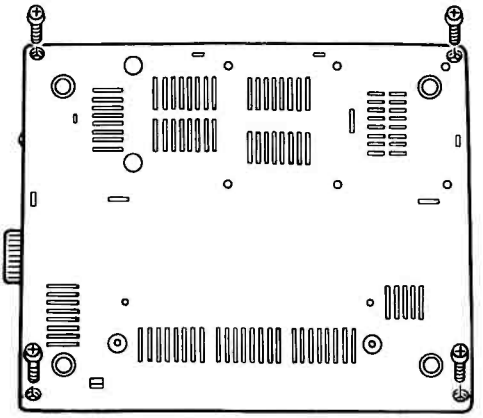
Top Cover Removal 5631

1. Set the printer Power switch to Off and unplug the printer power cord from the outlet.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Pull the Forms Feed knob from the shaft using a steady, firm pull.



6. Turn the printer upside down and place it on a smooth surface.

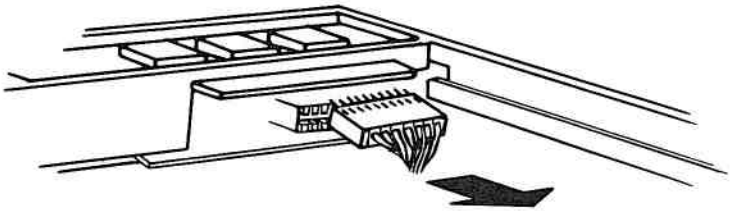
7. Use a Phillips screwdriver and completely loosen the four corner screws in the base.



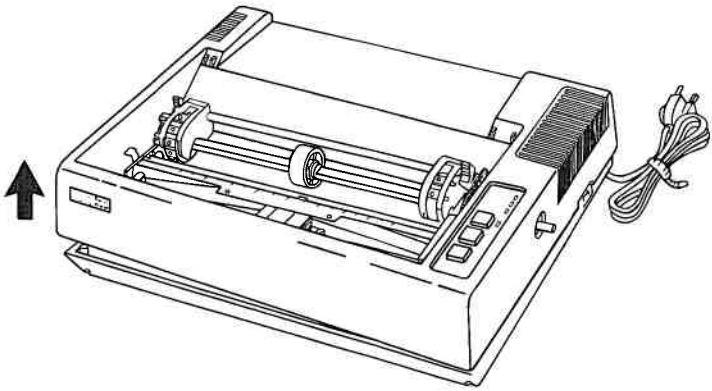
8. Turn the printer right-side up.

   WARNING: Be sure to grasp both the printer and the base cover.

9. Pull the control panel cable from the control panel in the top cover.

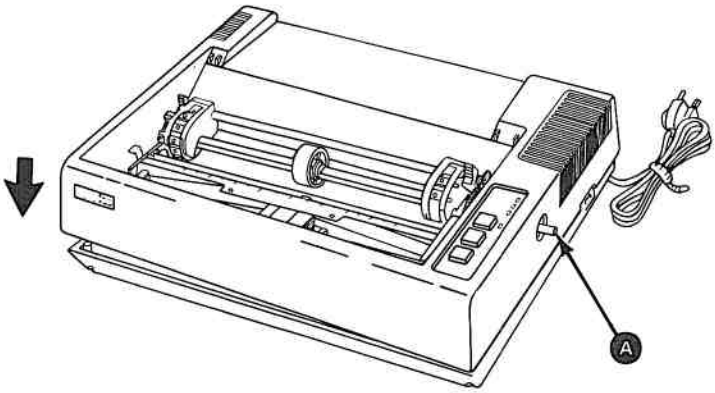


10. Lift the left side of the cover, then the right side, away from the base cover. Then slide the top cover to the right to clear the forms feed shaft.

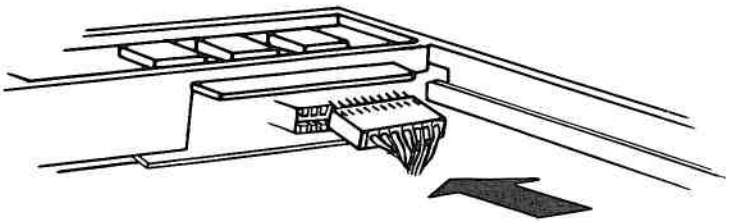


Top Cover Replacement 5632

1. Place the forms feed shaft through the opening (A) in the top cover and lower the top cover onto the base cover.

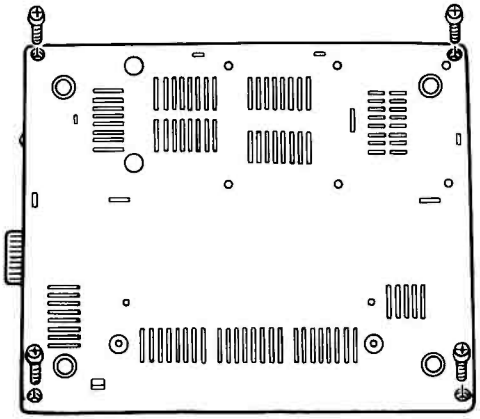


2. Connect the control panel cable to the control panel.



3. Turn the printer upside down.

4. Install the four screws.



5. Turn the printer right-side up.

6. Install the Forms Feed knob **(5635)**.

7. Install the access cover **(5630)**.

8. Install the forms rack **(5640)**.

Base Cover Removal 5633

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Remove the power transformer **(5675)** or **(5677)**.
7. Remove the fuse-filter card and power cord **(5653)** or **(5655)**.

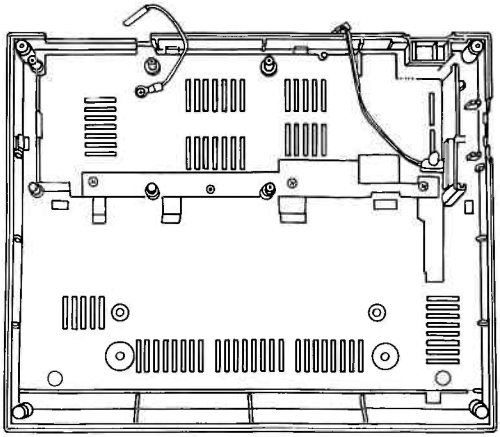
8. Remove the driver circuit card **(5620)**.

9. Remove the control circuit card **(5616)**.

10. Remove the print mechanism assembly **(5685)**.

11. Remove the heat sink and power transistor assembly **(5660)**.

The base cover is now completely detached from the other FRUs.

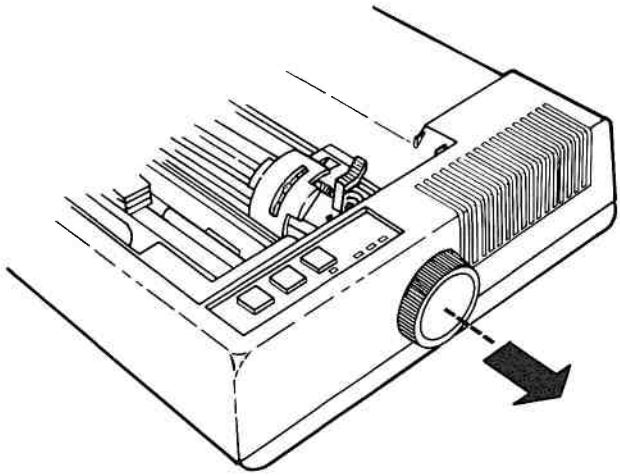


Base Cover Replacement 5634

1. Set the base cover on a work surface.
2. Install the heat sink and power transistor assembly **(5661)**.
3. Install the print mechanism assembly **(5686)**.
4. Install the control circuit card **(5617)**.
5. Install the driver circuit card **(5621)**.
6. Install the fuse-filter card and power cord **(5654)** or **(5656)**.
7. Install the power transformer **(5676)** or **(5678)**.
8. Install the top cover **(5632)**.
9. Install the access cover **(5630)**.
10. Install the forms rack **(5640)**.

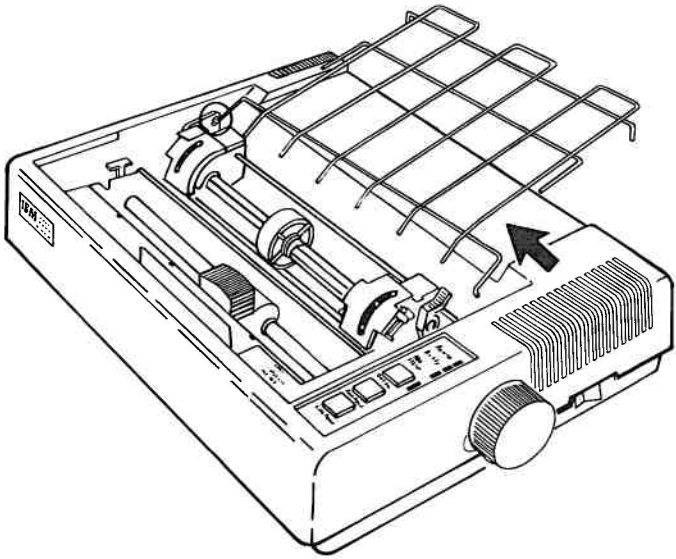
Forms Feed Knob Removal 5635

Pull the Forms Feed knob from the shaft using a steady, firm pull.



Forms Rack Removal 5640

1. Remove all forms.
2. Compress the rack on one side to unhook it from the frame.
3. Lift the rack away from the frame.



Forms Tractors Removal 5645

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

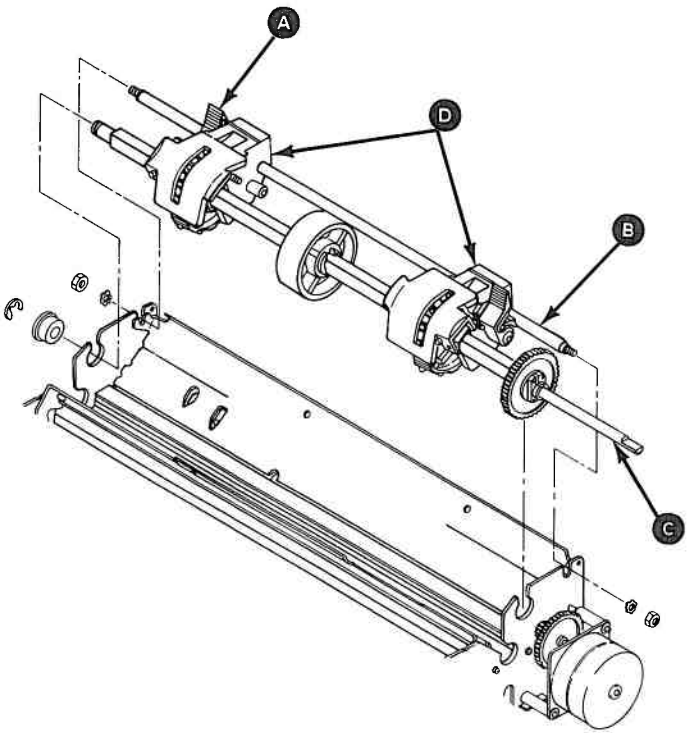
6. Rotate the lock levers (A) to the forward (released) position.

7. Loosen the nuts on the ends of the tractor support shaft (B).

8. Remove the retaining clip on the left end of the guide shaft (C) and slide the bushings to the outside of the frame.

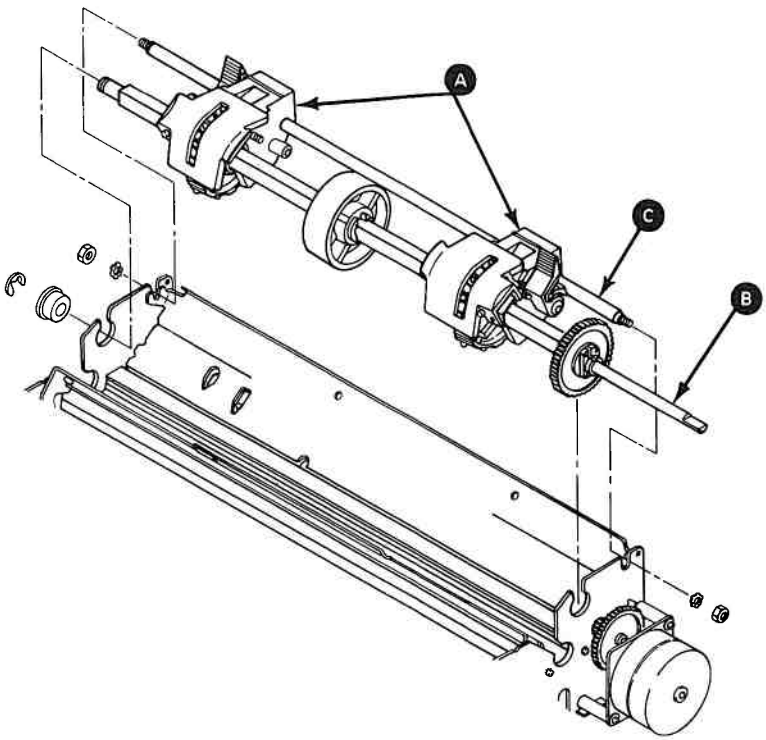
9. Lift the guide shaft, support shaft, and forms tractors from the unit.

10. Slide the forms tractors (D) off the shafts.



Forms Tractors Replacement 5646

1. Slide the forms tractors (A) onto the guide shaft (B) and support shaft (C).
2. Place the guide shaft and support shaft into the slots on the frame.
3. Slide the bushings on the guide shaft into the frame and install the retaining clip on the left end of the shaft.
4. Tighten the retaining nuts on the ends of the support shaft.
5. Install the top cover **(5632)**.
6. Install the access cover **(5630)**.
7. Install the forms rack **(5640)**.

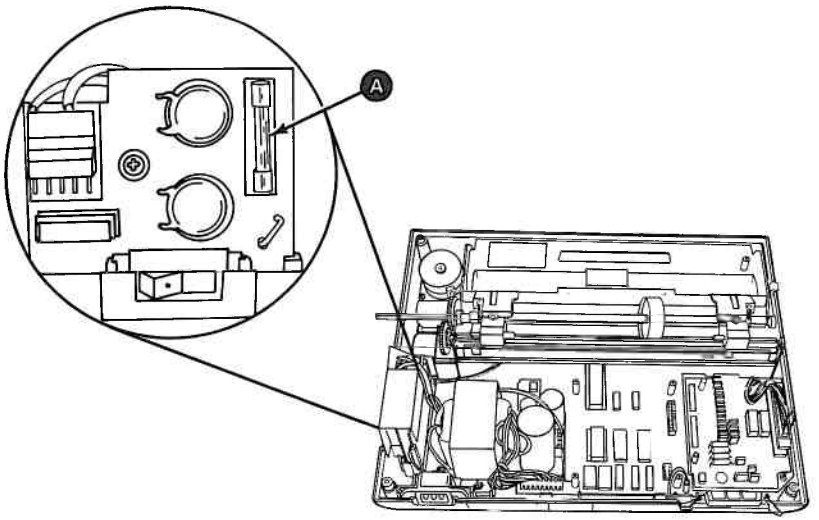


Fuse Removal 5650

1. Set the printer Power switch to Off, unplug the printer power cord from the the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

   CAUTION
   Static voltage may be present on the fuse-filter card. Be careful.

6. Remove the safety shield on the fuse-filter card **(5695)**.
7. Pull the fuse (A) from the holder.



Fuse-Filter Card and AC Socket Removal — 220/240 Volt 5653

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

> **CAUTION**
> Static voltage may be present on the fuse-filter card. Be careful.

6. Remove the safety shield from the fuse-filter card assembly **(5695)**.

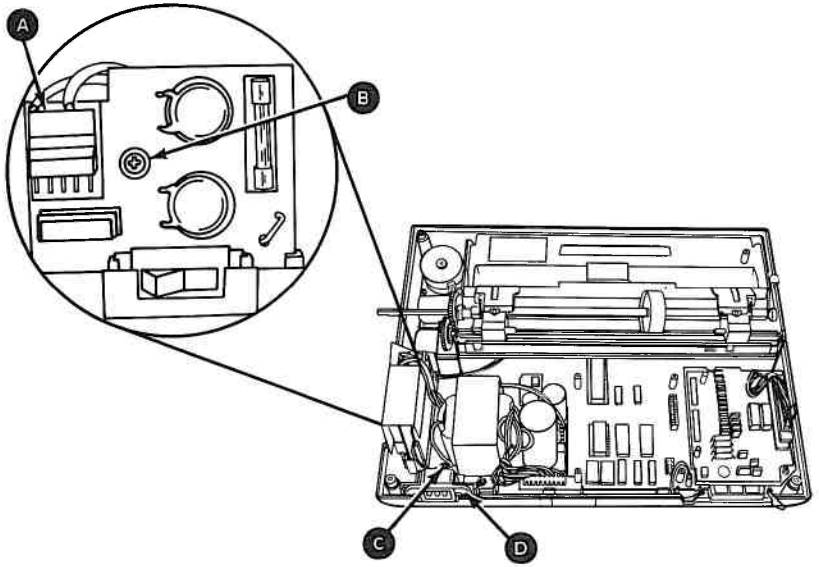
7. Remove the transformer primary connector (A) from the fuse-filter card.

8. Remove the screw (B) from the center of the fuse-filter card.

9. Remove the screw (C) from the ground wire of the AC socket.

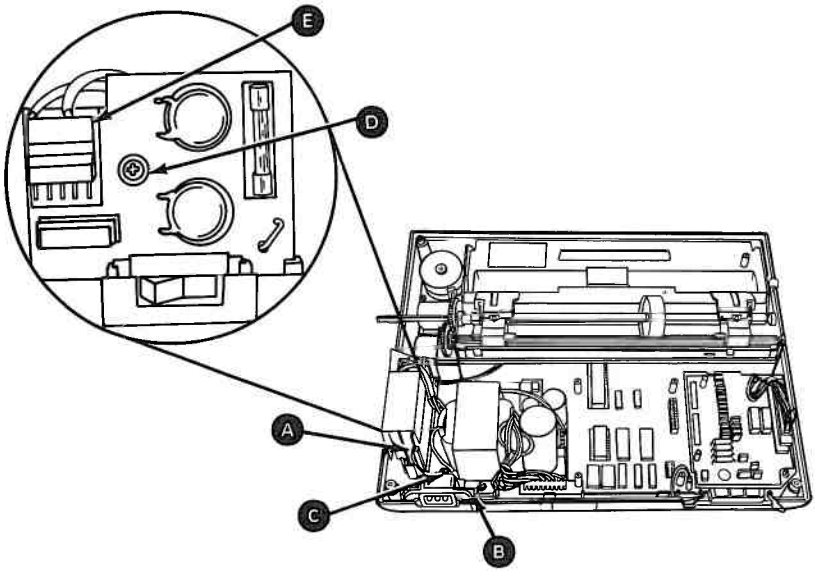
10. Lift the AC socket (D) from the slot in the base cover.

11. Lift the fuse-filter card from the slot in the base cover.



Fuse-Filter Card and AC Socket Replacement — 220/240 Volt 5654

1. Insert the fuse-filter card into the slot (A) in the base cover.
2. Insert the AC socket into the slot (B) in the base cover.
3. Install the screw (C) into the ground wire of the AC socket.
4. Install the screw (D) in the center of the fuse-filter card.
5. Connect the transformer primary (E) to the fuse-filter card.
6. Install the safety shield on the fuse-filter card **(5696)**.
7. Install the top cover **(5632)**.
8. Install the access cover **(5630)**.
9. Install the forms rack **(5640)**.



Fuse-Filter Card and Power Cord Removal—120 Volt 5655

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

> **CAUTION**
> Static voltage may be present on the fuse-filter card. Be careful.

6. Remove the safety shield from the fuse-filter card assembly **(5695)**.

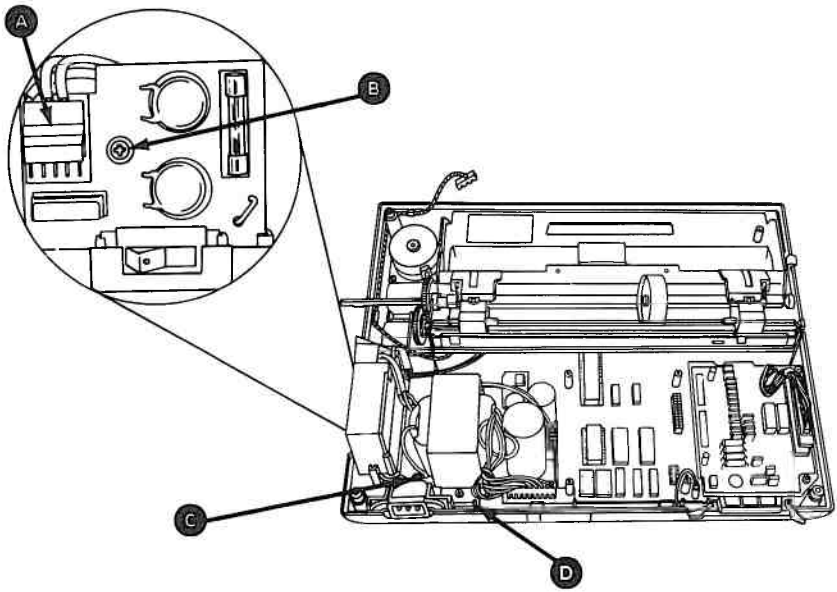
7. Remove the transformer primary connector (A) from the fuse-filter card.

8. Remove the screw (B) from the center of the fuse-filter card.

9. Remove the screw (C) from the ground terminal of the printer power cord.

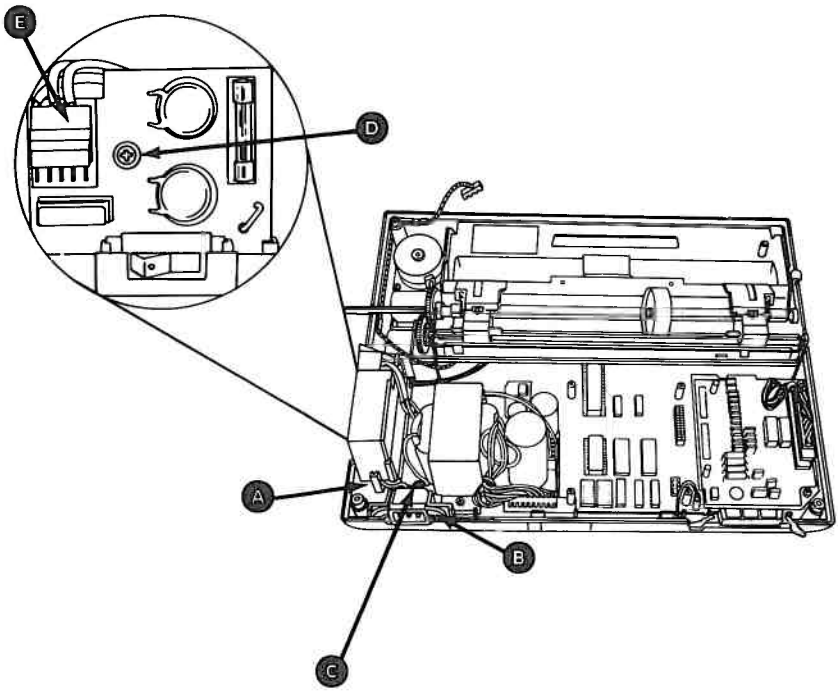
10. Lift the strain relief (D) from the slot in the base cover.

11. Lift the fuse-filter card from the slot in the base cover.



Fuse-Filter Card and Power Cord Replacement — 120 Volt 5656

1. Insert the fuse-filter card into the slot (A) in the base cover.
2. Insert the strain relief into the slot (B) in the base cover.
3. Install the screw (C) into the ground terminal of the power cord.
4. Install the screw (D) in the center of the fuse-filter card.
5. Connect the transformer primary (E) to the fuse-filter card.
6. Install the safety shield on the fuse-filter card **(5696)**.
7. Install the top cover **(5632)**.
8. Install the access cover **(5630)**.
9. Install the forms rack **(5640)**.



Heat Sink and Power Transistor Assembly Removal 5660

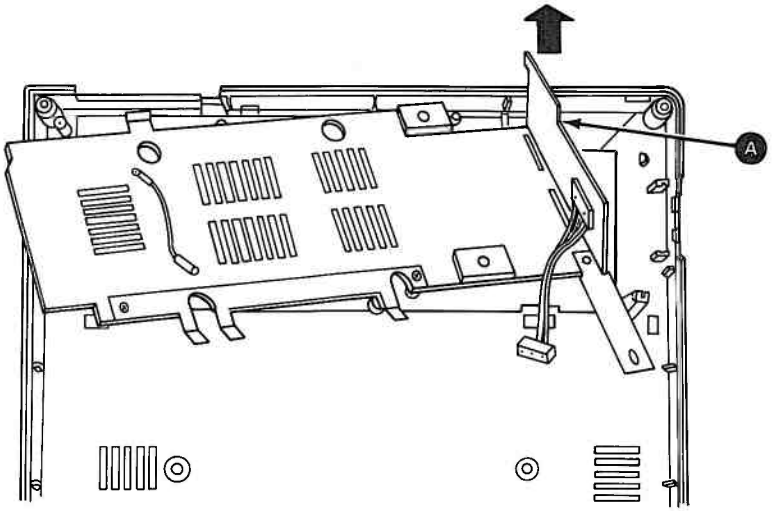
1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Remove the power transformer **(5675)** or **(5677)**.
7. Remove the fuse-filter card and power cord **(5653)** or **(5655)**.

8. Remove the driver circuit card **(5620)**.

9. Remove the control circuit card **(5616)**.

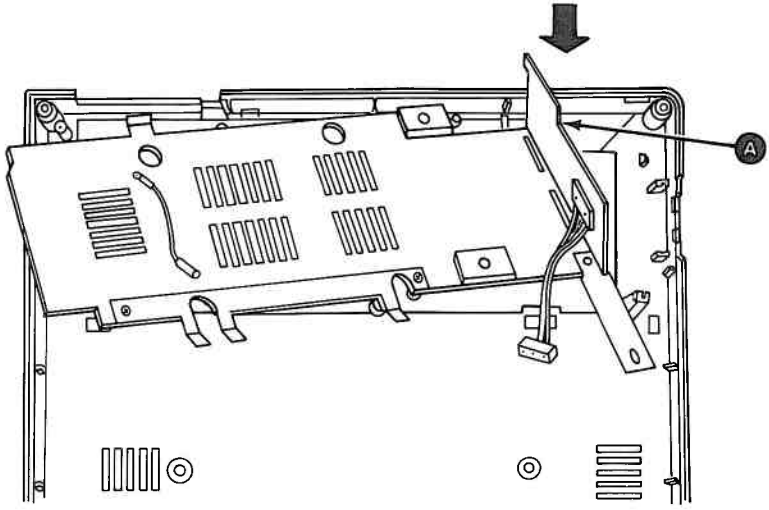
10. Remove the print mechanism assembly **(5685)**.

11. Lift the heat-sink assembly (A) from the base cover.



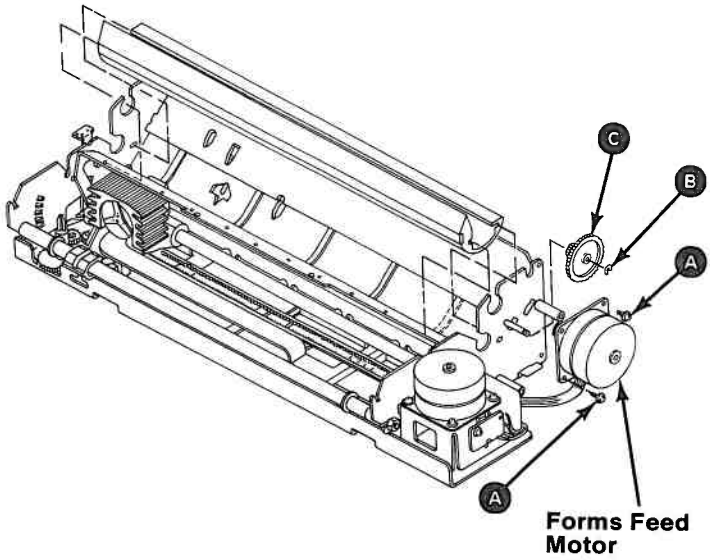
Heat-Sink and Power Transistor Assembly Replacement 5661

1. Place the heat sink and power transistor assembly (A) on the base cover.
2. Install the print mechanism assembly **(5686)**.
3. Install the control circuit card **(5617)**.
4. Install the driver circuit card **(5621)**.
5. Install the fuse-filter card and power cord **(5654)** or **(5656)**.
6. Install the power transformer **(5676)** or **(5678)**.
7. Install the top cover **(5632)**.
8. Install the access cover **(5630)**.
9. Install the forms rack **(5640)**.



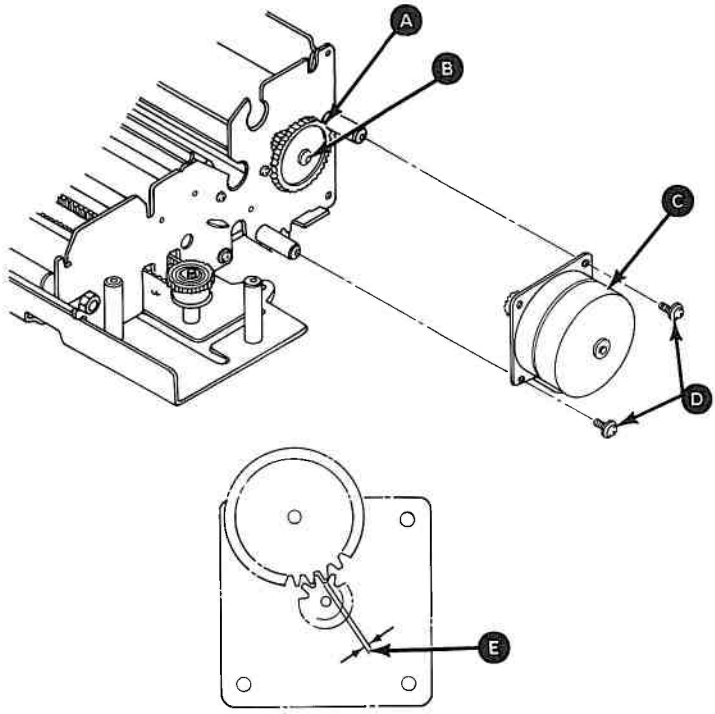
Intermediate Gear Removal 5665

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Remove the two screws (A) from the forms feed motor mounts.
7. Remove the intermediate gear retaining clip (B) .
8. Slide the intermediate gear (C) off the shaft.



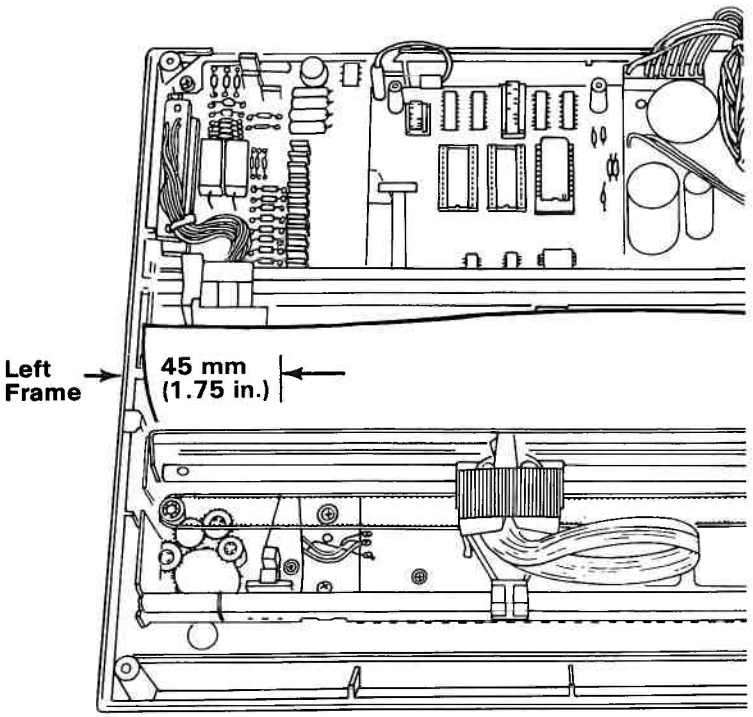
Intermediate Gear Replacement 5666

1. Slide the intermediate gear (A) onto the shaft.
2. Install the retaining clip (B) .
3. Place the forms feed motor (C) on the mounts.
4. Install the two screws (D) but do not tighten.
5. Adjust the motor so the gears mesh with minimum backlash (E) and no binds.
6. Tighten the two screws.
7. Install the top cover **(5632)**.
8. Install the access cover **(5630)**.
9. Install the forms rack **(5640)**.

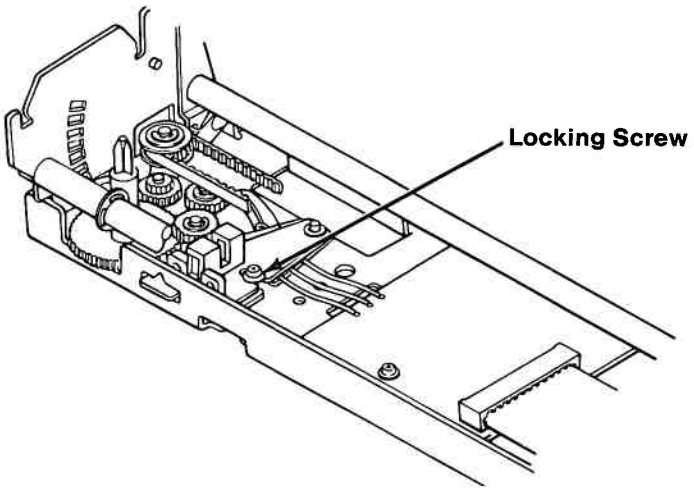


Left Margin Sensor Adjustment 5670

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Remove the ribbon cartridge.
7. Insert a sheet of paper in the printer. Place the paper against the left frame.
8. Measure 45 mm (1.75 in.) from the left frame and mark the position on the paper.

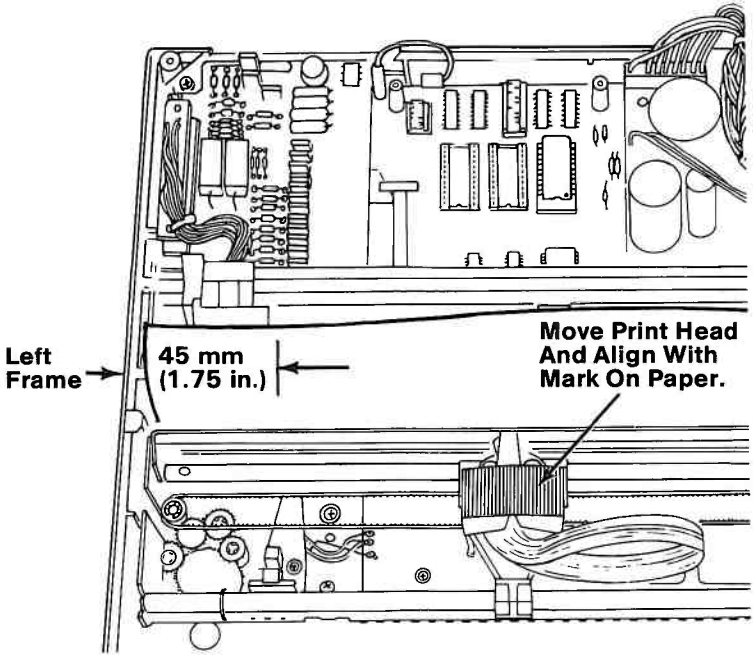


9. Loosen the left margin sensor locking screw.



10. Plug in the printer power cord. Set the printer Power switch to On.

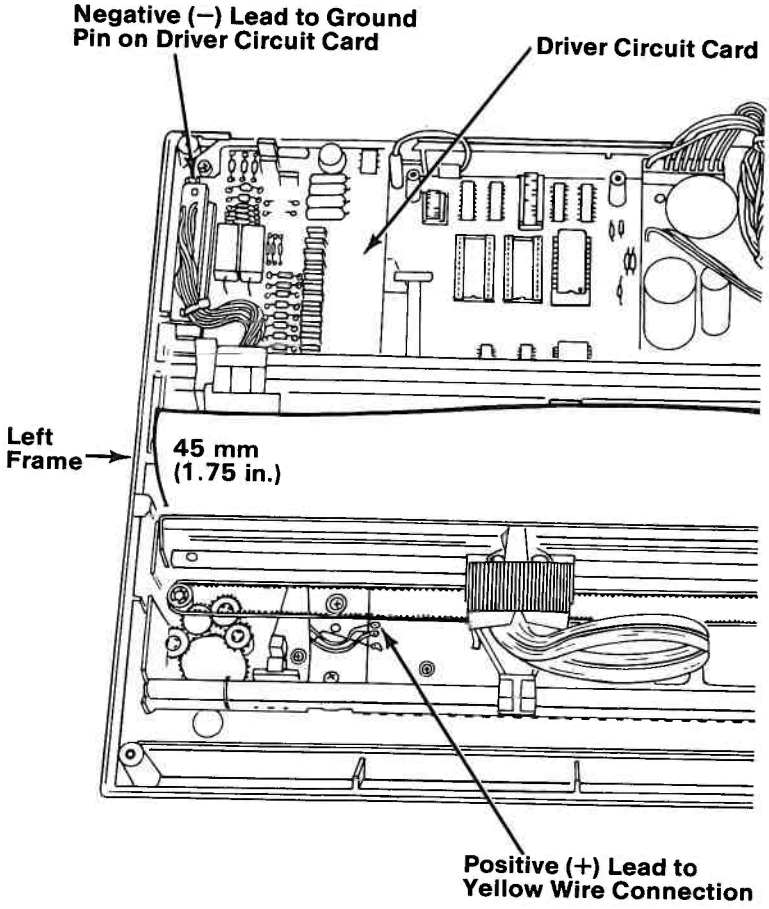
11. Move the print head by hand and align it with the 45 mm (1.75 in.) mark on the paper.



12. Set your multimeter to the 12 Vdc scale.

13. Place the negative (-) lead of the meter on the ground pin of the driver circuit card.

14. Place the positive (+) lead of the meter on the yellow wire solder connection on the left margin sensor.

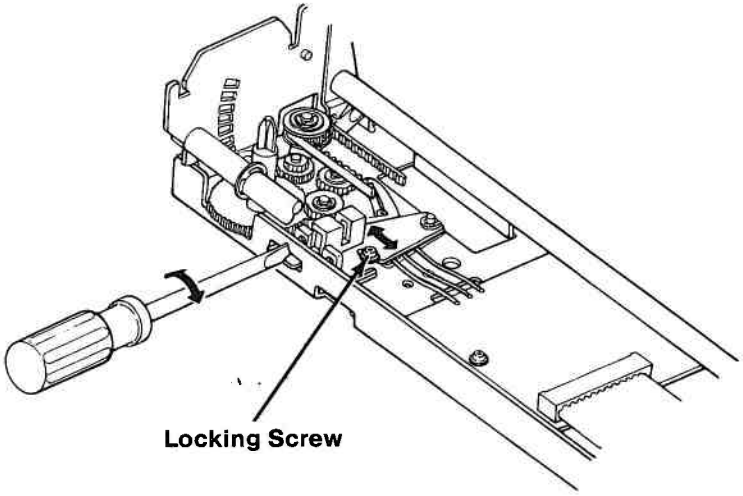


15. Move the left margin sensor to the left until the voltage indication on the meter is a down level (approximately 0 Vdc).

16. Move the sensor to the right until the voltage indication is an up level (approximately 5 Vdc).

    Note: If the voltage indication stays at a down level, move the head one position to the left and repeat Steps 15 and 16.

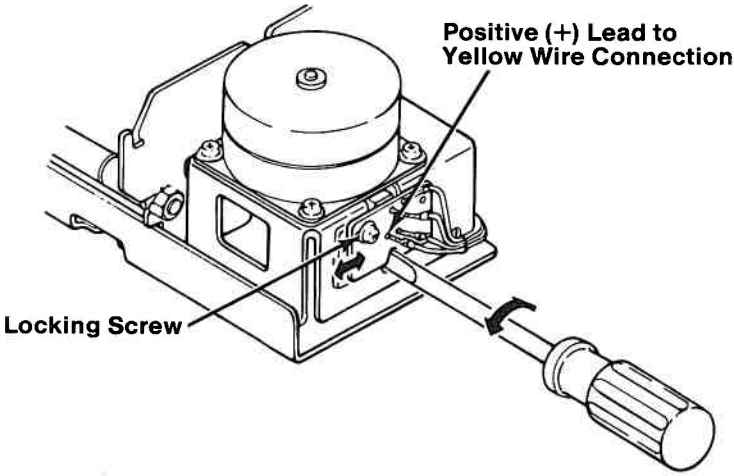
17. Tighten the left margin sensor locking screw.



18. Place the positive (+) lead of the meter on the yellow wire solder connection on the printer timing sensor (PTS) board.

19. Loosen the PTS board locking screw.

20. Move the PTS board either way until the voltage indication is at an up level (approximately 5 Vdc).



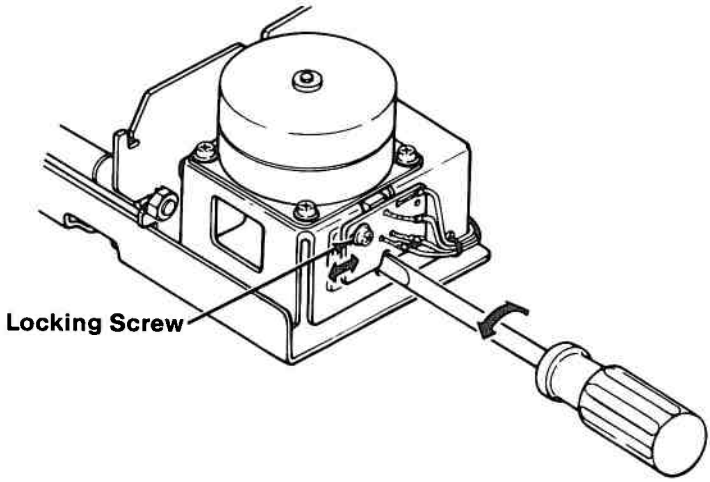
21. Do the following:

    a. Move the print head slightly to the left. The voltage indication should drop to a down level (approximately 0 Vdc). Do not allow the print head to step to the next detented position.

    b. Move the print head slightly to the right. The voltage indication should again drop to a down level (approximately 0 Vdc).

       Note: It is very important that the amount of pressure exerted on the print head be equal in both directions when the meter indication drops to the down level, without your causing the print head to jump to the next detented position.

22. Tighten the PTS locking screw and do Step 21 again. Realign if necessary.



23. Do the Printer Offline Diagnostic Test and observe the speed in both directions.

24. If the buzzer sounds, the PTS board is set incorrectly. Repeat the procedure starting at Step 18.

25. If the forward and reverse printing speeds are different, do the following:

    a. Place the positive (+) lead of the meter on the yellow wire solder connection on the PTS board.

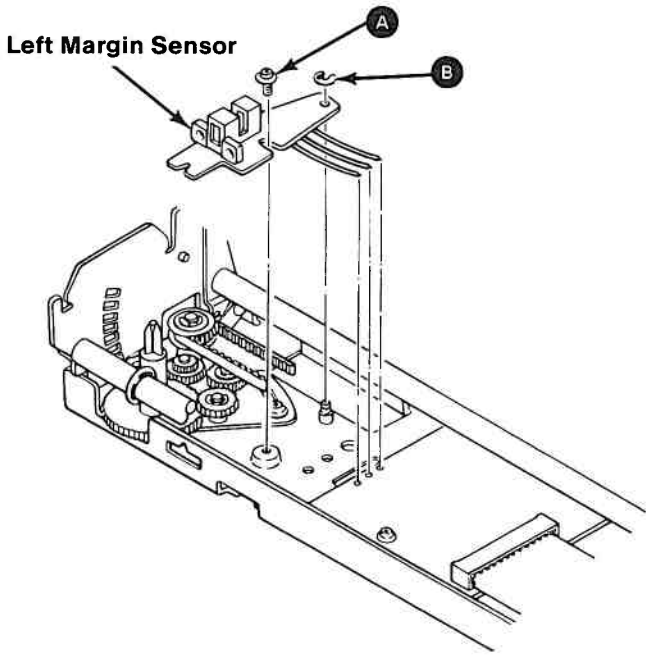
    b. Loosen the PTS board locking screw.

    c. Move the PTS board until you observe another up level indication, then repeat the procedure from Step 21.

If the speed is the same in both directions, the adjustment is complete.

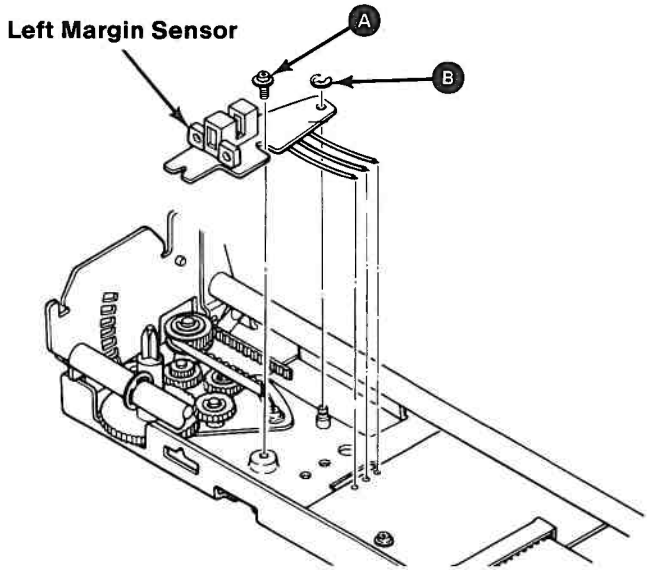
Left Margin Sensor Removal 5671

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Move the carriage to the right frame.
8. Remove the retaining screw (A) and retaining clip (B).
9. Unsolder the three wires from the left margin sensor.
10. Lift the sensor from the printer.



Left Margin Sensor Replacement 5672

1. Solder the three wires from the terminal board to the left margin sensor.
2. Position the sensor pivot hole over the post.
3. Install retaining screw (A) and retaining clip (B).
4. Adjust the left margin sensor **(5670)**.
5. Install the top cover **(5632)**.
6. Install the ribbon cartridge.
7. Install the access cover **(5630)**.
8. Install the forms rack **(5640)**.

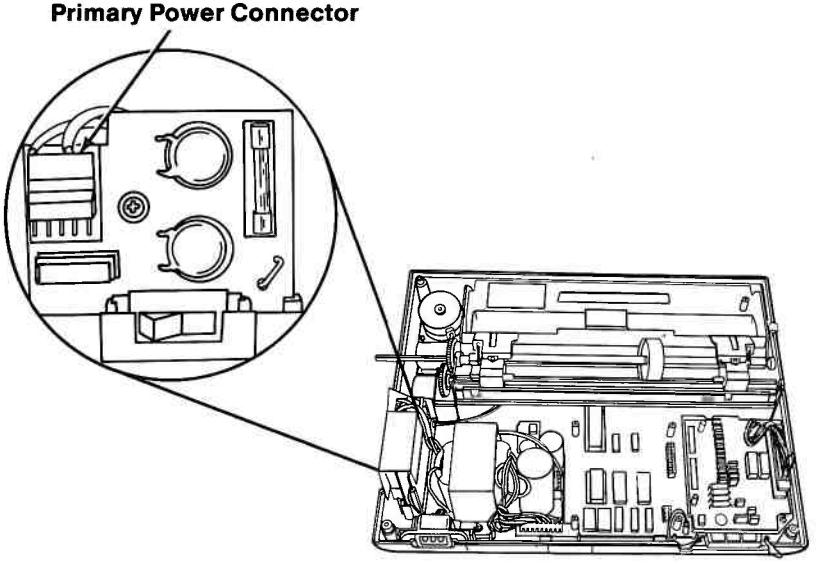


Power Transformer 220/240 Volt Primary Power Connector Wiring Check 5674

Before replacing the Power Transformer, check the new one for proper wiring.

For 220 Volt installations, the Primary Power Connector must have a White wire in Primary Power Connector pin 1 and a Brown wire in pin 4. The Orange wire is stored in pin 6.

For 240 Volt installations, the Primary Power Connector must have a White wire in pin 1 and an Orange wire in pin 4. The Brown wire is stored in pin 6.

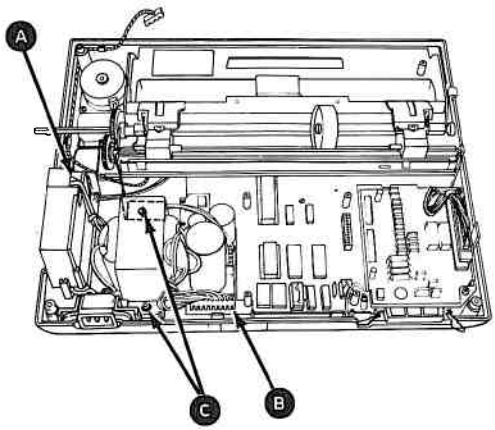


Power Transformer Removal—220/240 Volt 5675

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

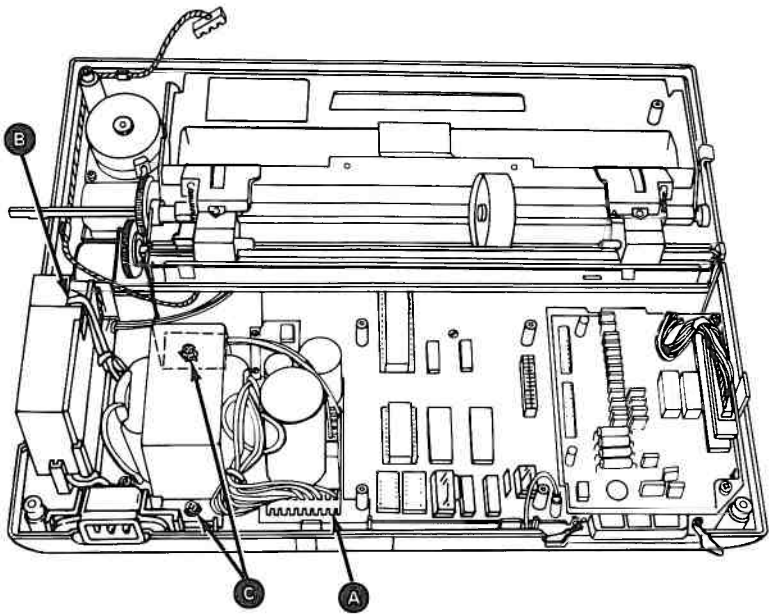
   CAUTION Static voltage may be present on the fuse-filter card. Be careful.

6. Remove the safety shield **(5695)**.
7. Unplug the connector (A) from the fuse-filter card.
8. Unplug the connector (B) from the control circuit card.
9. Remove the two screws (C) from the base of the transformer.
10. Lift the transformer from the base.



Power Transformer Replacement—220/240 Volt 5676

1. Place the transformer on the base in the area next to the fuse-filter card. Note the position of the two connectors, Ⓐ and Ⓑ .
2. Install the two base mounting screws Ⓒ .
3. Plug the connector Ⓑ into the control circuit card.
4. Plug the connector Ⓐ into the fuse-filter card.



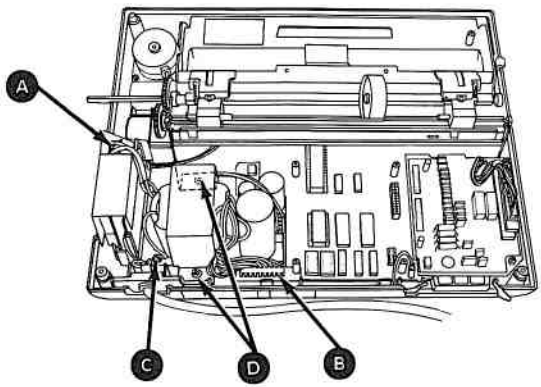
5. Install the safety shield **(5696)**.
6. Install the top cover **(5632)**.
7. Install the access cover **(5630)**.
8. Install the forms rack **(5640)**.

Power Transformer Removal—120 Volt 5677

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

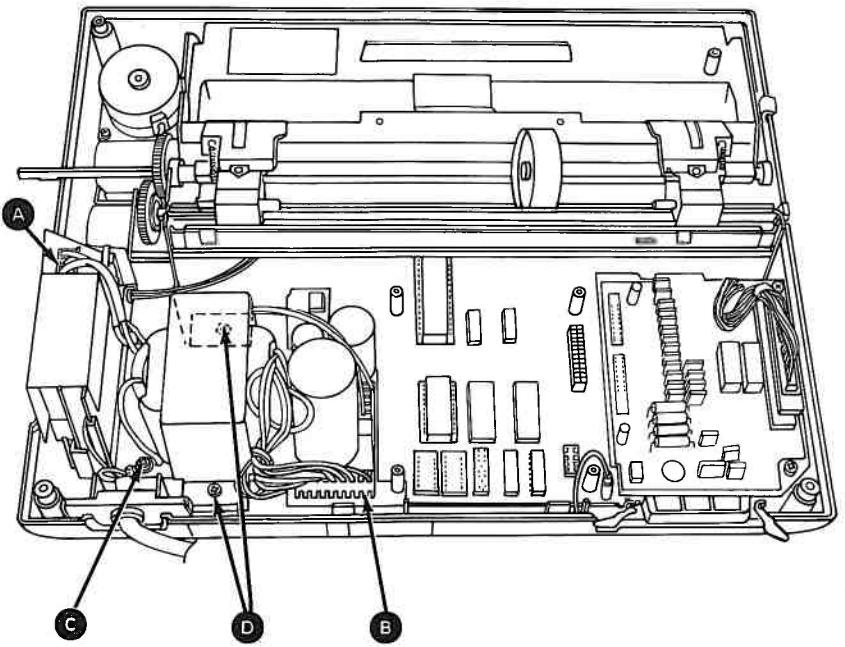
   CAUTION
   Static voltage may be present on the fuse-filter card. Be careful.

6. Unplug the connector (A) from the fuse-filter card.
7. Unplug the connector (B) from the control circuit card.
8. Remove the screw (C) from the transformer ground wire.
9. Remove the two screws (D) from the base of the transformer.
10. Lift the transformer from the base.



Power Transformer Replacement—120 Volt 5678

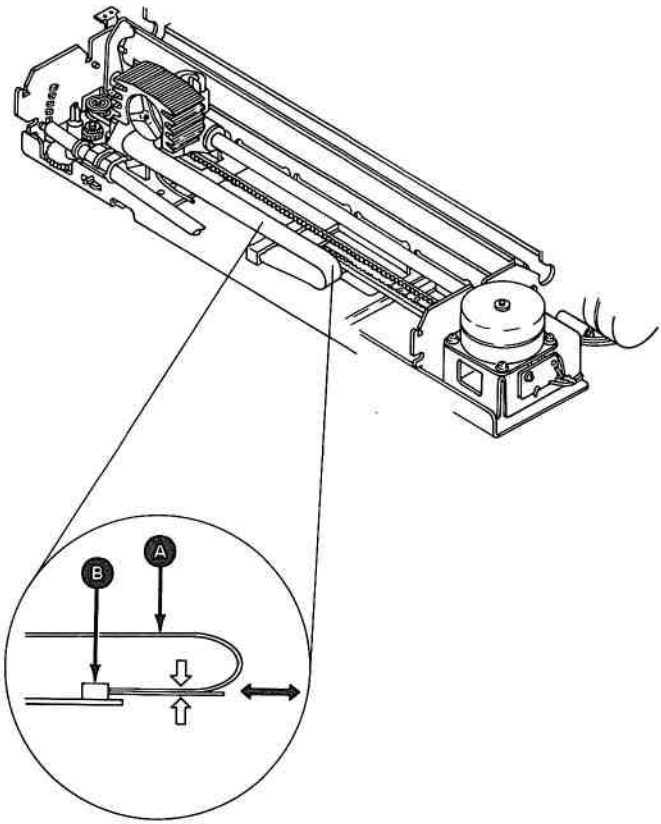
1. Place the transformer on the base in the area next to the fuse-filter card. Note the position of the two connectors, Ⓐ and Ⓑ .
2. Install the two base mounting screws Ⓓ .
3. Install the screw in the ground wire Ⓒ .
4. Plug the connector Ⓑ into the control circuit card.
5. Plug the connector Ⓐ into the fuse-filter card.



6. Install the top cover **(5632)**.
7. Install the access cover **(5630)**.
8. Install the forms rack **(5640)**.

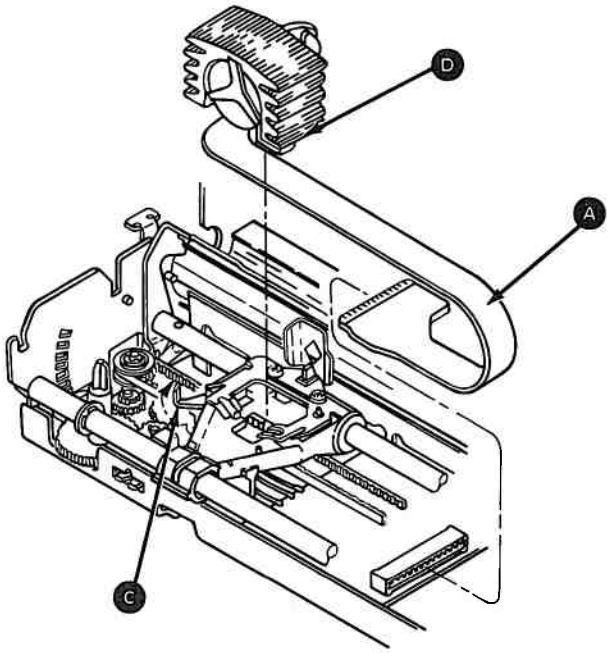
Print Head Removal 5680

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Pull the print head cable (A) from the connector (B) .



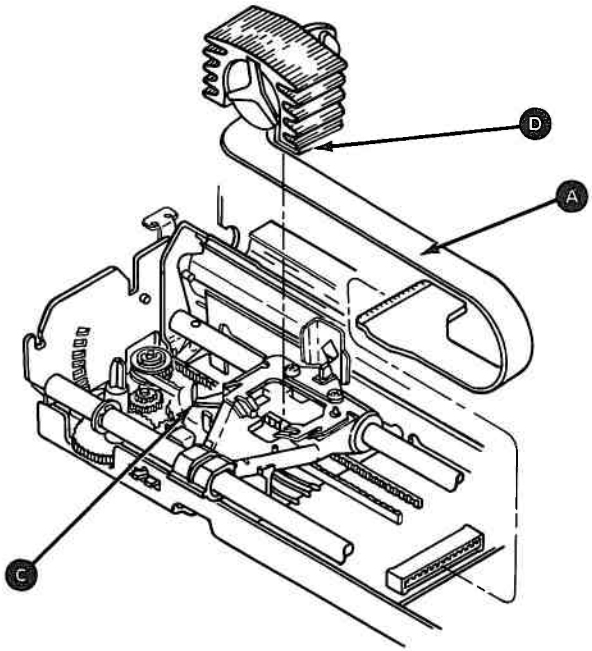
8. Pivot the print head lock lever (C) clockwise.

9. Lift the print head (D) and cable (A) from the carriage.



Print Head Replacement 5681

1. Insert the feet (D) that are on the print head into the opening on the carriage.
2. Pivot the lock lever (C) counterclockwise while pressing down on the print head.
3. Connect the print head cable (A) at the connector.
4. Install the top cover **(5632)**.
5. Install the ribbon cartridge.
6. Install the access cover **(5630)**.
7. Install the forms rack **(5640)**.



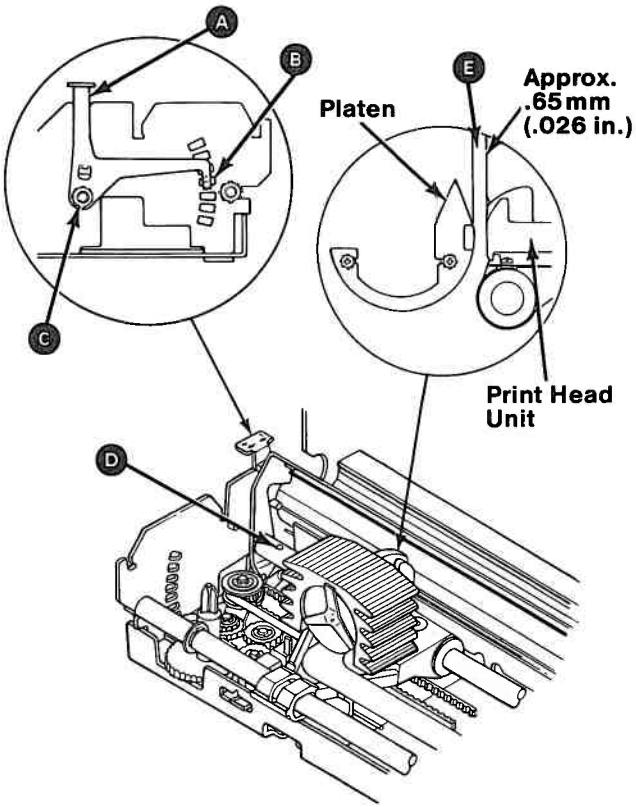
Note: Broken wires may be the result of other problems. If you are replacing a print head because of a broken wire, do the following steps to prevent damaging the new print head.

1. Remove the top cover. Disconnect CN6 on the driver control card. Check for 22 ohms resistance between pin CN6-10 (male end) and pins CN6-1 through 9. Replace the print mechanism assembly if there are any shorts or opens.

2. Switch the Power on. Check for +24 Vdc at pins CN6-1 through 9 on the driver card (use the ground pin for the common lead). If any pin has +24 Vdc, replace the control cards. If all pins read 0 Vdc, switch the power Off and reconnect CN6. Print head circuitry is functional.

Print Head Gap Adjustment 5682

1. Remove the print mechanism assembly **(5685)**.
2. Set the print head gap adjusting lever (A) to the fourth position (B).
3. Loosen the nut (C).
4. Rotate the carriage shaft (D) to get a 0.65 mm (0.026 in.) gap between the print head and the platen (E).
5. Tighten the nut (C).
6. Install the print mechanism assembly **(5686)**.



Print Mechanism Assembly Removal 5685

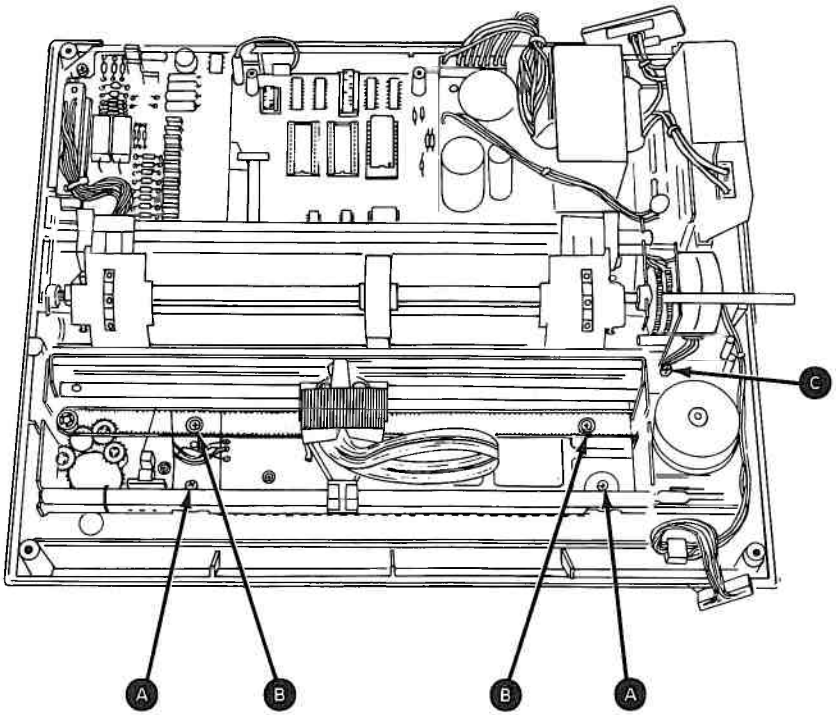
1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Remove the driver circuit card **(5620)**.
8. Remove the control circuit card **(5616)**.

9. Remove the two screws (A) from the base of the print mechanism assembly.

10. Remove any shipping screws (B) still installed.

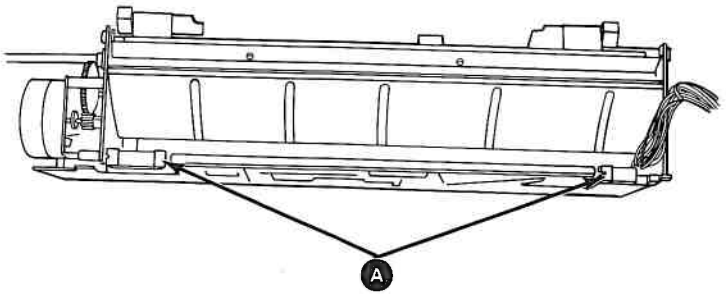
11. Remove the screw (C) from the ground strap.

12. Lift the print mechanism assembly from the base cover.



Print Mechanism Assembly Replacement 5686

1. Verify that the rubber grommets (A) are in the position shown.

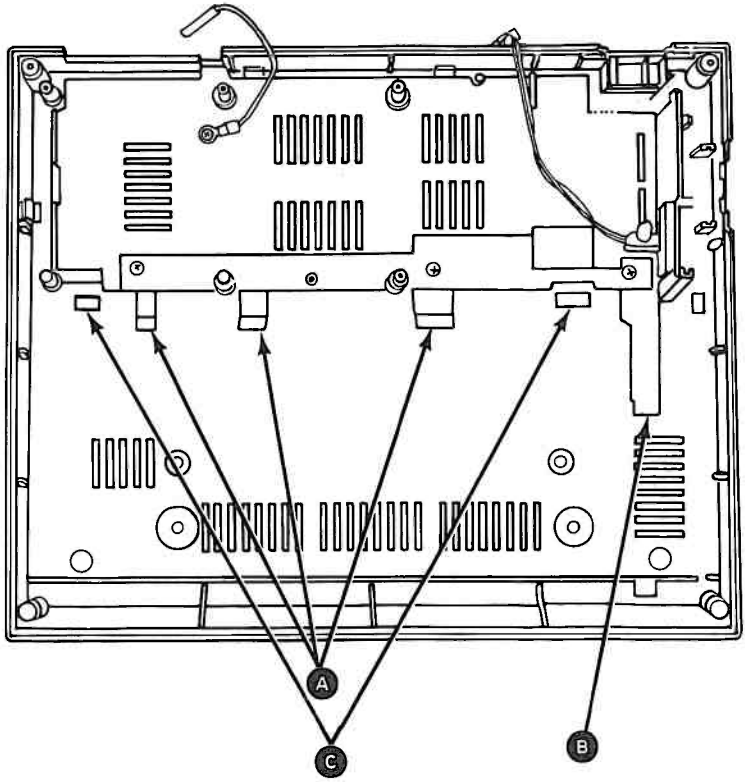


(Rear View)

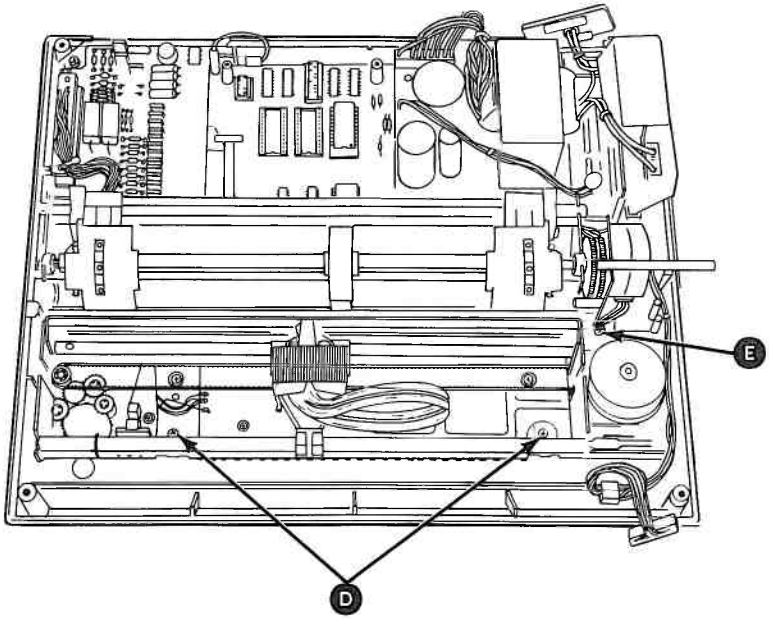
2. Place the print mechanism assembly on the base cover.

3. Slide the print mechanism assembly toward the rear, over the three grounding tabs (A) and under the ground strap (B) .

4. Place the rubber grommets around the plastic stops (C) .



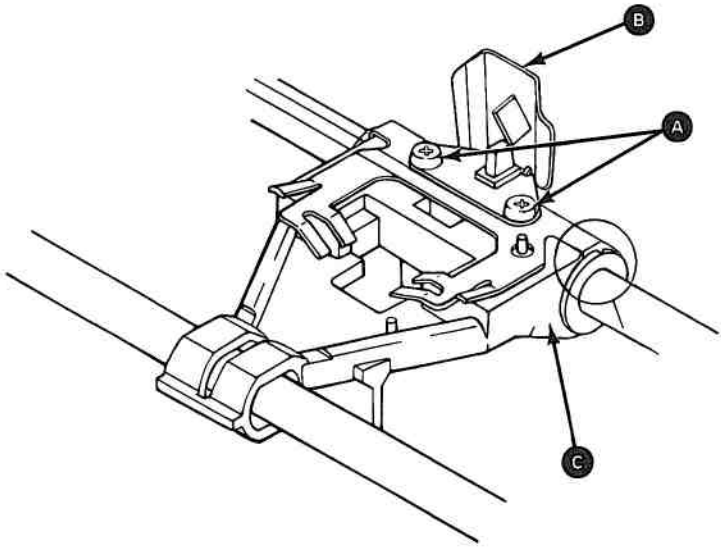
5. Install the two screws (D) .



6. Install the screw (E) in the ground strap.
7. Install the control circuit card **(5617)**.
8. Install the driver circuit card **(5621)**.
9. Install the top cover **(5632)**.
10. Install the ribbon cartridge.
11. Install the access cover **(5630)**.
12. Install the forms rack **(5640)**.

Ribbon Shield Removal 5690

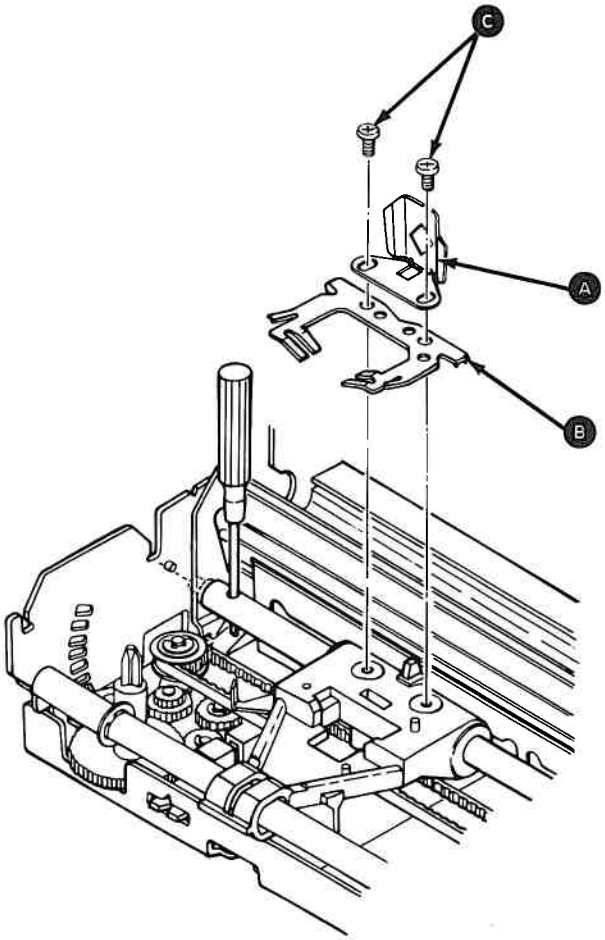
1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Remove the print head **(5680)**.
8. Remove the two screws (A) at the base of the ribbon shield (B).
9. Lift the shield straight up from the carriage (C).



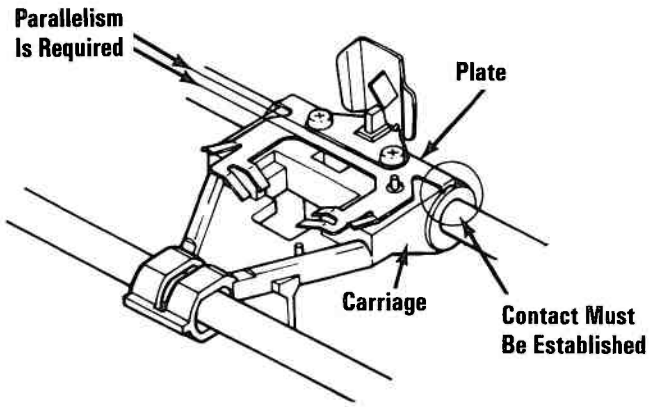
Ribbon Shield Replacement 5691

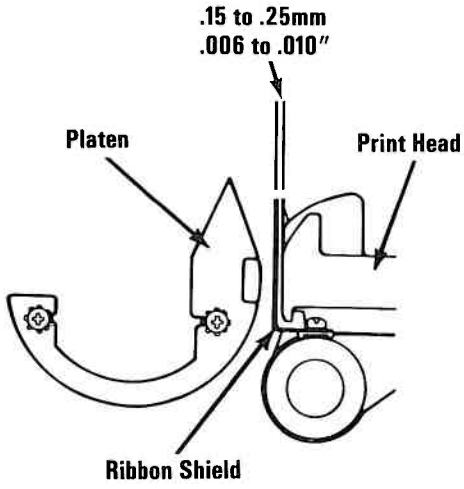
1. Place the shield (A) and plate (B) on the print head carriage.

2. Insert the screws (C). (Do not tighten.)



3. Place the shield and plate as shown. Tighten the screws.





4. Install the print head **(5681)**.
5. Install the top cover **(5632)**.
6. Install the ribbon cartridge.
7. Install the access cover **(5630)**.
8. Install the forms rack **(5640)**.

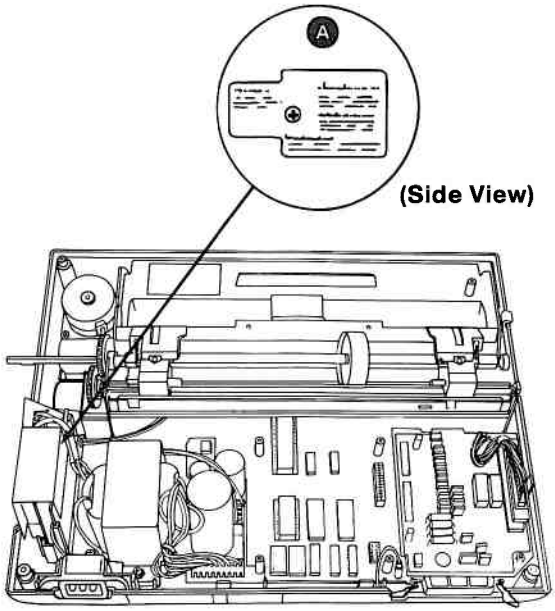
Safety Shield Removal 5695

1. Set the printer Power switch to Off, unplug the printer power cord from the outlet, and disconnect the Printer Cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

CAUTION Static voltage may be present on the fuse-filter card. Be careful.

6. Loosen the screw (A) .

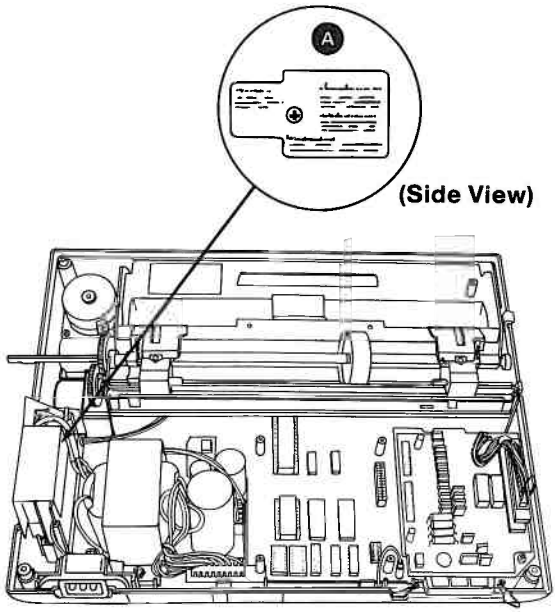
7. Lift the safety shield from the fuse-filter card.



Safety Shield Replacement 5696

CAUTION
Static voltage may be present on the fuse-filter card. Be careful.

1. Place the safety shield on the fuse-filter card.
2. Install the screw (A) .



3. Install the top cover **(5632)**.
4. Install the access cover **(5630)**.
5. Install the forms rack **(5640)**.

Notes:

SECTION 6. SWITCH SETTINGS

Contents

Notes:

Graphics Printer

The printer DIP switches are used to set certain printer functions and to select line spacing, character set, form length, and printing quality. The setting of the DIP switches determines the values that will automatically be set each time the printer is switched on.

Note: Switch 1-7 for the Graphics Printer must be set for local requirements. This switch selects Table 1 or 2 below, and is factory-set to Off for the U.S. and English speaking countries.

Functions and Conditions of Dip Switch No. 1

Graphics Printer

Switch No.	Function	On	Off	Factory Set
1-1	Not Applicable	–	–	On
1-2	CR	Print Only	Print & Line Feed	On
1-3	Buffer Full	Print Only	Print & Line Feed	Off
1-4	Cancel Code	Invalid	Valid	Off
1-5	Not Applicable	–	–	On
1-6	Error Buzzer	Sound	Does Not Sound	On
1-7	Character Generator	Table 2	Table 1	Off
1-8	Select In Signal	Fixed Internally	Not Fixed Internally	On

Matrix Printer

Switch No.	Function	On	Off	Factory Set
1-1	Not Applicable	–	–	On
1-2	CR	Print Only	Print & Line Feed	On
1-3	Buffer Full	Print Only	Print & Line Feed	On
1-4	Cancel Code	Invalid	Valid	Off
1-5	Delete Code	Invalid	Valid	On
1-6	Error Buzzer	Sound	Does Not Sound	On
1-7	Character Character	N.A.	Graphic Pattern Select	Off
1-8	Select In Signal	Fixed Internally	Not Fixed Internally	On

Functions and Conditions of Dip Switch No. 2

Graphics Printer

2-1	Form Length	12"	11"	Off
2-2	Line Spacing	1/8"	1/6"	Off
2-3	Auto Feed XT Signal	Fixed Internally	Not Fixed Internally	Off
2-4	1 in Skip Over Perforation	Valid	Not Valid	Off

Matrix Printer

2-1	Not Applicable	–	–	On
2-2	Not Applicable	–	–	On
2-3	Auto Feed XT Signal	Fixed Internally	Not Fixed Internally	Off
2-4	Coding Table Select	N.A.	Standard	Off

Notes:

SECTION 7. PARTS CATALOG

Contents

Notes:

The warranty terms and conditions applicable in the country of purchase (except for the United States and Puerto Rico) for an IBM Personal Computer product are available from the supplier.

LIMITED WARRANTY - IBM SERVICE PARTS

(Applies to United States and Puerto Rico).

The International Business Machines Corporation warrants that each IBM Service Part for an IBM Personal Computer Product will be free from defects in materials and workmanship under conditions of normal use for a period of 90 days from the date of purchase from IBM. Service Parts will be either reconditioned parts or new parts. Should an IBM Service Part fail to be free from defects in materials or workmanship at any time during the 90-day warranty period, IBM will, at its option, repair or replace this Service Part at no charge. All replaced Service Parts will become the property of IBM. This limited warranty does not include damage to the Service Part resulting from accident, disaster, misuse, abuse, or non-IBM modification of the Service Part.

Limited Warranty service may be obtained by delivering the Service Part to the IBM location where the part was purchased and providing proof of purchase date. Contact IBM by writing to IBM National Parts Center, P.O. Box 481, Greencastle, Indiana 46135 for further information.

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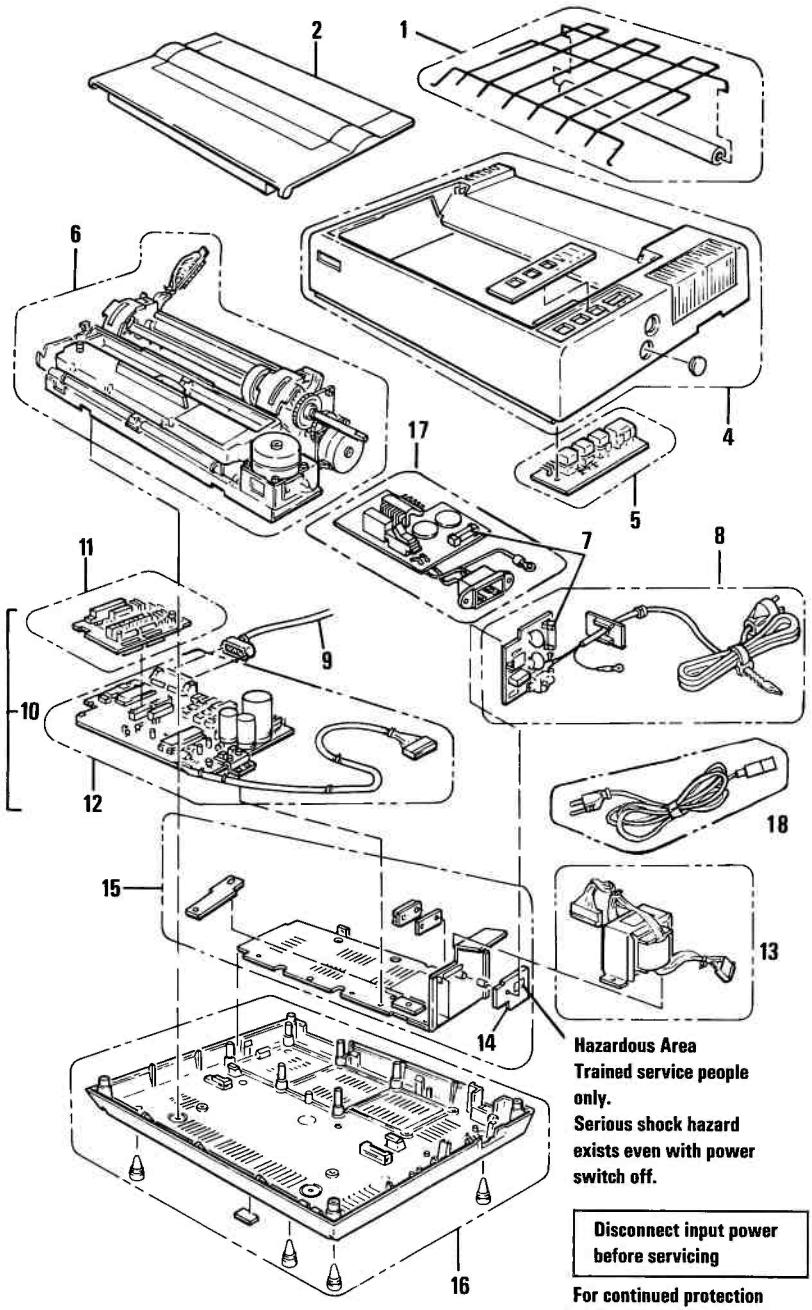
THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

Graphics Printer



Hazardous Area
Trained service people only.
Serious shock hazard exists even with power switch off.

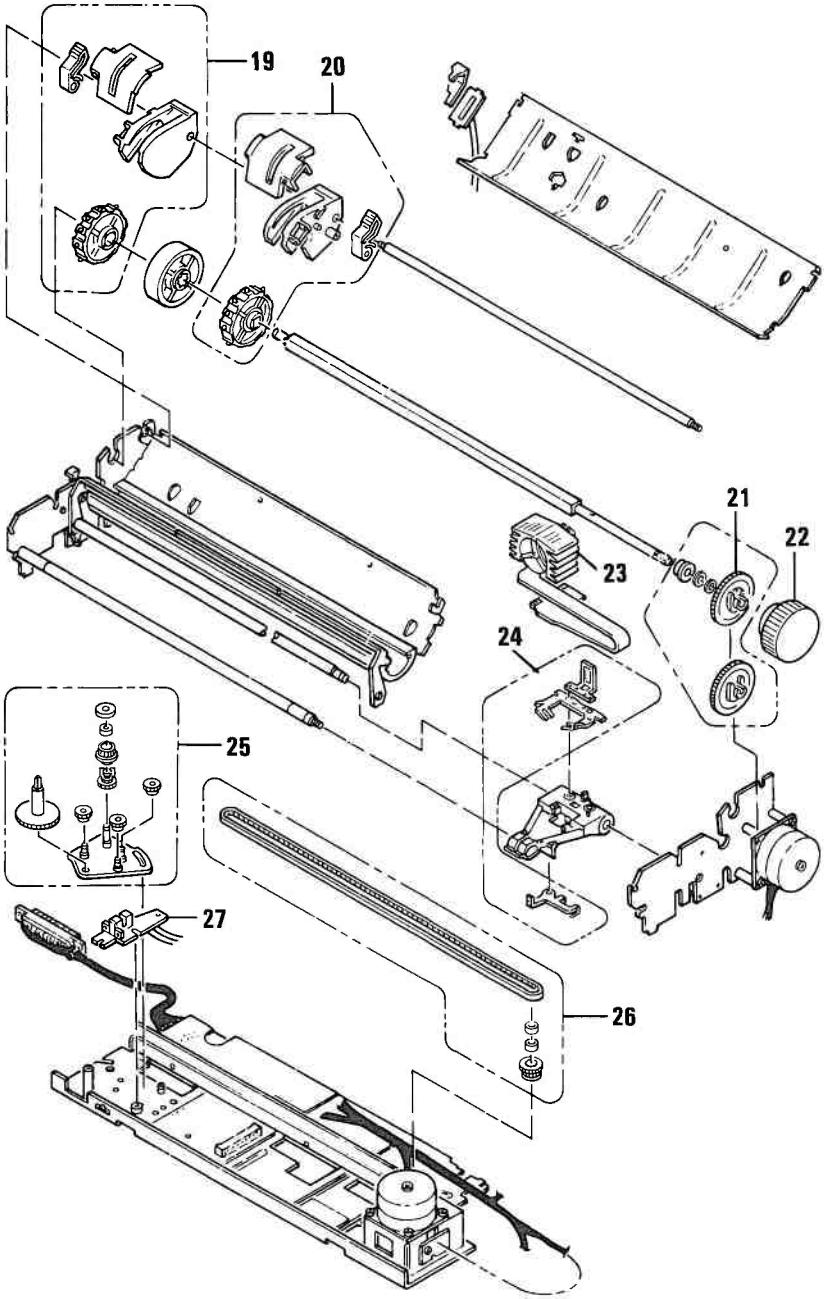
Disconnect input power before servicing

For continued protection against fire hazard, replace only with same type and rating of fuse.

Graphics Printer

Major Unit Code	Index No.	Part Number	Description
554	1	8529191	Forms Rack
000	2	8529185	Access Cover
000	3	8529186	Label Kit - Consisting of - Control Panel Label Nameplate-Front Nameplate-Rear Warning Label Bottom Label-FCC Warning Label-Safety Shield 1 ea. 120,220,240 Label-Rear
000	4	8529182	Top Cover
000	5	8529184	Control Panel
551	6	8529198	Print Mechanism Assembly
600	7	8529220	Fuse-2A for 120 Volt
600	7	8529278	Fuse-315mA for 220/240 Volt
600	8	8529187	Fuse-Filter Card/ Power Cord Assembly for 120 Volt
551	9	8529214	Printer Cable
318	10	8529268	Control Cards, Graphics Printer -Consisting of-
318	11	8529221*	Driver Card
318	12	8529276*	Logic Card
318	10	8529197*	Control Cards, Matrix Printer -Consisting of-
318	11	8529221*	Driver Card
318	12	8529222*	Logic Card
600	13	8529196	Power Transformer 120 Volt
600	13	8654236	Power Transformer 220 Volt
600	13	8529277	Power Transformer 240 Volt
600	14	8529215	Safety Shield
600	15	8529217	Heat Sink/Power Transistor
000	16	8529181	Base Assembly
600	17	8529279	Fuse-Filter Card/AC Socket for 220/240 Volt
600	18		Power Cord (Detachable)**

*Restricted Availability
**See Power Cord Parts list for the proper power cord certified for your country.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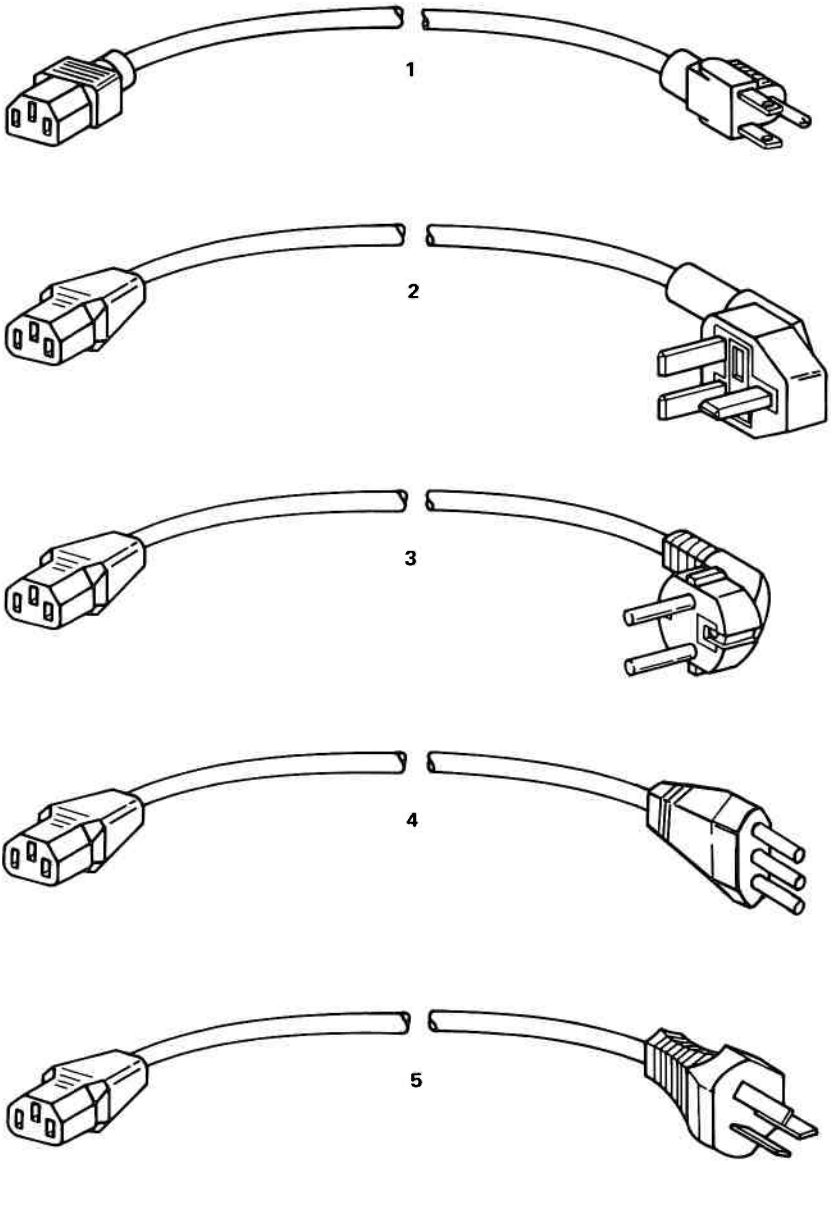
Graphics Printer

Major Unit Code	Index No.	Part Number	Description
550	19	8529188	Forms Tractor Assembly, Left
550	20	8529216	Forms Tractor Assembly, Right
550	21	8529194	Intermediate Gear
550	22	8529193	Forms Feed Knob
551	23	8529183	Print Head
551	24	8529192	Ribbon Shield
551	25	8529195	Carriage Drive Assembly
551	26	8529190	Carriage Belt
551	27	8529189	Left Margin Assembly
000		8529200	Printer Misc. Hardware - Consisting of - Plain Washers C.T.P. Screws Retaining Rings, Type E CP Screws with OW Cup Screws Spacers Outside Toothed Lock Washers CP Screws with SW Cup Screws (Binding Head) Hexagon Nuts CB Screws
000		8529218	Printer Misc. Springs - Consisting of - Spring Pin Leaf Spring PE Lever Spring Headlock Lever Spring Scale Spring, Left Scale Spring, Right Paper Holding Cover Spring
000		8529219	Printer Misc. Parts - Consisting of - Board Spacing Paper Guide Roller Grommet Rubber Bumper A Rubber Bumper B Wire Band

Power Cords



Power Cords

Major Unit Code	Index No.	Part Number	Description
600	1	8286120	Power Cord U.S.*
			Power Cord Venezuela*
			Power Cord Colombia*
600	2	8529341	Power Cord U.K.*
			Power Cord Hong Kong*
			Power Cord Singapore*
600	3	8529281	Power Cord Germany*
			Power Cord France *
			Power Cord Spain*
600	4	8529282	Power Cord Italy*
600	5	8529284	Power Cord Australia*
			Power Cord New Zealand*

* Use only the proper Power Cord certified for your country.

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Personal Computer Hardware Reference Library

Hardware Maintenance and Service

Compact Printer

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

Warning: This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

INSTRUCTIONS TO USER

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals, and the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B 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 residential installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- If peripherals not offered by IBM are used with this equipment, it is suggested that you use shielded, grounded cables with in-line filters, if necessary.

If necessary consult your dealer service representative for additional suggestions.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

CAUTION
This product is equipped with a UL-listed and CSA-certified plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

Preface

The *Hardware Maintenance and Service Compact Printer* manual is the publication used to isolate and repair any failure of a Field Replaceable Unit (FRU) in your printer.

The diagnostic section of the *Hardware Maintenance and Service Compact Printer* manual must be used in conjunction with the system *Hardware Maintenance and Service* manual. This printer manual assumes that you were directed to the diagnostic section by the "Problem Isolation Charts" in the *Hardware Maintenance and Service* manual. It is also assumed that you are familiar with "Problem Isolation Charts" (PICs). If you need instructions on how to use the PICs refer to the system *Hardware Maintenance and Service* manual.

This manual is divided into six sections.

Section 1 "Introduction" contains a general description of your printer.

Section 2 "Introduction to Diagnostic Aids" explains the diagnostic aids that are available for the Compact Printer.

Section 3 "Problem Isolation Charts" provides step-by-step instructions that aid in locating the failing FRU.

Section 4 "Locations" is used to find a part or FRU in the printer.

Section 5, "Removals, Replacements, and Adjustments" provides the information to complete the repair activity.

Section 6, "Parts Catalog" contains illustrations and part numbers for the individual FRUs.

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SECTION 1. INTRODUCTION

Contents

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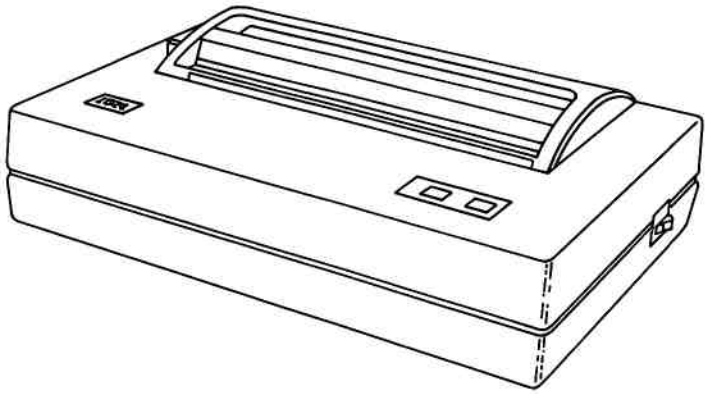
Compact Printer Description

The IBM PC Compact Printer is a table-top, dot matrix, thermal printer. It attaches to a serial adapter through a standard printer cable, which has a 25-pin connector on the computer end.



The following are features of the Compact Printer:

- Graphics printing
- 50 characters-per-second print speed
- Extended character sets
- 80 characters per line
- 5-by-8 dot matrix

CAUTION
This product is equipped with a UL-listed and CSA-certified plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

SECTION 2. INTRODUCTION TO DIAGNOSTIC AIDS

Contents

Notes:

Introduction

This section explains the diagnostic aids that are available for the Compact Printer: Problem Isolation Charts (PICs), and the Advanced Diagnostics diskette, and the printer self-test. The diagnostic aids are used to troubleshoot printer problems.

This manual supplements the system *Hardware Maintenance and Service* manual. If you are having a problem with your printer, follow the procedures in that manual until you are instructed to turn to this manual.

Problem Isolation Charts

The PICs will help you to isolate a problem to the failing field replaceable unit (FRU).

Advanced Diagnostics Diskette

The Advanced Diagnostics diskette has tests that check the functions of the Compact Printer and adapters. If any problem is detected, the diagnostic test stops and an error code appears.

Power-On Self Test

Each time you switch the Compact Printer on, it checks itself. The print head returns to the left margin and the Ready light comes on. If a problem is detected, the test stops and you then use the appropriate PIC.

Compact Printer Self Test

The Compact Printer has internal diagnostic tests. To run the self test, do the following steps.

1. Set the printer and system power Off.

2. Insert thermal forms in the printer.

3. Press and hold the Paper Feed button and set the printer Power switch to On. (This starts the printer self test. To end the test, set the printer Power switch to Off.)

SECTION 3. PROBLEM ISOLATION CHARTS

Contents

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Printer Entry

This is the entry point for using the Compact Printer PIC. You have entered this PIC because you were directed here by one of the PICs in the system *Hardware Maintenance and Service* manual. You may have a 330X error code or an undetermined problem with your IBM Personal Computer Compact Printer. The printer is assumed to be plugged into a functional wall outlet.

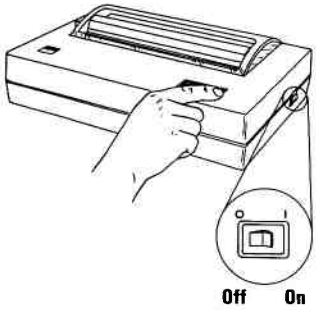
Notes:

Compact Printer 3300

You have entered this PIC because your system has a 33XX error or you have a problem with the IBM PC Compact Printer. If your printer has visible obstructions or broken parts, remove the obstructions or replace the appropriate FRU.

Note: Before you begin this PIC, you must first successfully complete the Asynchronous Communications Adapter PIC in the system *Hardware Maintenance and Service* manual.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set the printer Power switch to Off.
3. Ensure the forms are properly inserted.
4. Press and hold the Paper Feed button and set the printer Power switch to On. (This starts the printer self test. To end the test, set the printer Power switch to Off.)

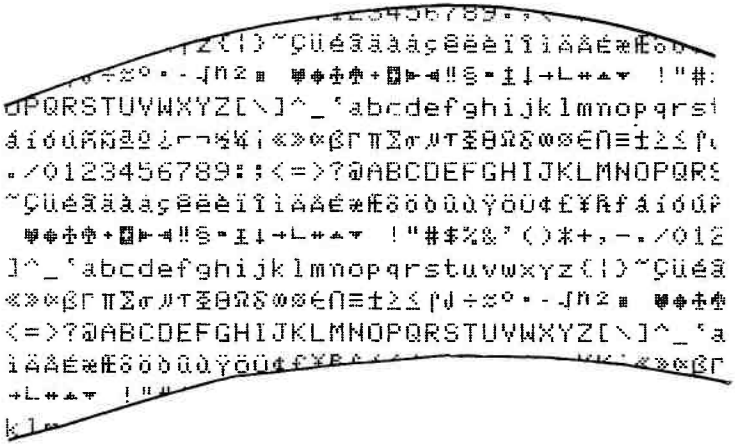


DOES THE COMPACT PRINTER BEGIN TO PRINT?

NO Go to page 3-3300-10.

YES

Compare the printout with the example below.



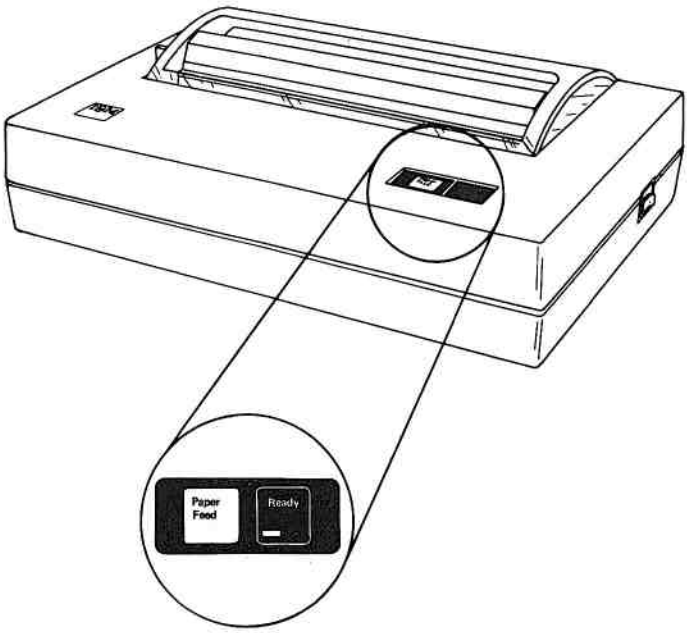
DOES THE PRINTOUT MATCH THE EXAMPLE?

NO Go to "Failure Symptom Table" on page 3-3300-20.

YES

If you previously stopped the self test, set the printer Power switch to On.

Look at the control panel.



IS THE READY LIGHT ON?

NO Go to page 3-3300-9.

YES

1. Stop the self test by setting the printer Power switch to Off.

2. Ensure the printer and IBM PC Compact Printer Connector Adapter are properly attached to the primary Asynchronous Communications Adapter in the system (or expansion) unit.

3. Ensure the Power switch on the system unit (and expansion unit, if attached) is Off.

4. Insert the Advanced Diagnostics diskette in drive A.

5. Set the Power switch on the system unit (and expansion unit, if attached) to On.

6. Set the printer Power switch to On.

CONTINUE

7. Press 0 (RUN DIAGNOSTIC ROUTINES) then Enter.


```
SELECT AN OPTION

0 – RUN DIAGNOSTIC ROUTINES
1 – FORMAT DISKETTE
2 – COPY DISKETTE
3 – PREPARE SYSTEM FOR RELOCATION
9 – EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED
? 0

IS AN IBM COMPACT PRINTER
ATTACHED TO THE ASYNC ADAPTER (Y/N)?
```

DOES A SCREEN MESSAGE ASK IF A COMPACT PRINTER IS ATTACHED TO THE ASYNCHRONOUS ADAPTER?

NO Go to page 3-3300-7.

YES

1. Press Y then Enter.

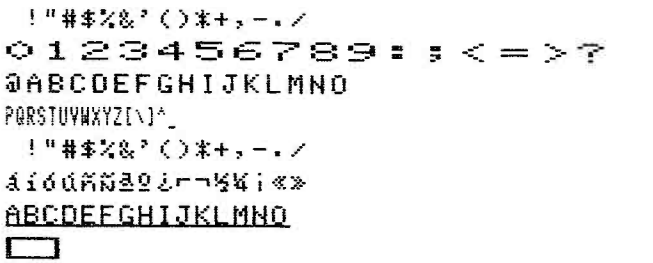
2. Depending on the configuration of your system, questions about attached devices may appear on your screen. Press Y or N as required then Enter.

3. Press Y or N (IS THE LIST CORRECT?) then Enter. (If the list is incorrect, follow the instructions on your screen and correct the list before answering yes. If you cannot correct the list, you still must answer yes before you can continue.)

4. Press 0 (RUN TEST ONE TIME) then Enter.

5. Select 33 (COMPACT PRINTER) then press Enter.

6. Compare your printout with the example below.



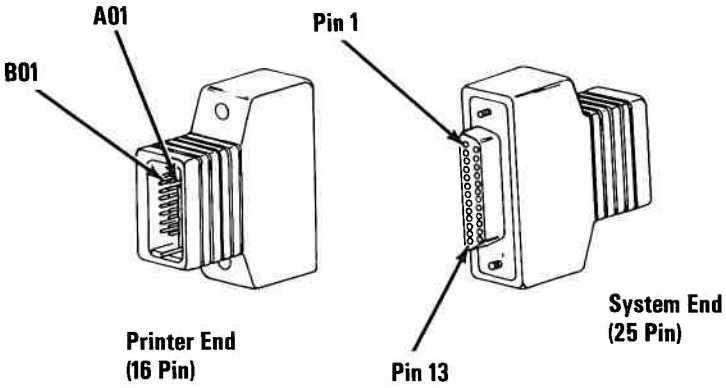
DOES THE PRINTOUT MATCH THE EXAMPLE?

NO Replace the logic card (see Section 5, "Removal/Replacement and Adjustments").

YES Your IBM PC Compact Printer successfully passed the diagnostic tests. If you still have an unsolved problem, request technical assistance.

You may have a problem with the Compact Printer Connector Adapter. Check continuity as follows.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set the printer Power switch to Off.
3. Disconnect the Printer Cable from the connector adapter.
4. Disconnect the connector adapter from the primary Asynchronous Communications Adapter.
5. Inspect the connector adapter for bent or broken pins. If necessary, replace the adapter.
6. Set the meter on the Ohms (x1) scale.



CONTINUE

Refer to the table below and check the continuity of the connector adapter. The resistance should be approximately 0 ohms.

Connector Adapter Continuity Chart

Printer End [16 Pin]		System End [25 Pin]
A02	———	20
A03	———	4
A04	———	2
A05	———	8
A06	———	6
A07	———	5
B02	———	7
B03	———	7
B04	———	7
B05	———	7
B06	———	7
B07	———	7
B08	———	7

IS THE CONTINUITY CORRECT?

NO Replace the connector adapter.

YES Replace the logic card (see Section 5, "Removal/Replacement and Adjustments").

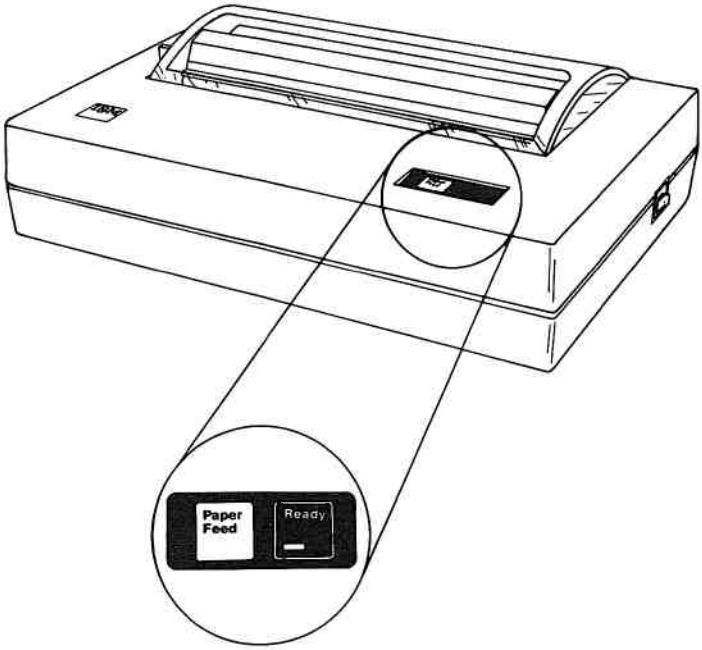
1. Set the printer Power switch to Off.

2. Remove the printer top cover (see Section 5, "Removal/Replacement and Adjustments").

3. Replace the logic card (see Section 5, "Removal/Replacement and Adjustments").

4. Install the printer top cover.

5. Set the printer Power switch to On.

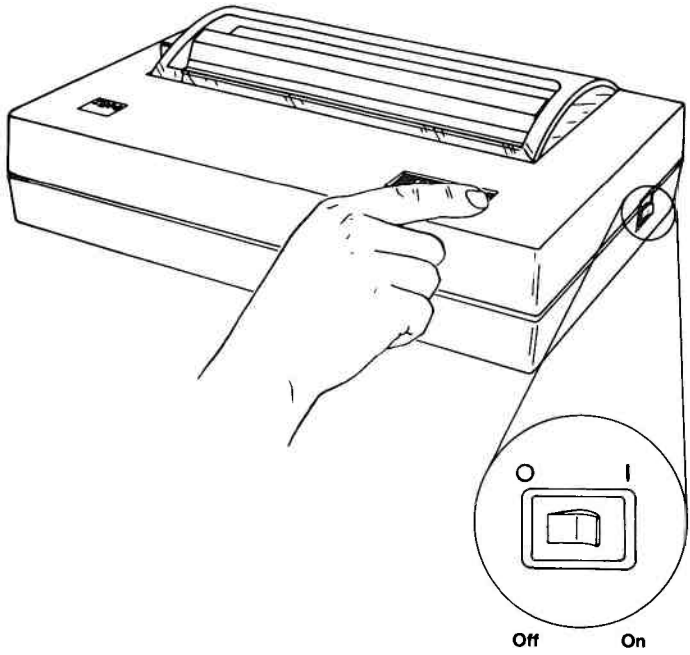


IS THE READY LIGHT ON?

NO Replace the IBM PC Compact Printer.

YES You have corrected the problem. Go to page 3-3300-1 and do the PIC again to ensure the printer is operating correctly.

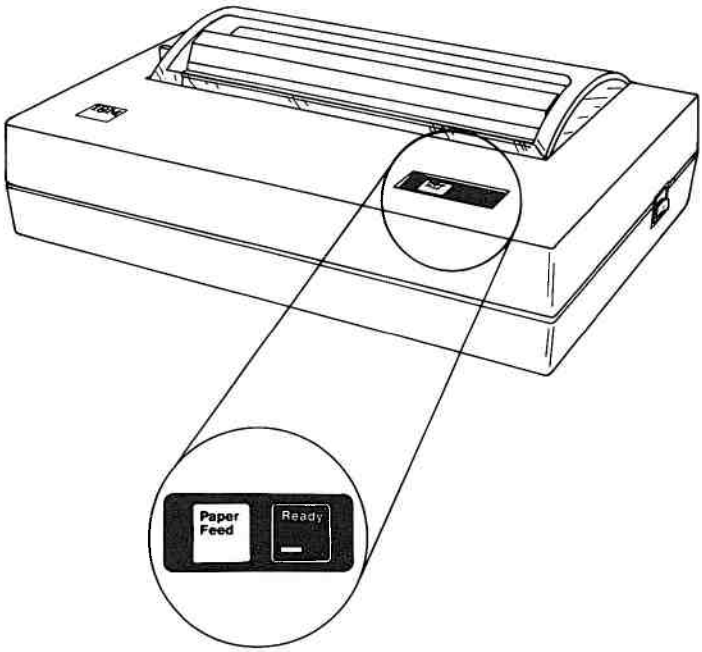
1. Set the printer Power switch to Off.
2. Remove the thermal forms from the printer.
3. Insert a sheet of plain bond paper in the printer.
4. Press and hold the Paper Feed button and set the printer Power switch to On.
5. Allow the printer to operate for the entire sheet of paper, then set the printer Power switch to Off. (No printing occurs on the non-thermal paper.)



CONTINUE

1. Remove the plain bond paper and insert the thermal forms.

2. Press and hold the Paper Feed button and set the printer Power switch to On.



DOES THE PRINTER BEGIN TO PRINT?

YES Go to page 3-3300-2.

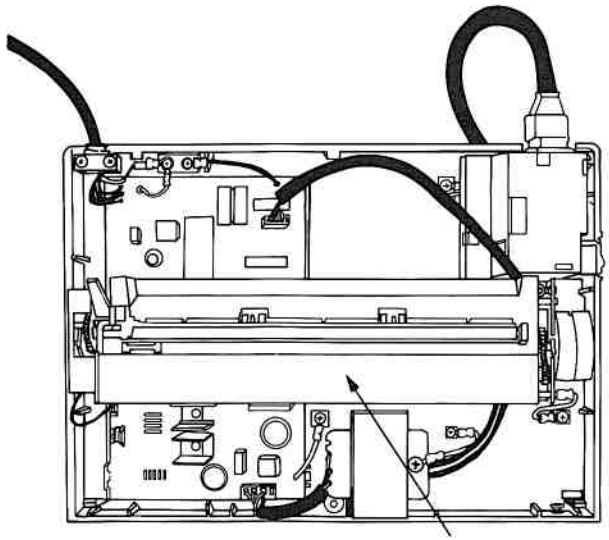
NO

1. Set the printer Power switch to Off.

2. Remove the printer top cover.

3. Inspect the print mechanism for:

   - Weak or broken springs
   - Worn or broken gears
   - Damaged platen



Print Mechanism

ARE ALL PARTS IN GOOD CONDITION?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES

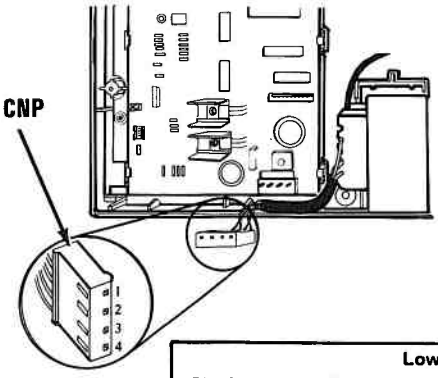
1. Disconnect the CNP connector from the logic card (see Section 5, "Removal/Replacement and Adjustments").

2. Plug the printer power cord into a properly grounded outlet.

3. Set the printer Power switch to On.

DANGER
LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY CARD AND TRANSFORMER ASSEMBLY.

4. Check the CNP connector for the voltages listed below.



			Low Vac	High Vac
Pin 1	to	Pin 2	14.5	16.0
Pin 3	to	Pin 4	9.0	10.5

ARE THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?

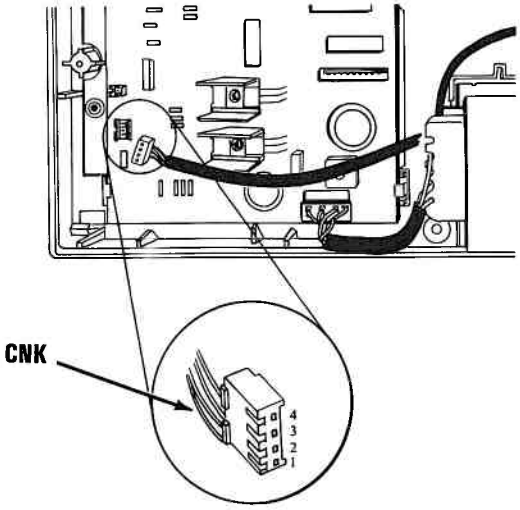
NO Replace the IBM PC Compact Printer.

YES

1. Set the printer Power switch to Off.

2. Disconnect the CNK connector from the logic card (see Section 5, "Removal/Replacement and Adjustments").

3. Refer to the table below and measure the resistances of the CNK connector while pressing and releasing the Paper Feed button.



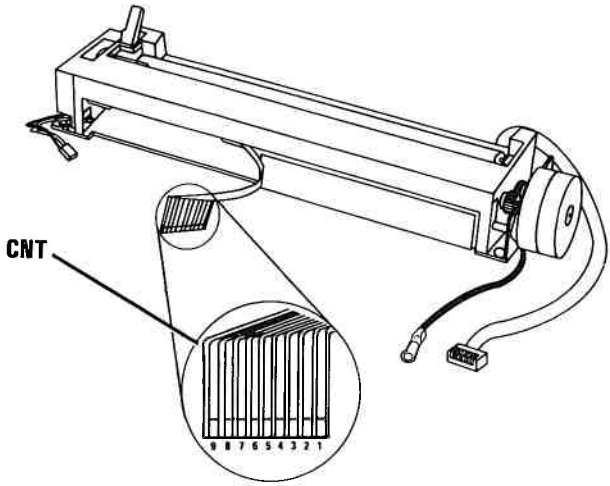
	Low Ohm	High Ohm
Pin 3 to Pin 4 (Pressed)	0	2
Pin 3 to Pin 4 (Released)	∞	

ARE THE RESISTANCES WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the IBM PC Compact Printer.

YES

1. Set the printer Power switch to Off.
2. Disconnect and remove the print mechanism.
3. Refer to the table below and measure the resistances of the CNT connector.



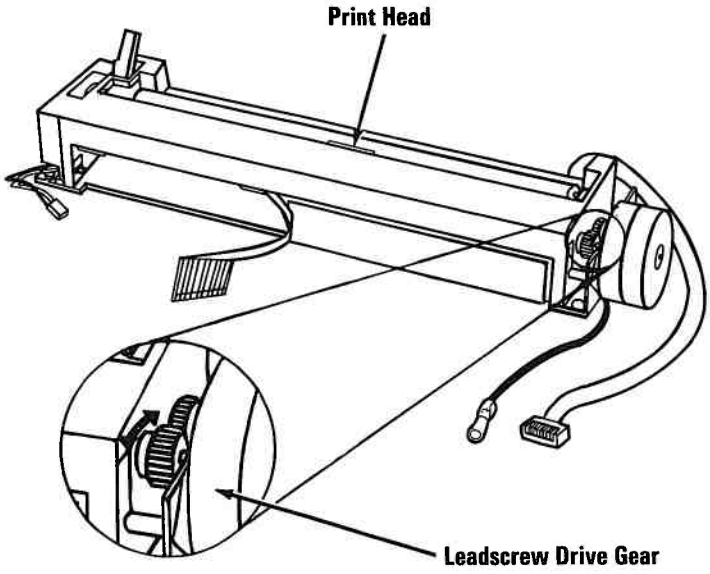
		Low Ohm	High Ohm
Pin 1	to Pin 9	36	50
Pin 2		36	50
Pin 3		36	50
Pin 4		36	50
Pin 5		36	50
Pin 6		36	50
Pin 7		36	50
Pin 8	to Pin 9	36	50

ARE THE RESISTANCES WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES

Rotate the leadscrew drive gear in both directions.



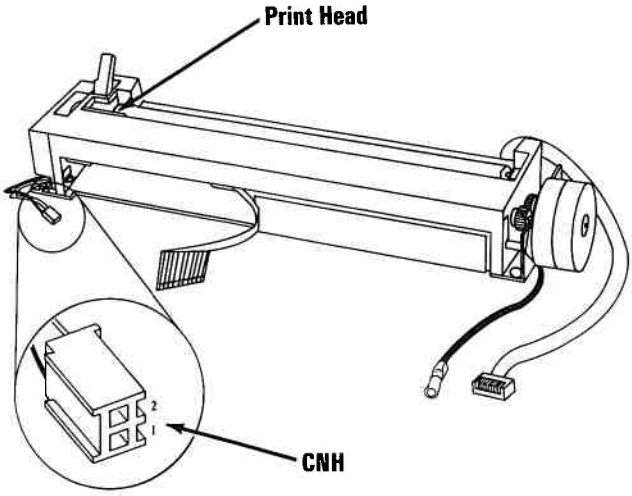
DID THE PRINT HEAD MOVE SMOOTHLY IN BOTH DIRECTIONS?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES

1. Rotate the leadscrew drive gear clockwise to move the print head to the leftmost position.

2. Measure the resistance between pins 1 and 2 of the CNH connector.



			Low Ohm	High Ohm
Pin 1	to	Pin 2	0	2

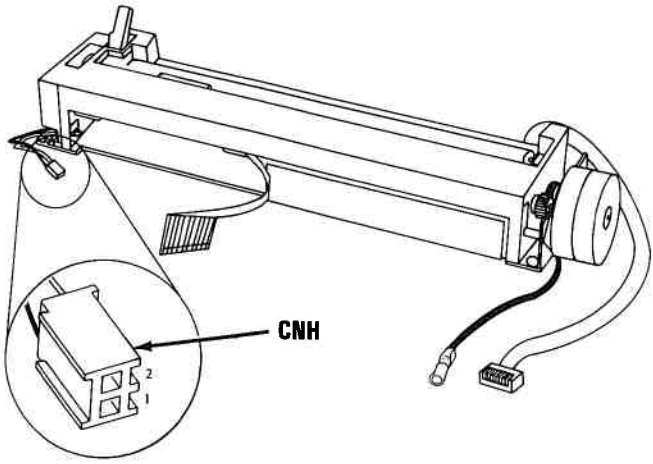
IS THE RESISTANCE WITHIN THE LIMIT SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES

1. Rotate the leadscrew drive gear counterclockwise to move the print head approximately 25 mm (about 1.0 in.) from the left side frame.

2. Measure the resistance between pins 1 and 2 of the CNH connector.



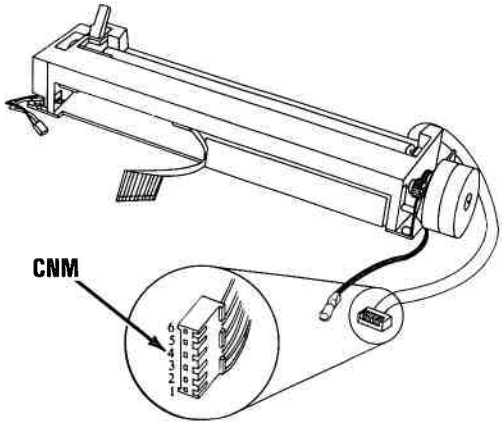
Pin 1	to	Pin 2	∞

DOES THE RESISTANCE REGISTER INFINITY?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES

Refer to the table below and measure the resistances of the CNM connector.



			Low Ohm	High Ohm
Pin 1	to	Pin 3	24	36
Pin 1	to	Pin 5	24	36
Pin 2	to	Pin 4	24	36
Pin 2	to	Pin 6	24	36

ARE THE RESISTANCES WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

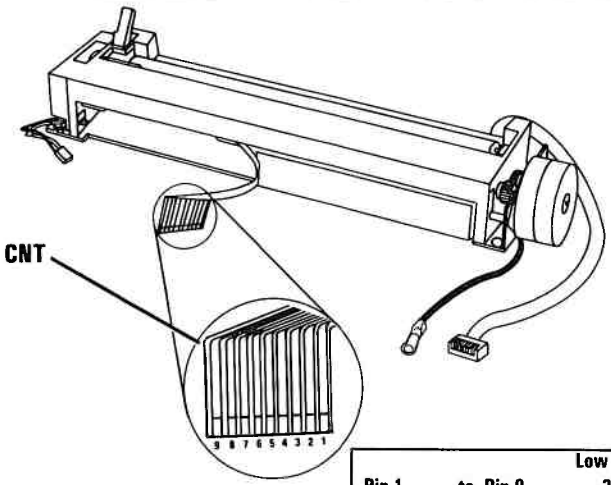
YES Replace the logic card (see Section 5, "Removal/Replacement and Adjustments").

Failure Symptom Table

Failure Symptom	Go To Page
Print Dots (Missing, Extra or Random)	3-3300-21
Erratic Carriage Motion	3-3300-21
Print Quality	3-3300-22
Forms Feeding (Erratic or No Feeding)	3-3300-23

Print Dots or Erratic Carriage Motion

1. Set the printer Power switch to Off.
2. Remove the printer top cover.
3. Disconnect and remove the print mechanism.
4. Refer to the table below and measure the resistances of the CNT connector.



		Low Ohm	High Ohm
Pin 1	to Pin 9	36	50
Pin 2		36	50
Pin 3		36	50
Pin 4		36	50
Pin 5		36	50
Pin 6		36	50
Pin 7		36	50
Pin 8	to Pin 9	36	50

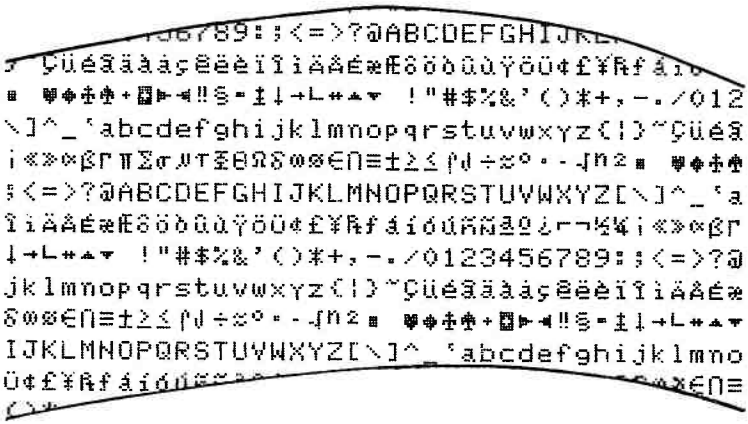
ARE THE RESISTANCES WITHIN THE LIMITS SHOWN IN THE TABLE?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES Replace the logic card (see Section 5, "Removal/Replacement and Adjustments").

Print Quality

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set the printer Power switch to Off.
3. Disconnect the Printer Cable from the primary Asynchronous Communications Adapter.
4. Replace the forms in your printer with new ones.
5. Press and hold the Paper Feed button and set the printer Power switch to On. (This starts the printer self test. To stop the test, set the printer Power switch to Off.)



IS THE PRINT QUALITY STILL A PROBLEM?

NO You have corrected the problem.

YES Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

Forms Feeding

Inspect the forms path for any obstructions.

> **Note:** Forms must be parallel to the sides of the printer to advance properly.

WERE THERE ANY OBSTRUCTIONS?

NO Replace the print mechanism (see Section 5, "Removal/Replacement and Adjustments").

YES Remove the obstructions.

You have finished the IBM PC Compact Printer PIC successfully. If you still have an unsolved problem, request technical assistance.

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SECTION 4. LOCATIONS

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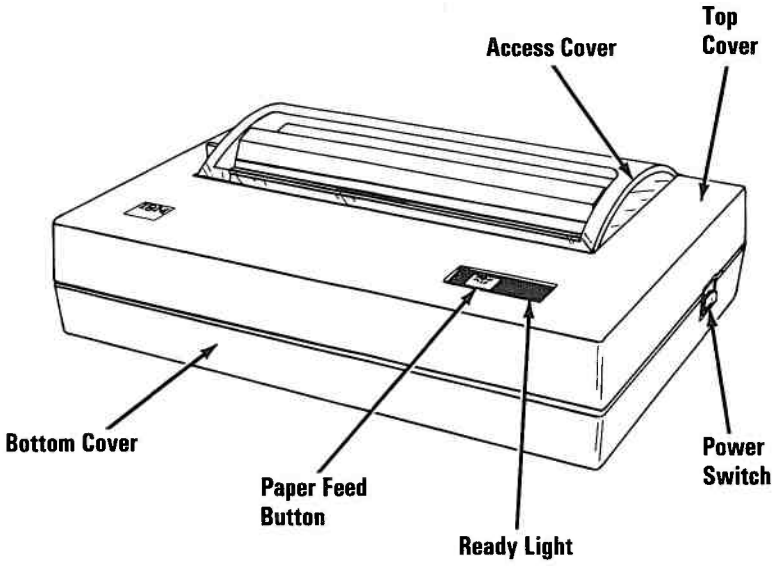
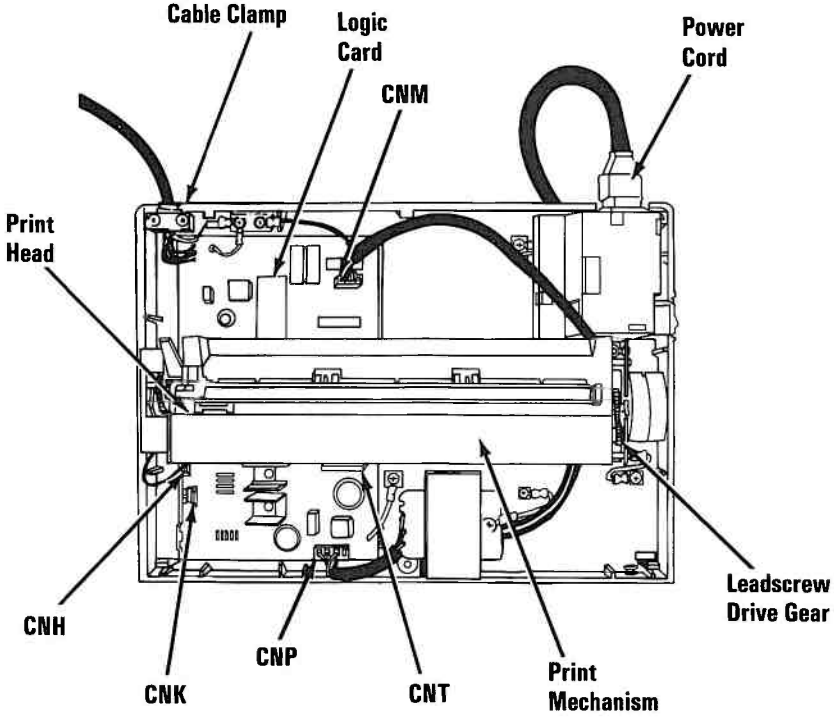
Compact Printer

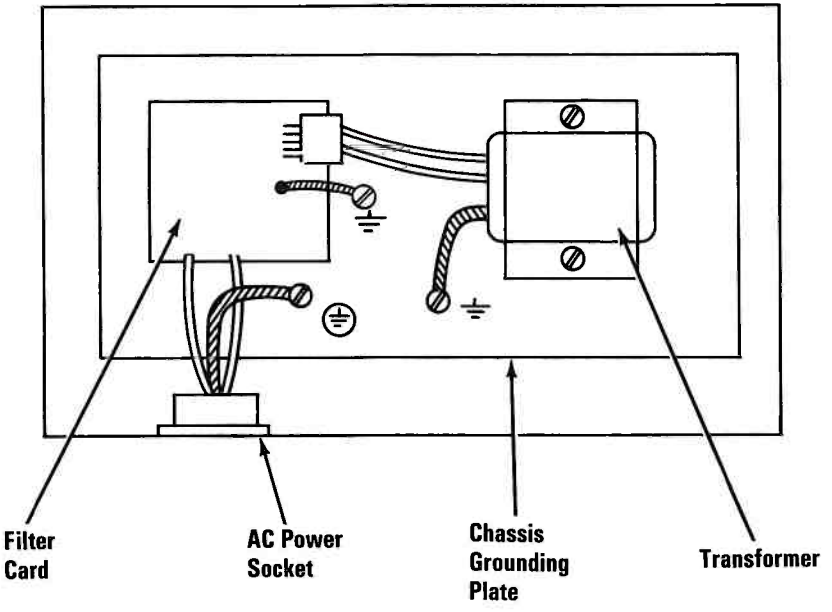


Compact Printer



Safety Ground Locations

110/120/220/240 Vac



IBM PC Compact Printer

Legend

Screw Connection	Primary Ground
Ground Lead	Chassis Ground

Compact Printer

Notes:

SECTION 5. REMOVALS, REPLACEMENTS, AND ADJUSTMENTS

Contents

Notes:

Introduction

To use this section, locate the assembly you are servicing in the table of contents. Each removal, replacement, or adjustment for a field replaceable unit (FRU) is identified by a reference number. Reference numbers are located in the upper left hand corner of each page.

> **Note:** Usually there is a separate number for both the removal and the replacement procedure for each FRU .

When a step is explained fully by another procedure, you can refer back to that procedure by using the reference number in parenthesis. For example:

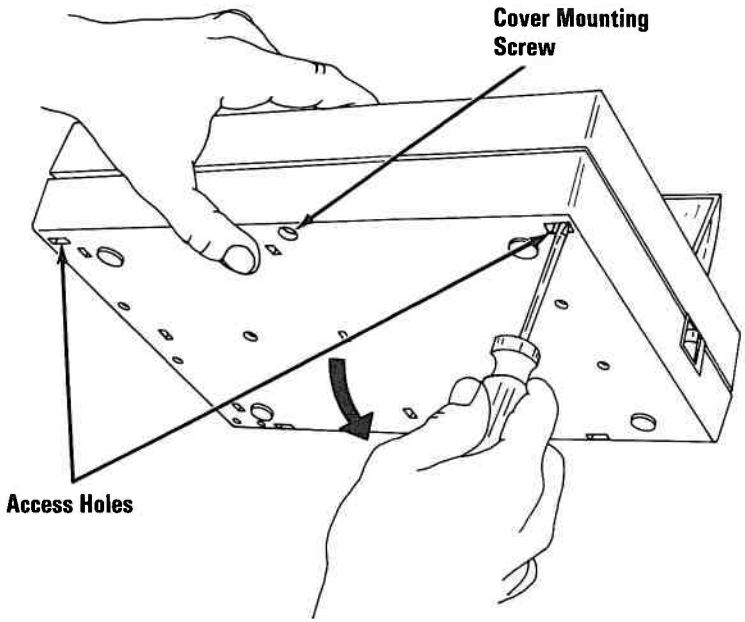
1. Set the printer Power switch to Off.
2. Unplug the power cable from the wall outlet.
3. Remove the printer top cover **(6000)**.

In the example, Step 3 refers you to procedure **6000** for instructions on removing the printer top cover.

Compact Printer

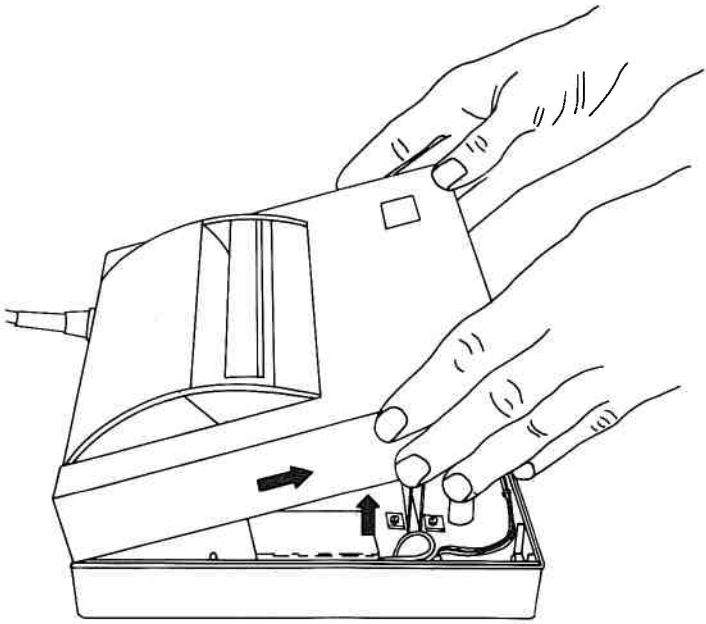
Top Cover Removal 6000

1. Set the printer Power switch to Off.
2. Unplug the power cord from the outlet and the rear of the printer.
3. Remove any paper.
4. Tilt the printer up and remove the cover mounting screw.
5. Insert a flat-blade screwdriver through one of the two access holes in the bottom cover.
6. Gently press down on the screwdriver and begin to separate the covers. Then repeat on the other side.
7. Return the printer to its operating position.

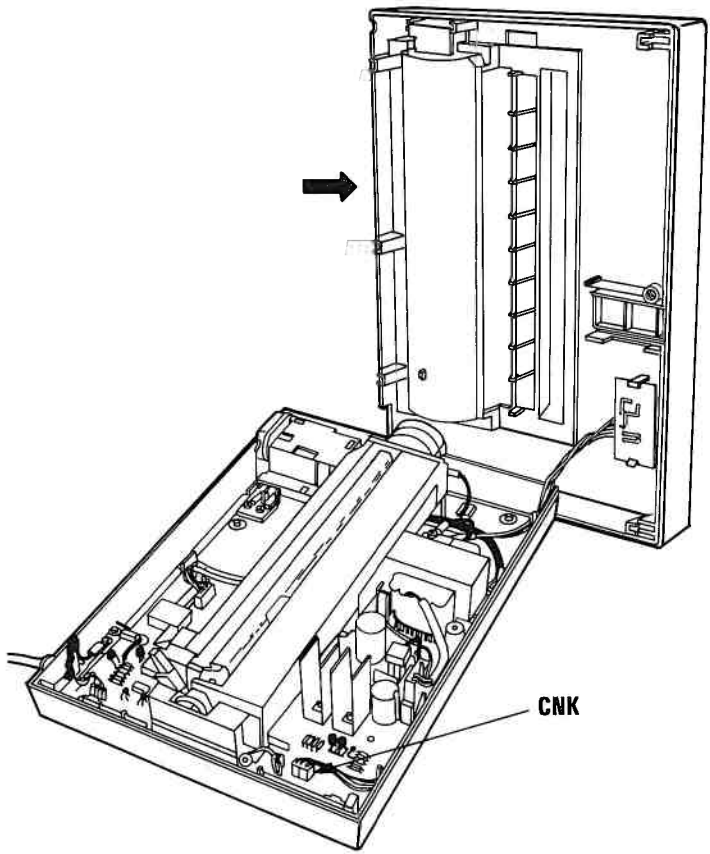


8. Lift the front of the top cover and slide it toward the front of the printer to separate it from the bottom cover.

Note: The control panel is attached by a cable inside the printer. Notice how the cable is routed so you can reinstall it correctly.

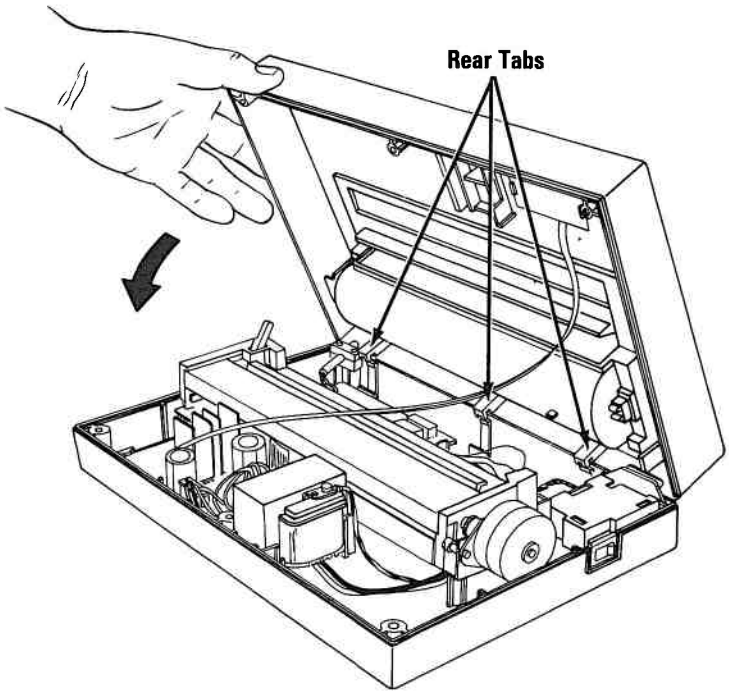


9. When the covers are separated, set the top cover aside and disconnect the CNK connector (control panel cable) from the logic card.



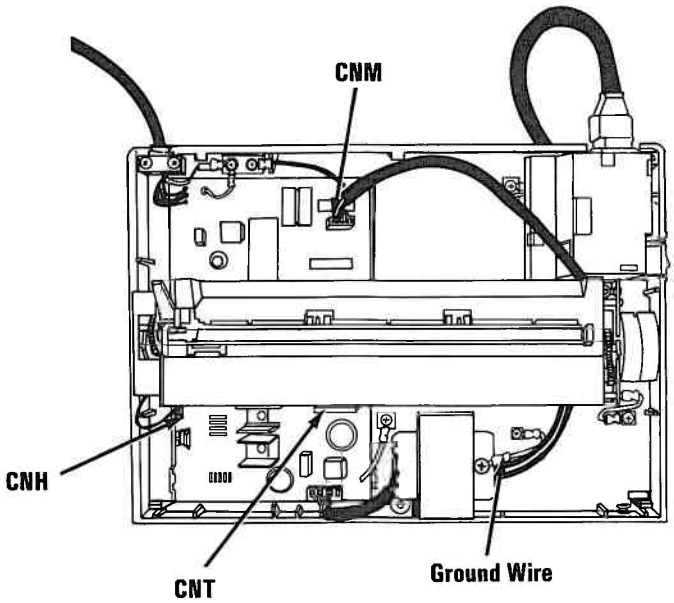
Top Cover Replacement 6001

1. Connect the CNK connector (control panel cable).
2. Place the rear of the top cover on the bottom cover, with the three rear tabs under their latches.
3. Pivot the top cover down until it closes securely.
4. Tilt the printer up and install the cover mounting screw.
5. Connect the power cord to the printer.

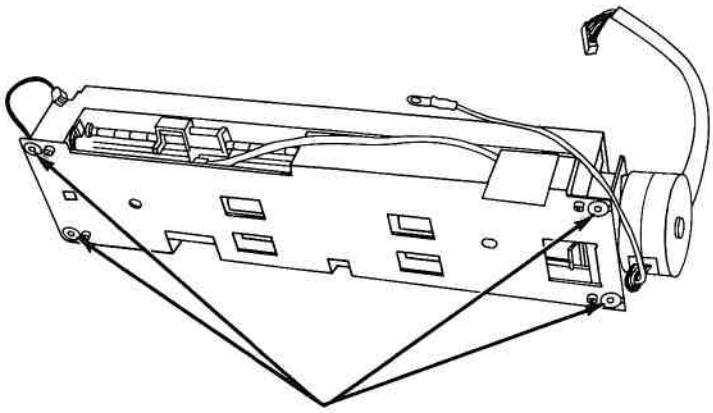


Print Mechanism Removal 6010

1. Set the printer Power switch to Off.
2. Unplug the power cable from the wall outlet.
3. Remove the printer top cover **(6000)**.
4. Disconnect the CNH and CNM connectors from the logic card.
5. Lift the print mechanism slightly and disconnect the CNT connector from the logic card.
6. Remove the ground wire from the grounding plate and lift the print mechanism from the bottom cover.



1. Ensure that the rubber mounting grommets are in place, as shown.



Rubber Mounting Grommets

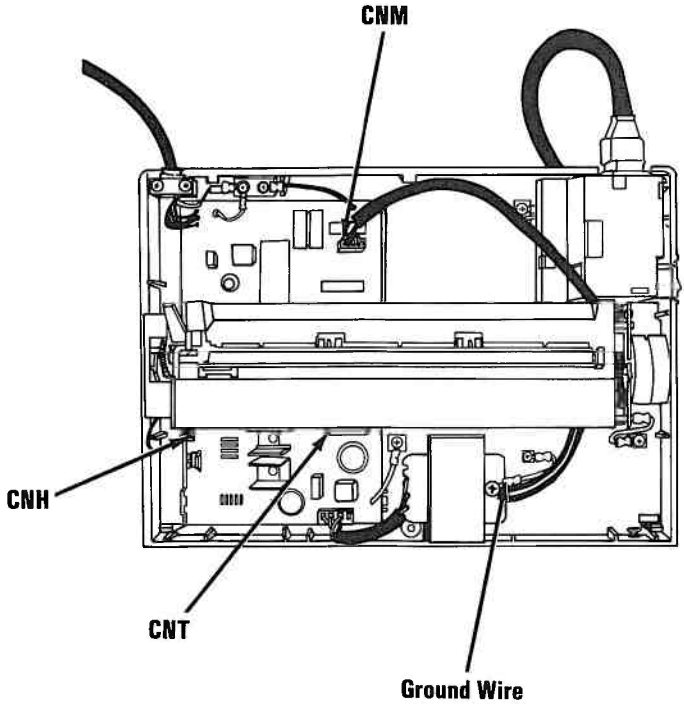
2. Place the print mechanism on its four mounting studs.

3. Connect the CNH, CNM, and CNT connectors to the logic card.

4. Connect the ground wire to the transformer.

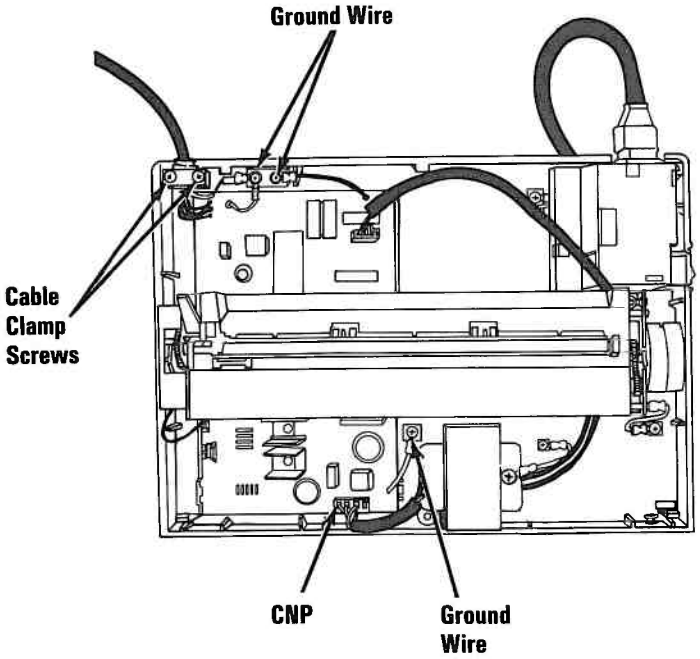
5. Install the top cover **(6001)**.

6. Connect the power cord to the printer.

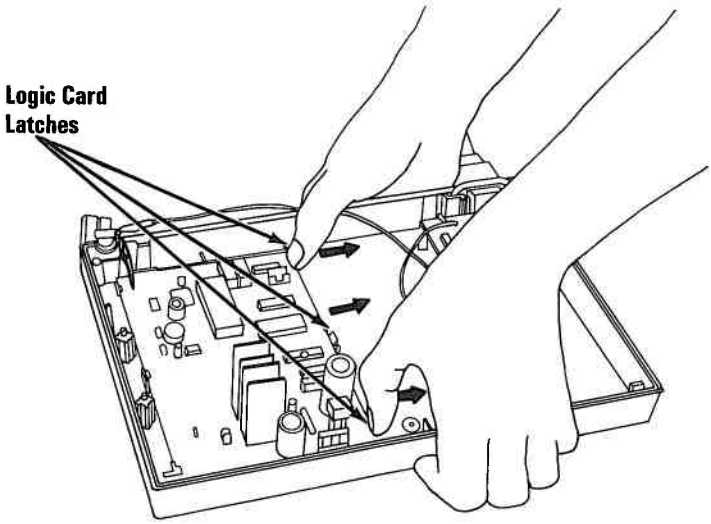


Logic Card Removal 6020

1. Set the printer Power switch to Off.
2. Unplug the power cord from the outlet.
3. Remove the printer top cover **(6000)**.
4. Remove the print mechanism **(6010)**.
5. Disconnect the CNP connector.
6. Remove the two screws from the clamp on the signal cable.
7. Remove the ground wire screws from the logic card.

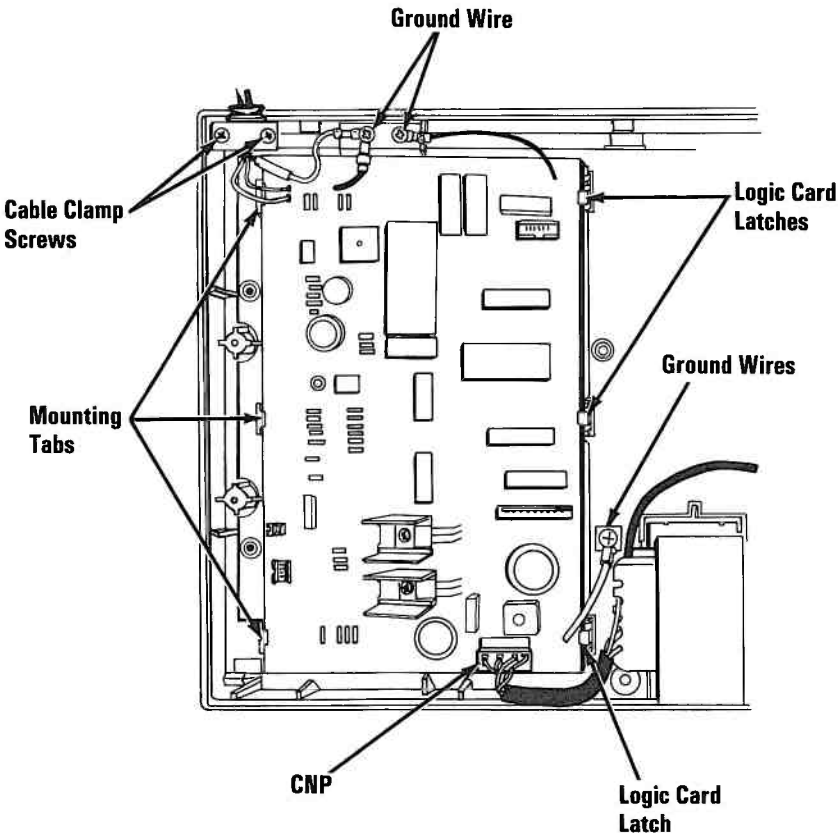


8. Press the three logic card latches away from the logic card, then lift the card out of the bottom cover.



Logic Card Replacement 6021

1. Slide the logic card into its three left-hand mounting tabs.
2. Gently push down on the right side of the logic card until the three logic card latches snap into place.
3. Install the two screws through the clamp on the signal cable and tighten the screws into the bottom cover.
4. Install the logic card ground wires and their screws.
5. Connect the CNP connector.
6. Install the print mechanism **(6011)**
7. Install the top cover **(6001)**.



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SECTION 6. PARTS CATALOG

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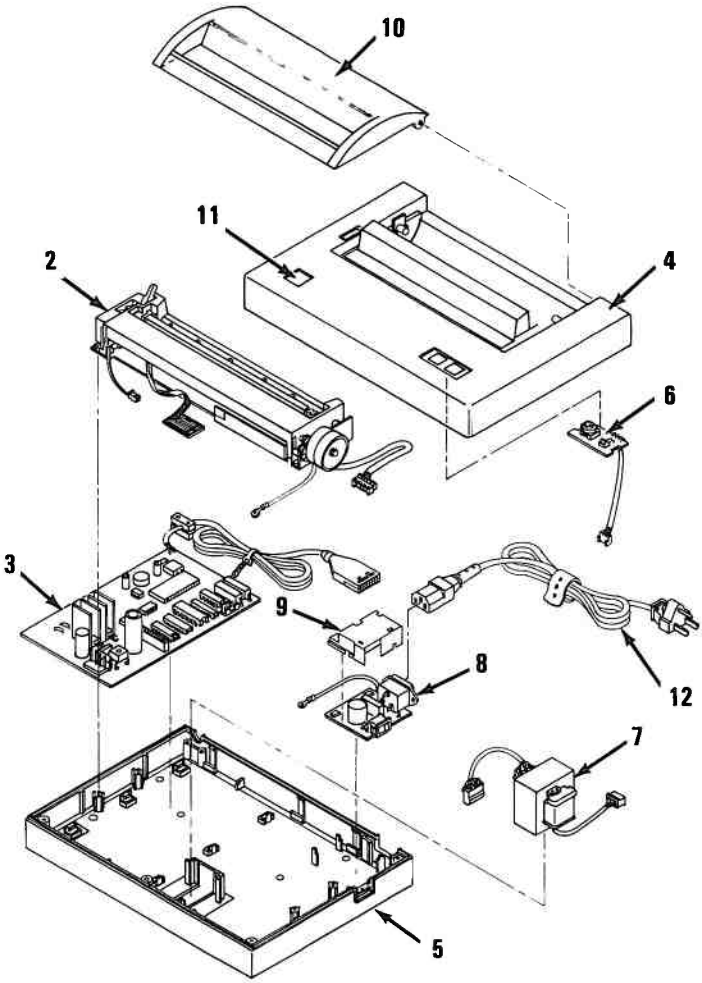
Compact Printer

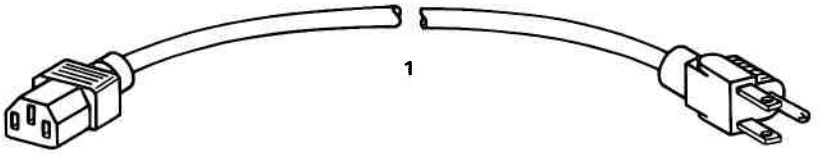


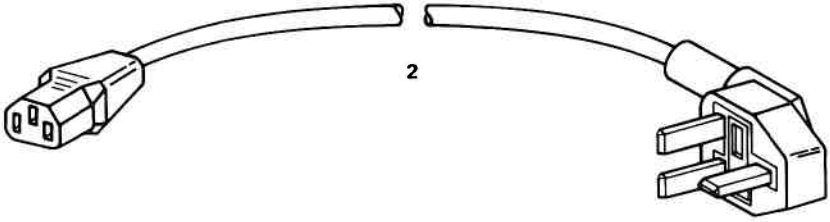
Compact Printer

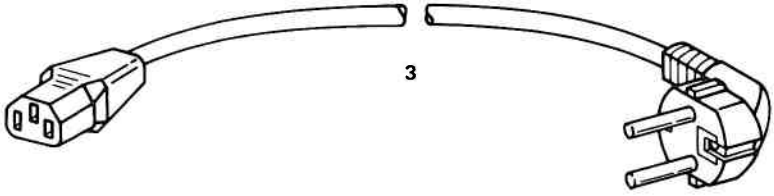
Major Unit Code	Index No.	Part Number	Description
555	1	8654411	Printer Assembly, 120 Volt
555	1	8286109	Printer Assembly, 100 - 110 Volt
555	1	8286110	Printer Assembly, 200 Volt
555	1	8286111	Printer Assembly, 220 - 240 Volt
551	2	8654409	Print Mechanism
318	3	8654407	Logic card
000	4	8654403*	Top Cover
000	5	8654404*	Bottom Cover
552	6	8654405*	Control Card
600	7	8654406*	Power Transformer, 120 Volt
600	7	6323448*	Power Transformer, 100 - 110 Volt
600	7	6323449*	Power Transformer, 200 Volt
600	7	6323450*	Power Transformer 220 - 240 Volt
600	8	8654408*	Power Supply Card
600	9	6323447*	Safety Cover
553	10	8654410*	Access Cover
000		8529186	Label Kit - Consisting of - Nameplate Logo Front Warning Label Interior FCC Label
600	12		Power Cord (Detachable)**

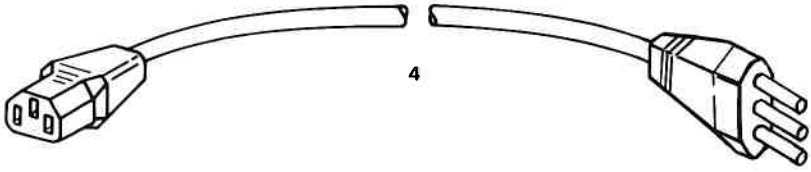
* Restricted Availability
**See Power Cord Parts list for the proper power cord certified for your country.

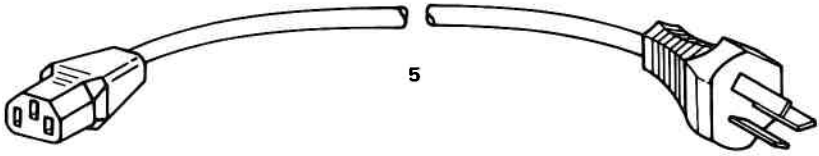
Power Cords











Power Cords

Major Unit Code	Index No.	Part Number	Description
600	1	8286120	Power Cord U.S.*
			Power Cord Venezuela*
			Power Cord Colombia*
600	2	8529341	Power Cord U.K.*
			Power Cord Hong Kong*
			Power Cord Singapore*
600	3	8529281	Power Cord Germany*
			Power Cord France *
			Power Cord Spain*
600	4	8529282	Power Cord Italy*
600	5	8529284	Power Cord Australia*
			Power Cord New Zealand*

* Use only the proper Power Cord certified for your country.

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