Personal Computer Hardware Reference Library

Hardware Maintenance and Service

Volume 2

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Hardware Maintenance and Service

Volume 2

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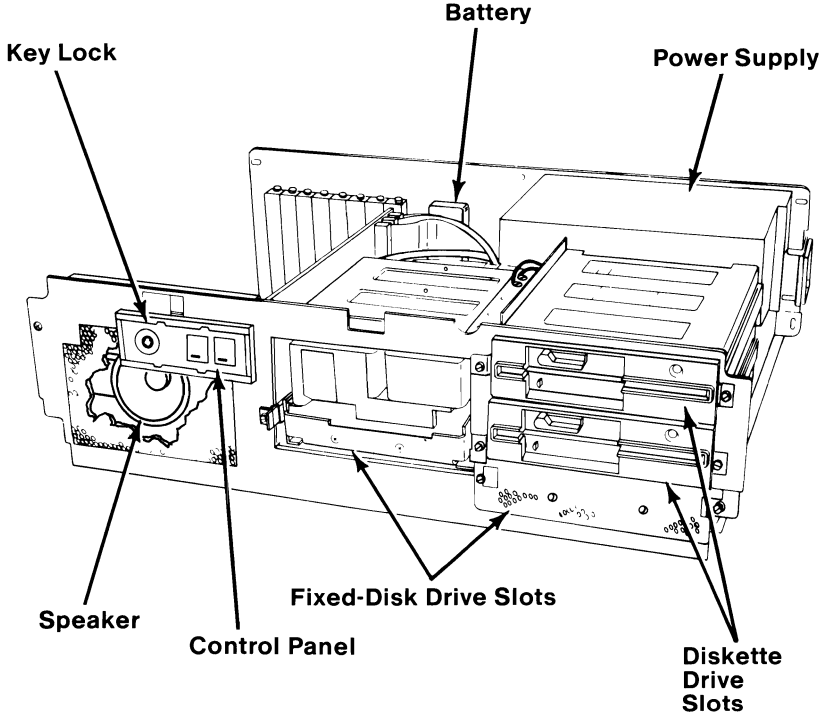
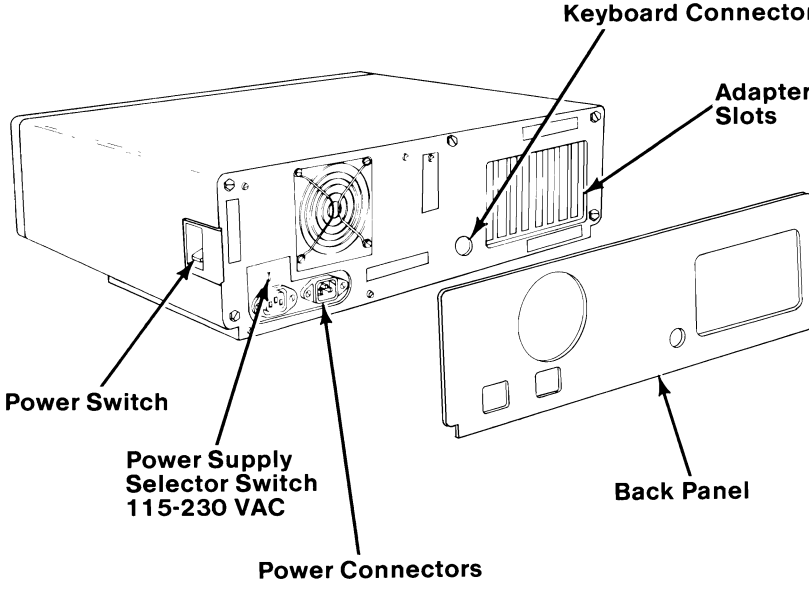
System Unit

Front View



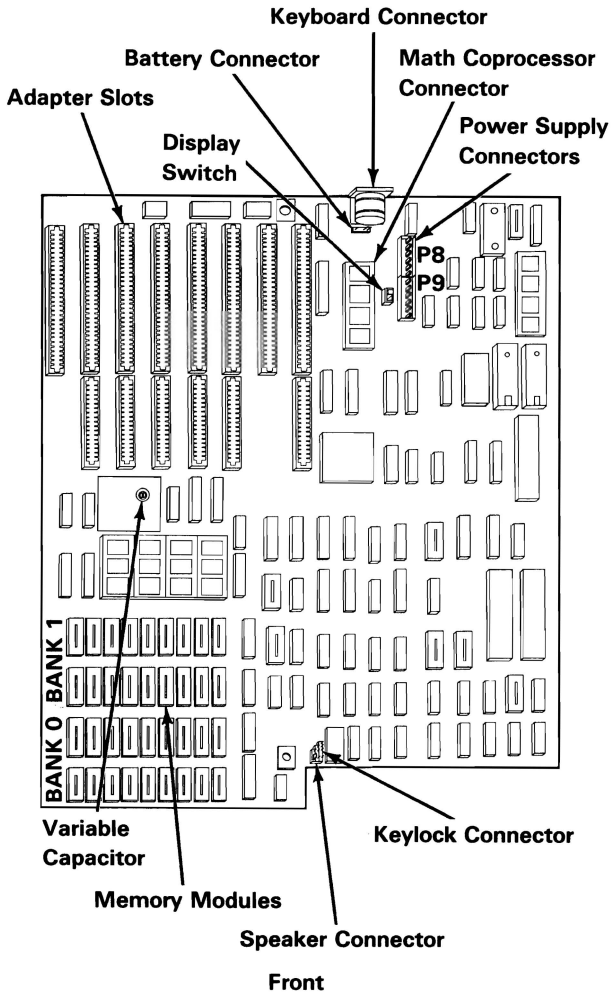
Rear View


Keyboard Connector
Adapter Slots
Power Switch
Power Supply Selector Switch 115-230 VAC
Power Connectors
Back Panel

System Board, Type 1

Notes:

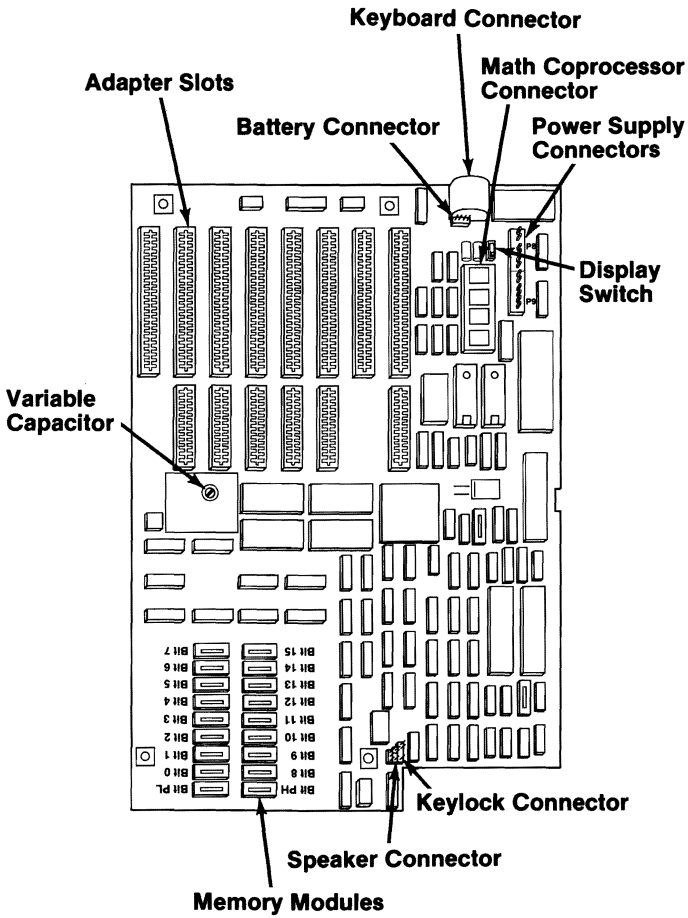
1. All memory modules on this system board are 128Kb RAM modules.
2. With two rows of memory modules installed the system board is populated to 256Kb.
3. With four rows of memory modules installed the system board is populated to 512Kb.



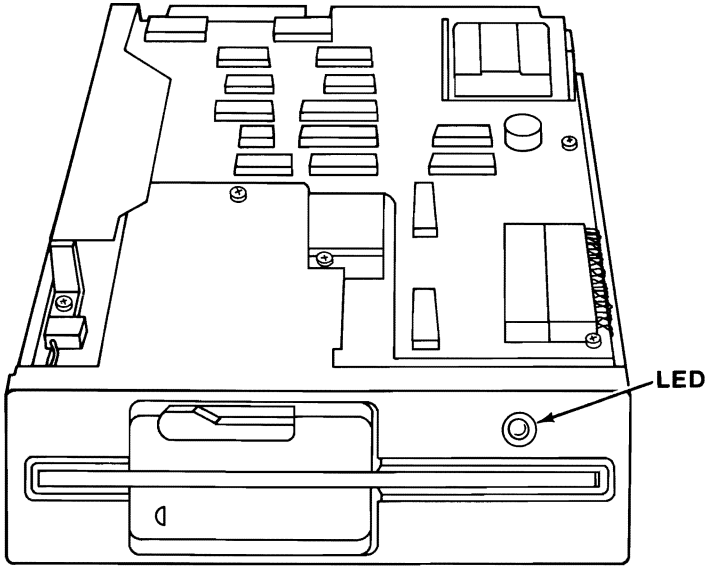
System Board, Type 2

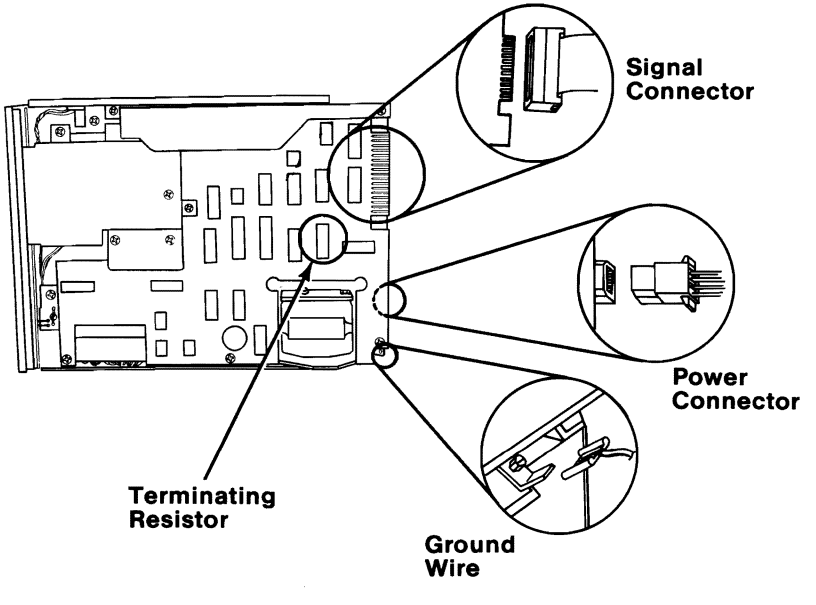
Notes:

1. All memory modules on this system board are 256Kb RAM modules.
2. Type 2 system boards have 512Kb of Base Memory installed on the system board.



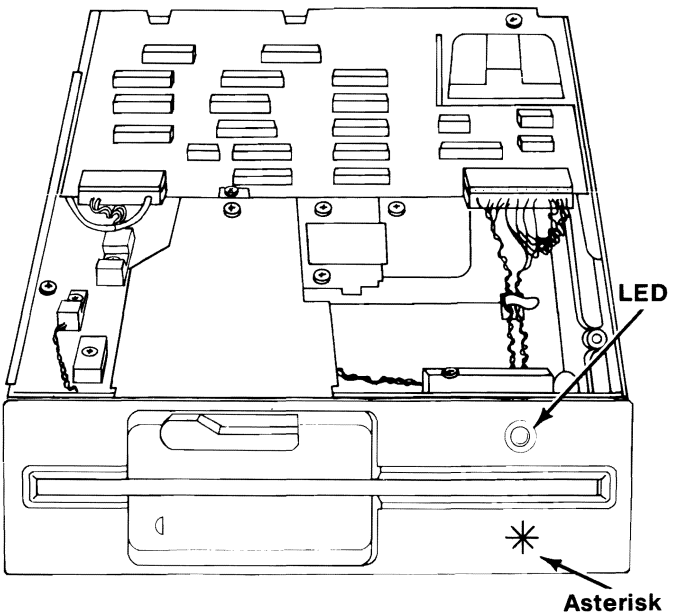
High Capacity Diskette Drive

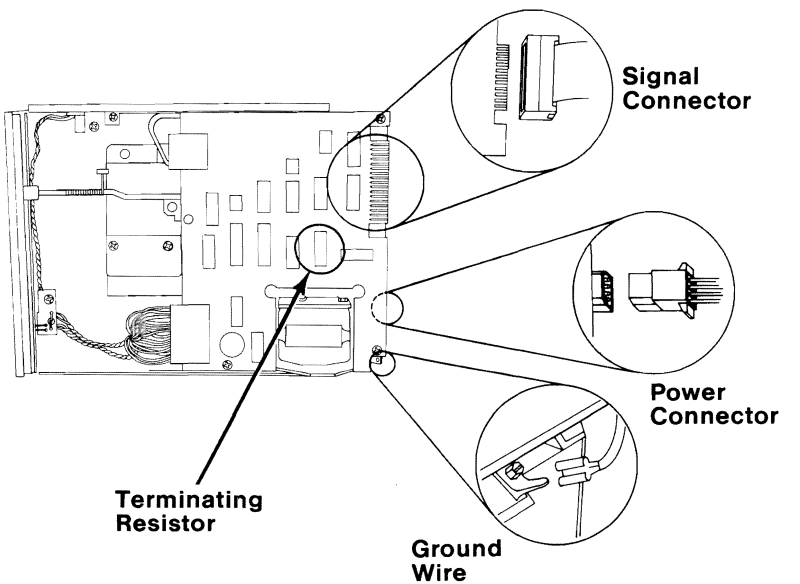




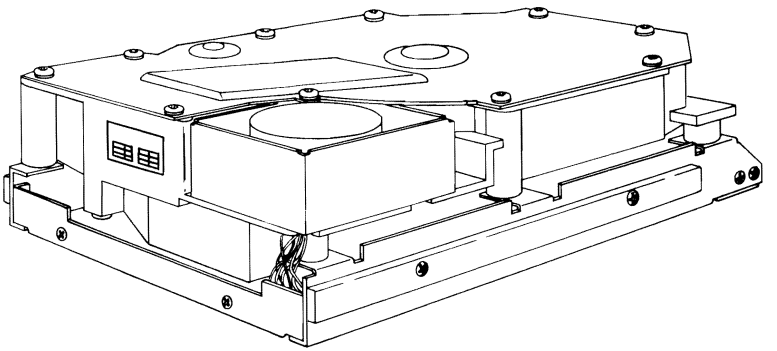
Notes:

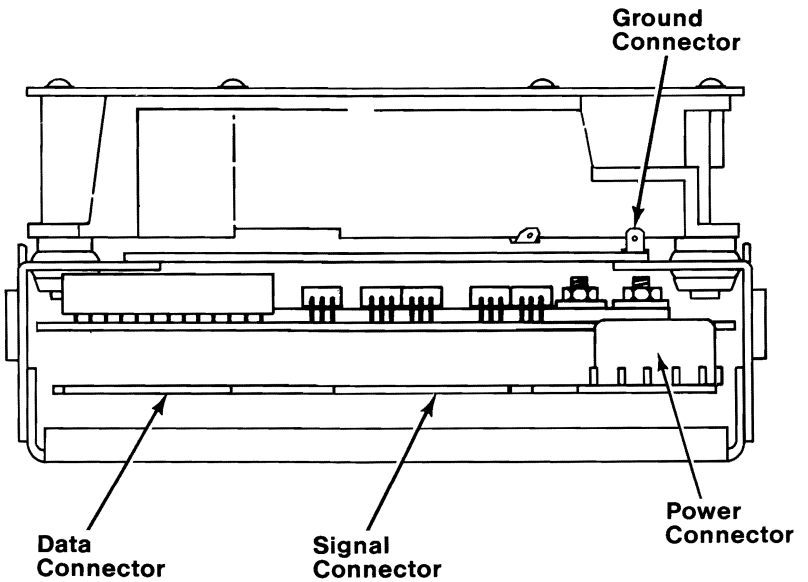
Double Sided Diskette Drive





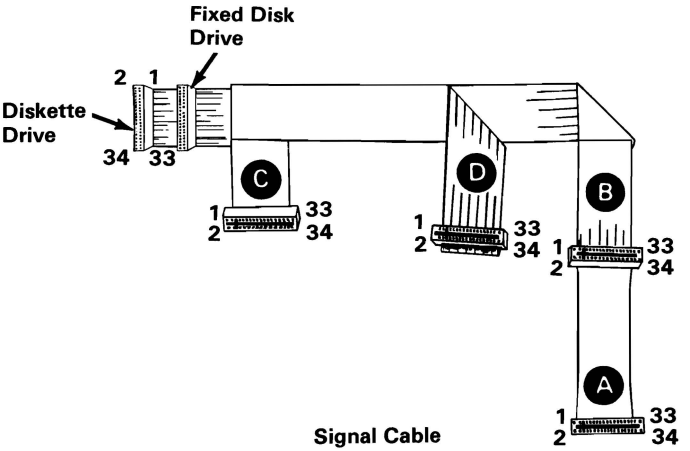
Fixed Disk Drive





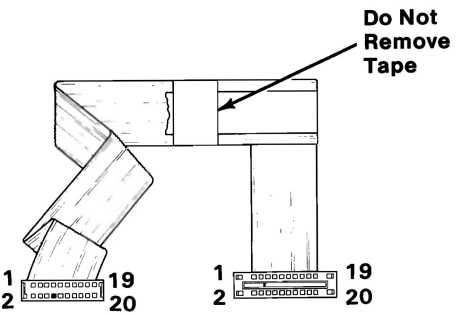
Rear View

Fixed Disk and Diskette Drive Signal Cable



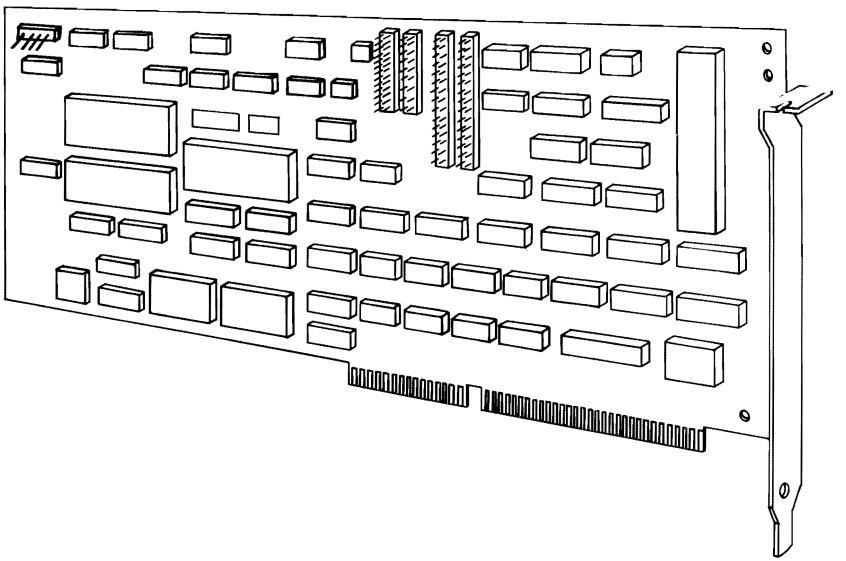
Signal Cable

Fixed Disk Drive Data Cable

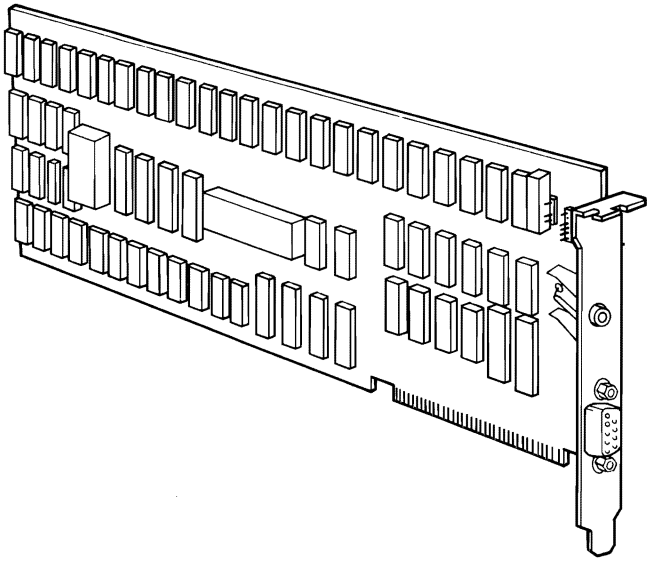


Data Cable

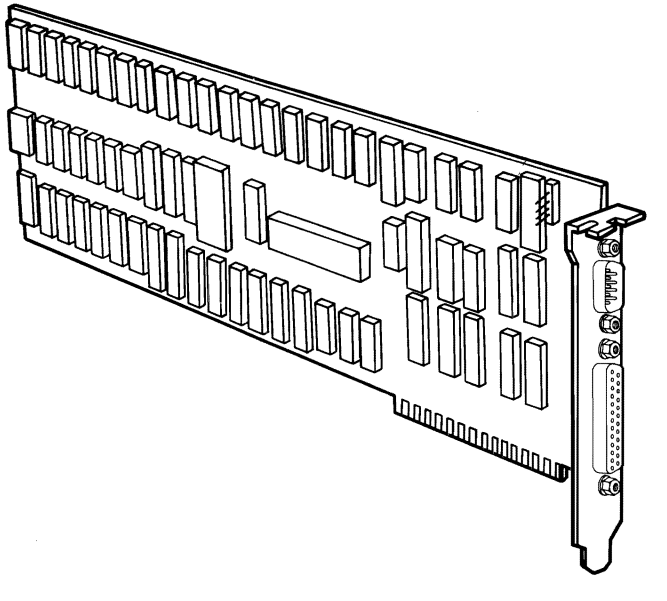
Fixed Disk and Diskette Drive Adapter



Color/Graphics Monitor Adapter

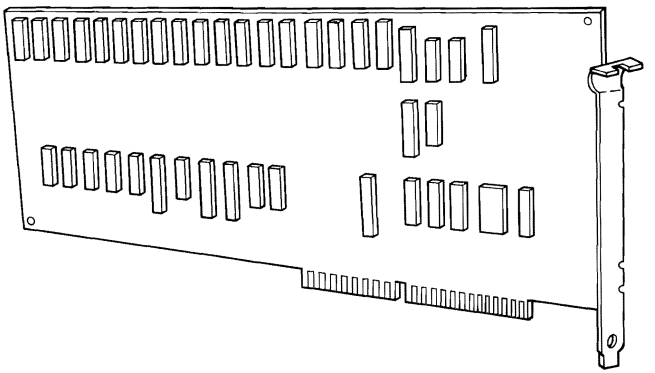


Monochrome Display and Printer Adapter



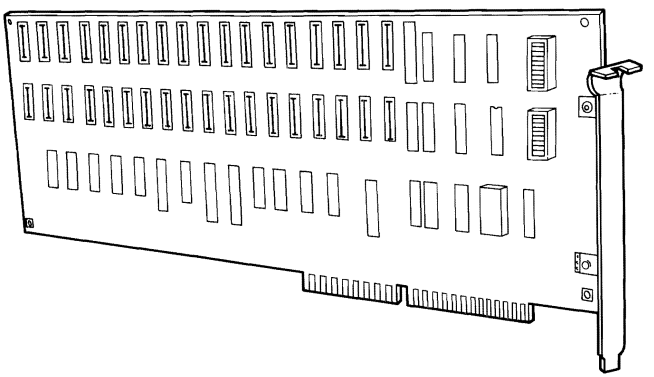
128Kb Memory Expansion Adapter

Note: The memory modules on this adapter are 64Kb RAM Modules.

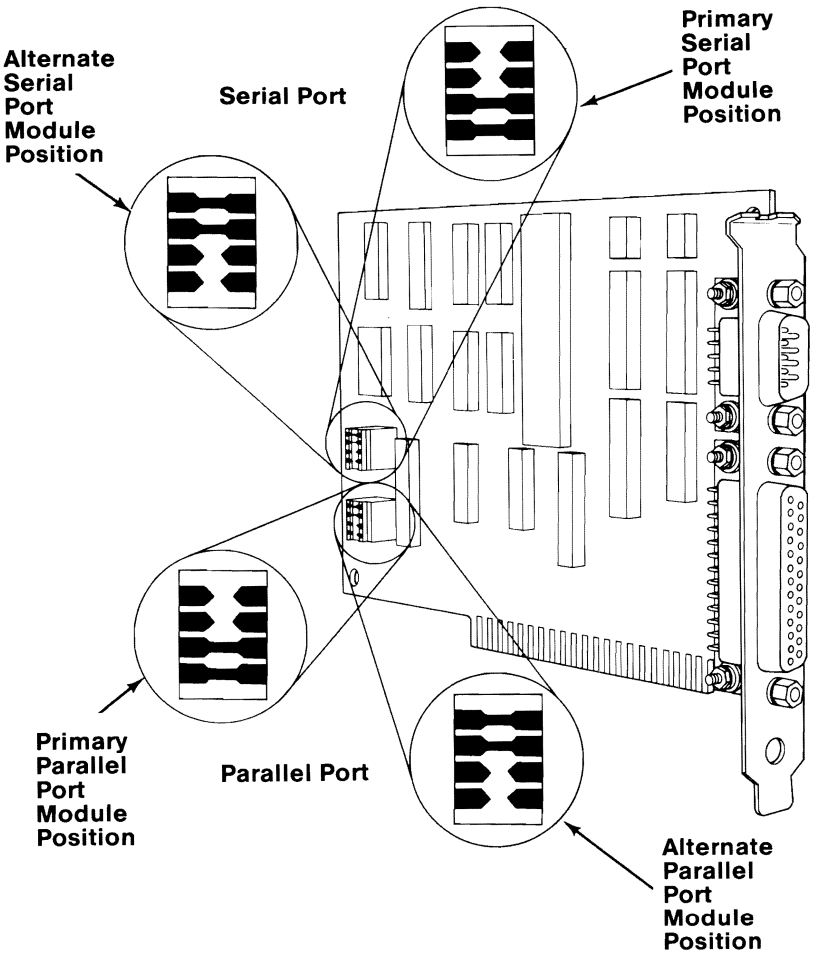


512Kb Memory Expansion Adapter

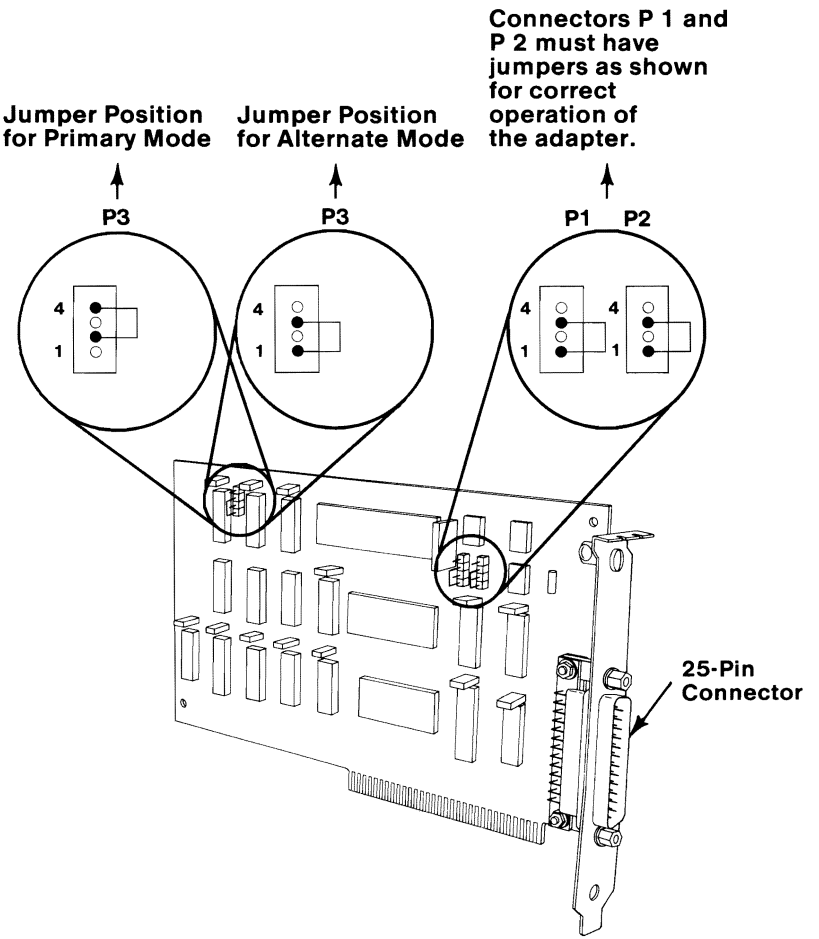
Note: The memory modules on this adapter are 128Kb RAM Modules.



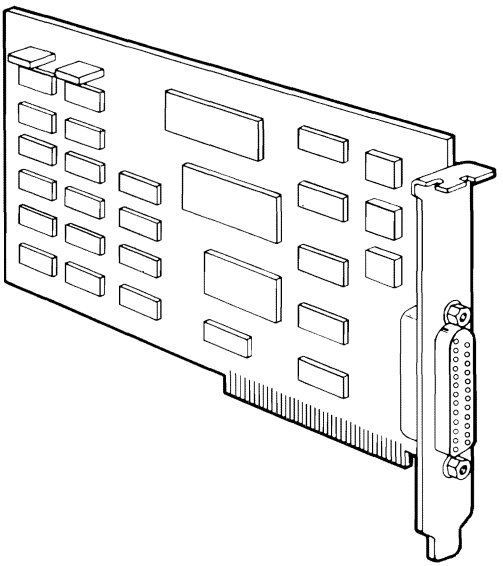
Serial/Parallel Adapter



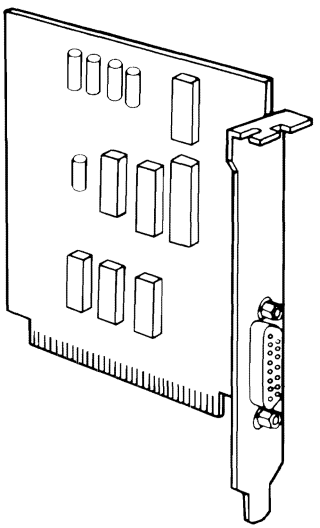
Binary Synchronous Communications Adapter



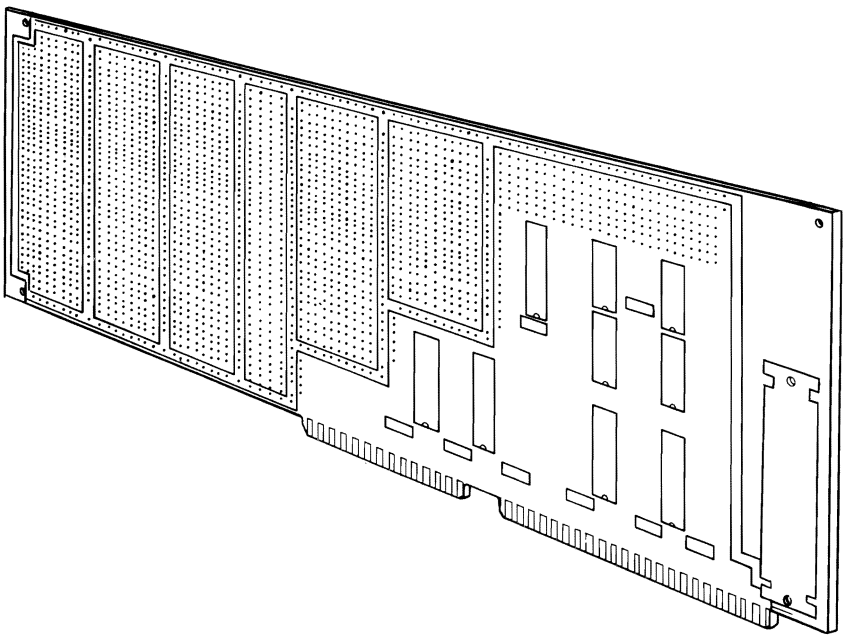
Synchronous Data Link Communications Adapter



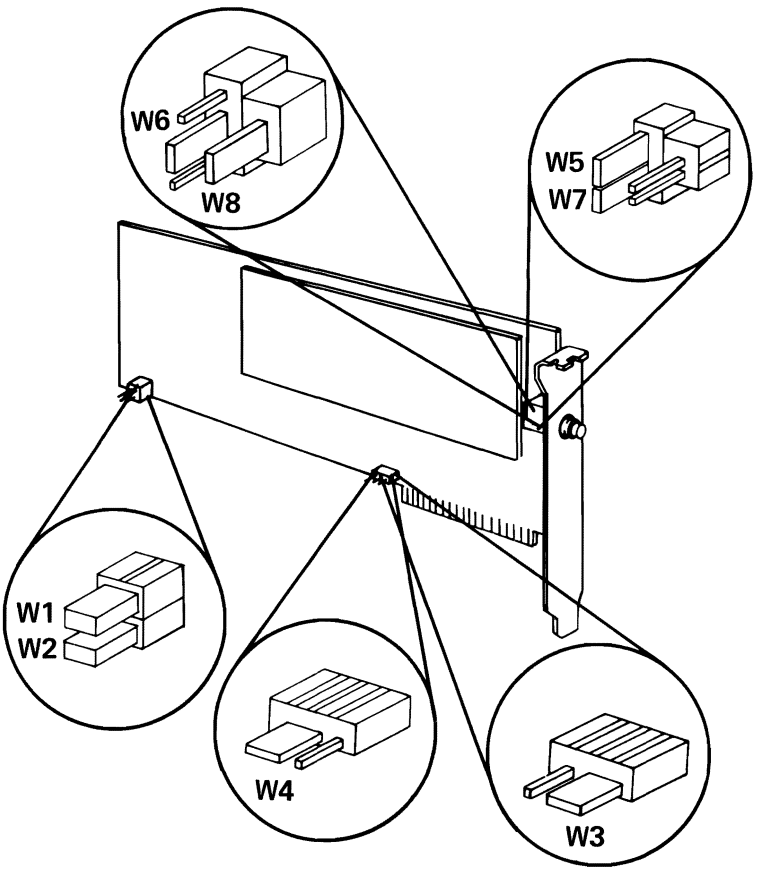
Game Control Adapter



Prototype Adapter



PC Network Adapter



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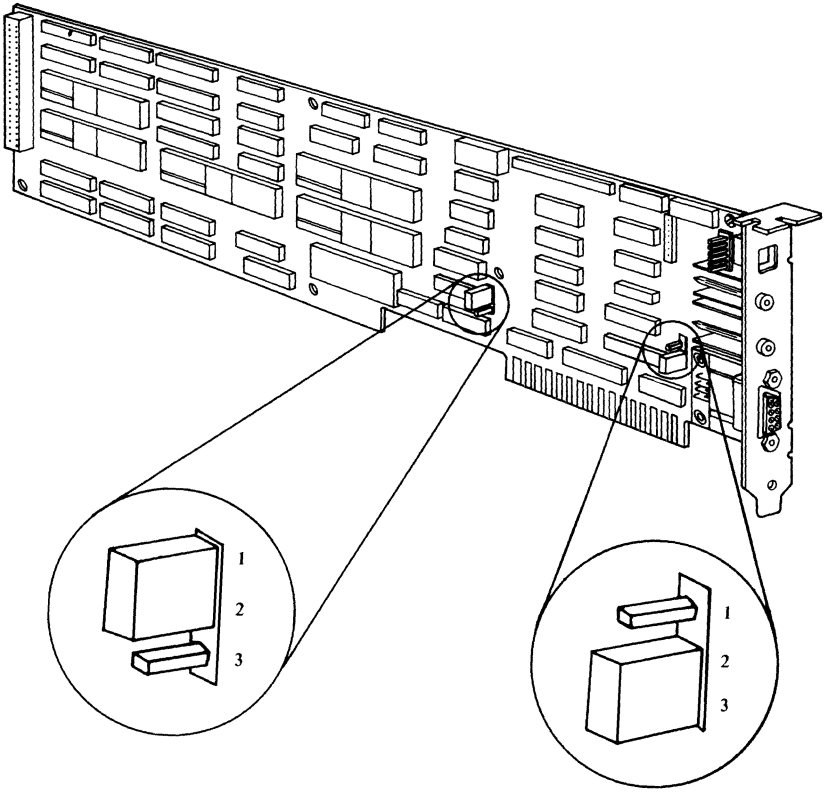
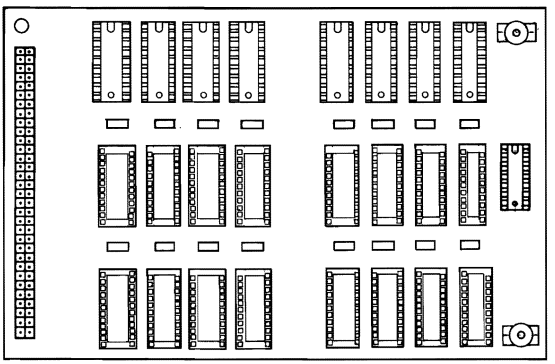
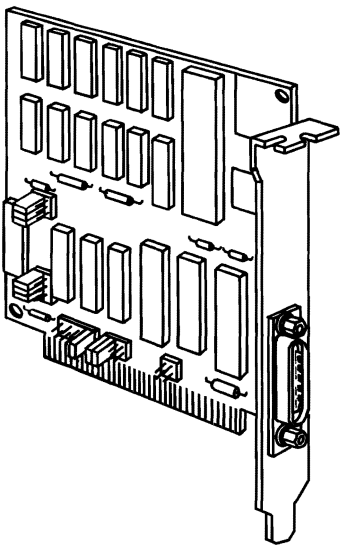


Enhanced Graphics Adapter



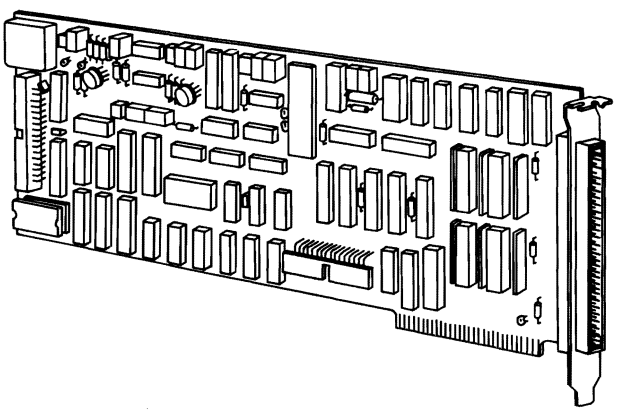
Graphics Memory Expansion Card

General Purpose Interface Bus Adapter



Note: See Section 6 for jumper information.

Data Acquisition Adapter



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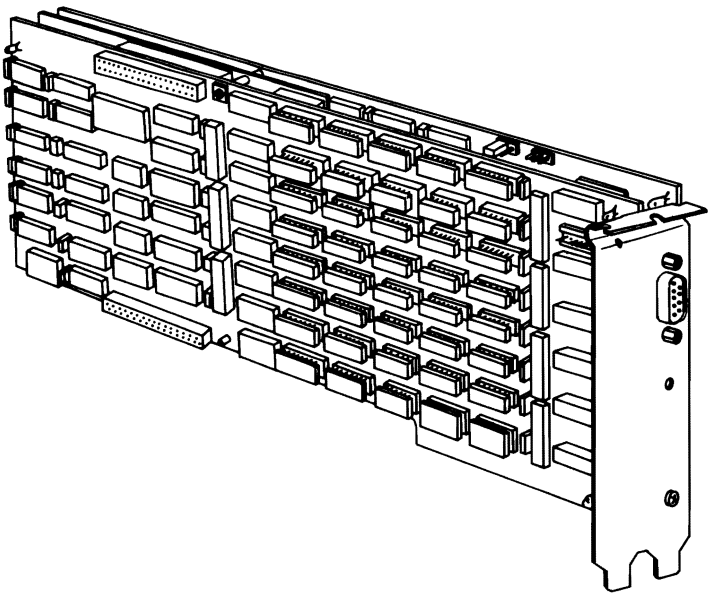
Professional Graphics Controller



Note: See Section 6 for jumper information.

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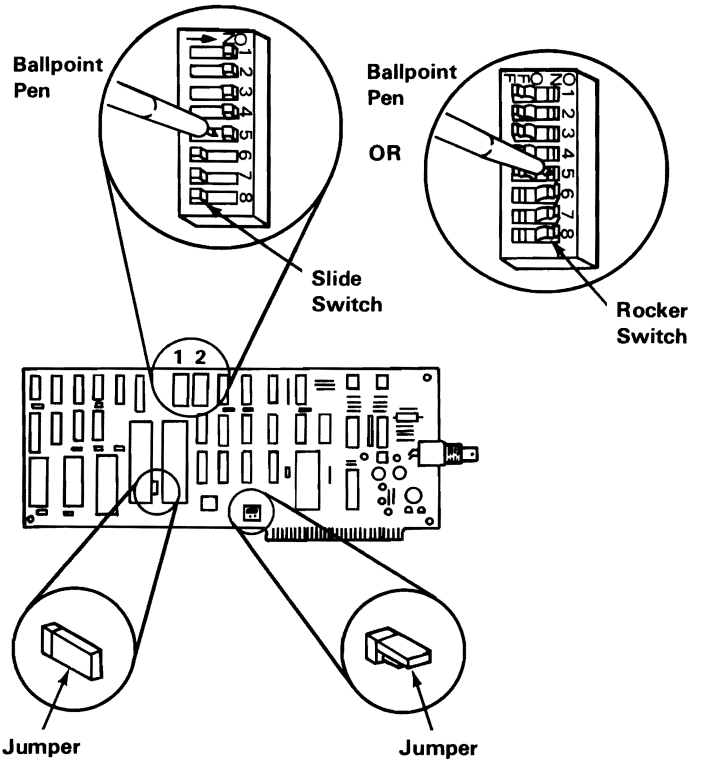
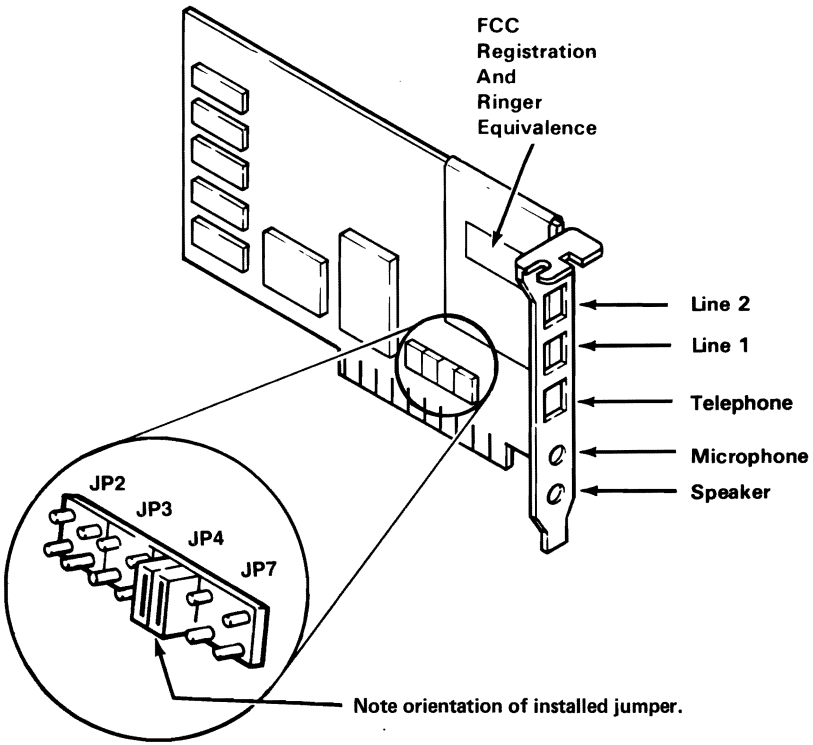
Cluster Adapter



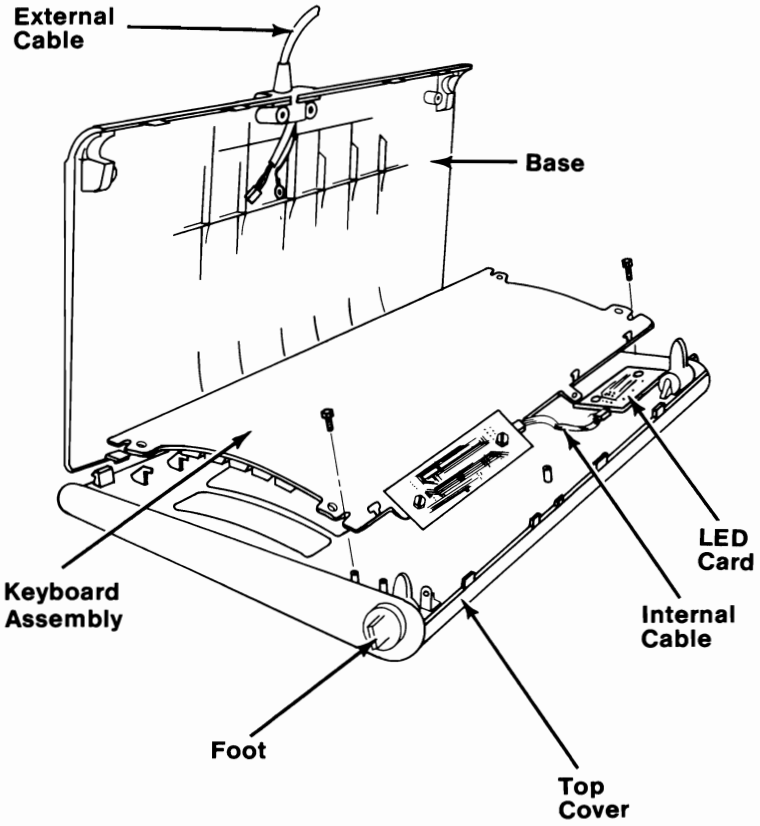
Note: Set a rocker switch by pressing the rocker down to the desired position.

Voice Communications Adapter

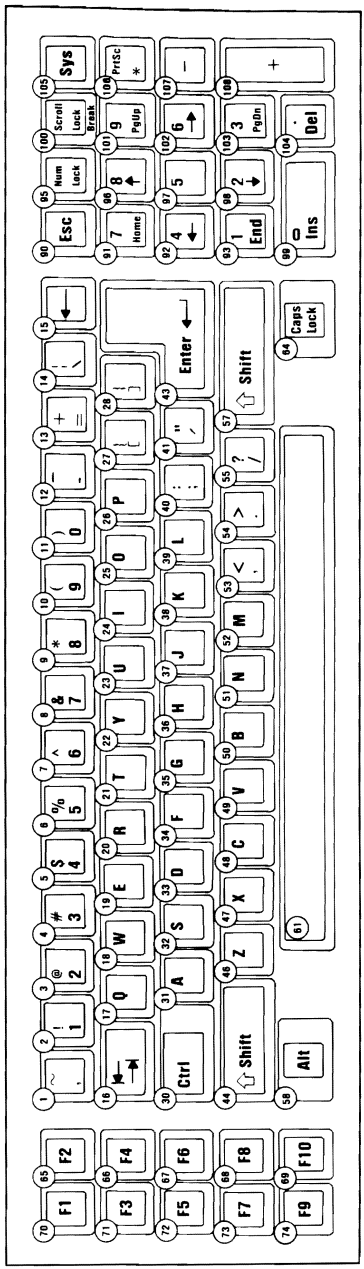


Jumper block is usually set at JP4. It must be installed at an interrupt level that does not conflict with other options.

Keyboard


External Cable
Base
LED Card
Keyboard Assembly
Internal Cable
Foot
Top Cover

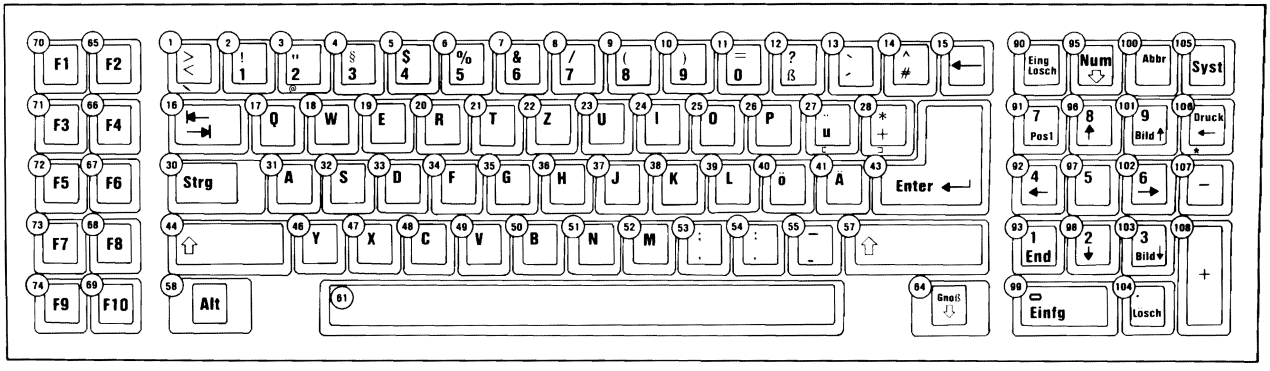
Keybutton Position–U.S.



The Number to the Upper Left Designates the Key Position in the Parts Catalog (See Section 7)

Keybutton Position–France

The Number to the Upper Left Designates the Key Position in the Parts Catalog (See Section 7)

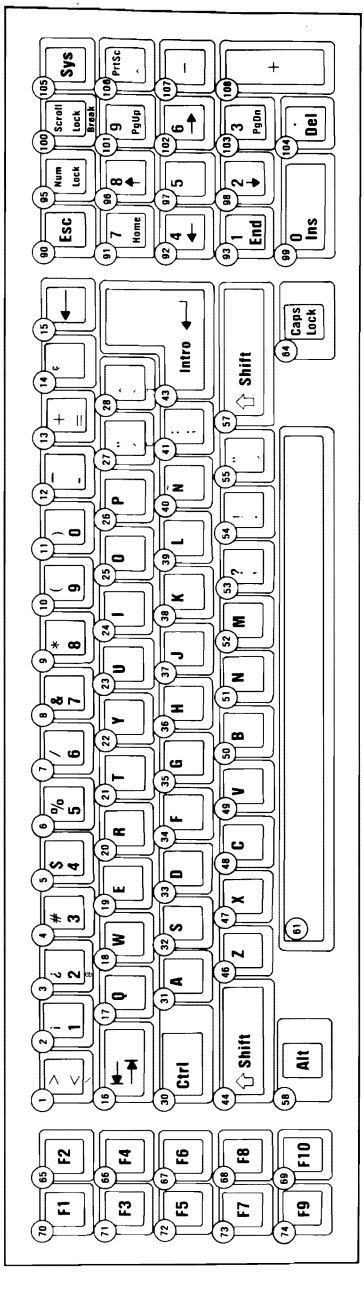


The Number to the Upper Left Designates the Key Position in the Parts Catalog (See Section 7)

Keybutton Position–Italy

The Number to the Upper Left Designates the Key Position in the Parts Catalog (See Section 7)

Keybutton Position–Spain

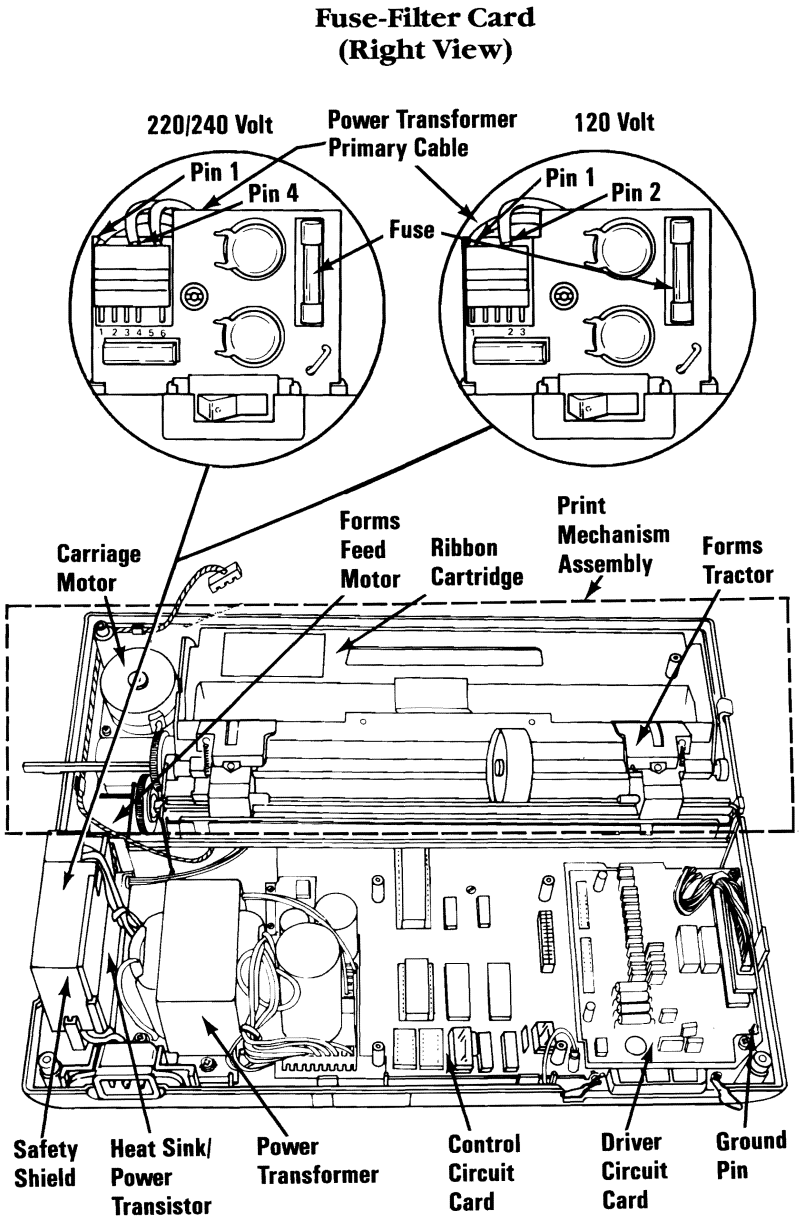


The Number to the Upper Left Designates the Key Position in the Parts Catalog (See Section 7)

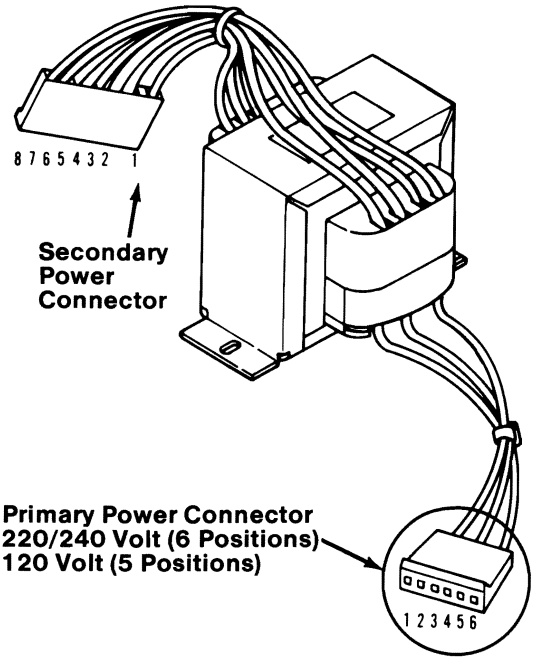
Keybutton Position–United Kingdom

The Number to the Upper Left Designates the Key Position in the Parts Catalog (See Section 7)

Rear View


Fuse-Filter Card
(Right View)
220/240 Volt
Power Transformer
Primary Cable
120 Volt
Pin 1
Pin 4
Fuse
Pin 1
Pin 2
Carriage
Motor
Forms
Feed
Motor
Ribbon
Cartridge
Print
Mechanism
Assembly
Forms
Tractor
Safety
Shield
Heat Sink/
Power
Transistor
Power
Transformer
Control
Circuit
Card
Driver
Circuit
Card
Ground
Pin

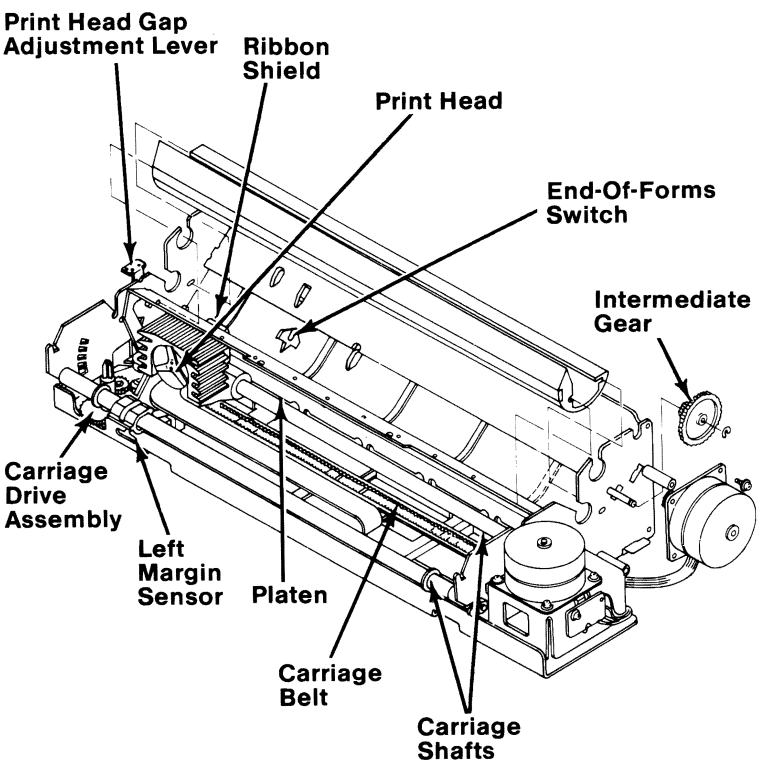
Power Transformer Connectors



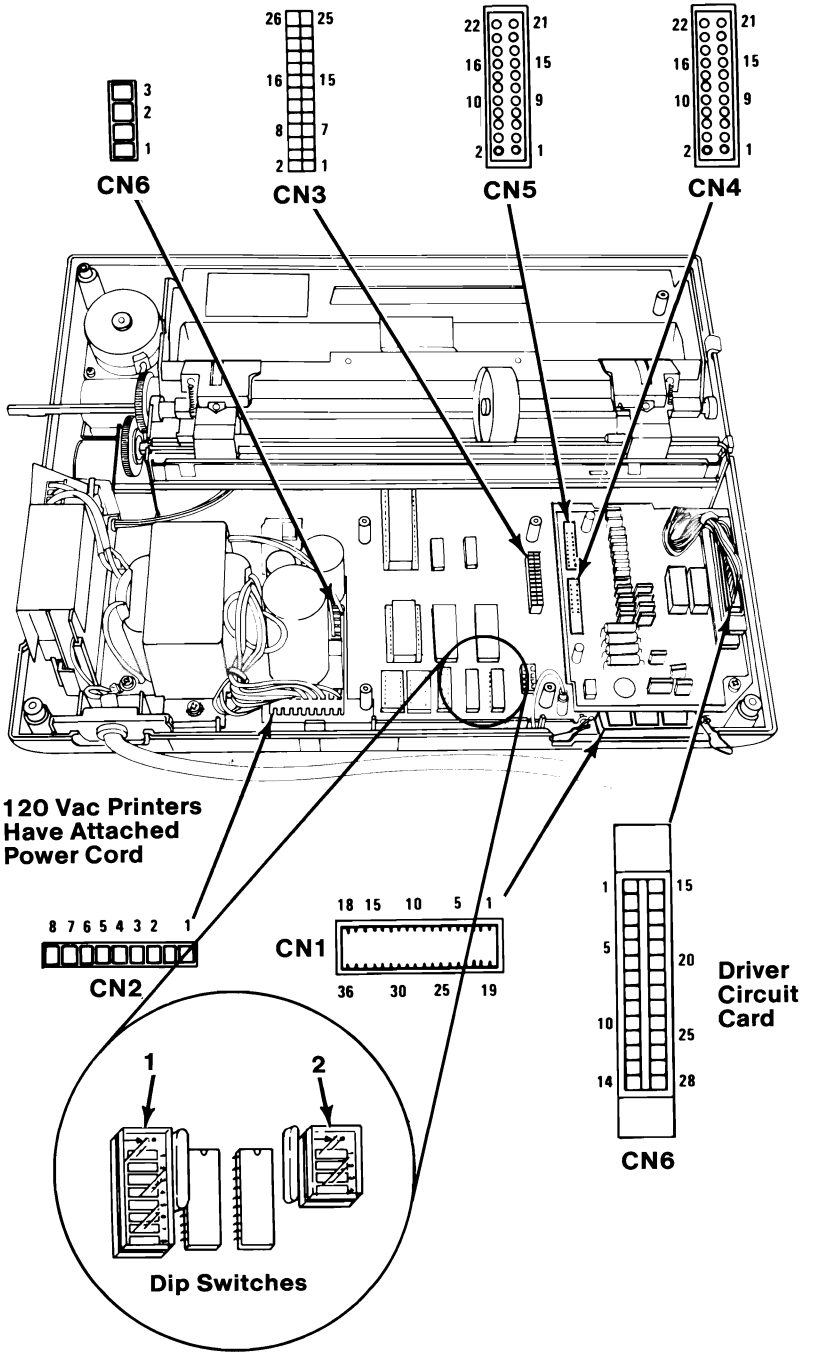
Power Transformer Connector Wiring					
	Primary			Secondary	
Connector Pin #*	120 Volt	220 Volt	240 Volt	Color	Voltage AC
1	White	White	White	Gray	9
2	Black			Gray	9
3				Orange	24.2
4		Brown	Orange	Orange	24.2
5				Red	9.6
6		Orange	Brown	Red	9.6
7				Blue	16.6
8				Blue	16.6

*The connectors have no numbers on them. Use the numbers on the boards for "Connector Pin #." For 120 Volt Primary Connector, Pin #'s 1 and 2 correspond to actual connector positions 1 and 4.

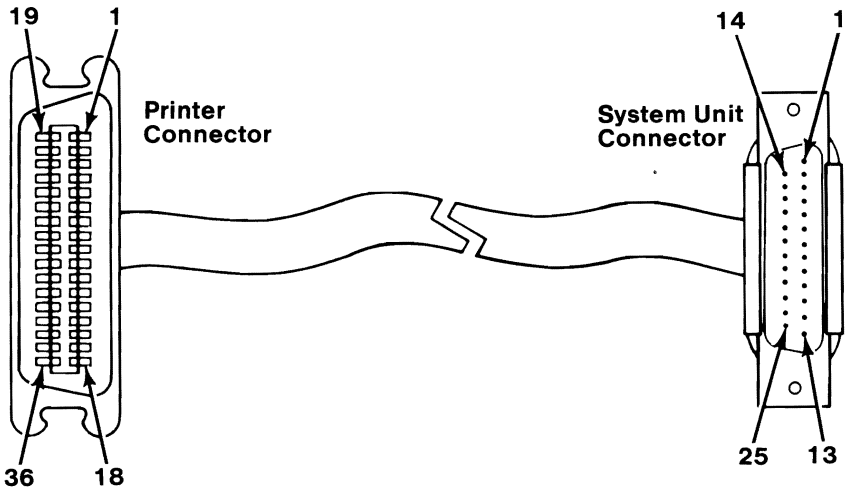
Print Mechanism Assembly (Front View)



Printer (Rear View)



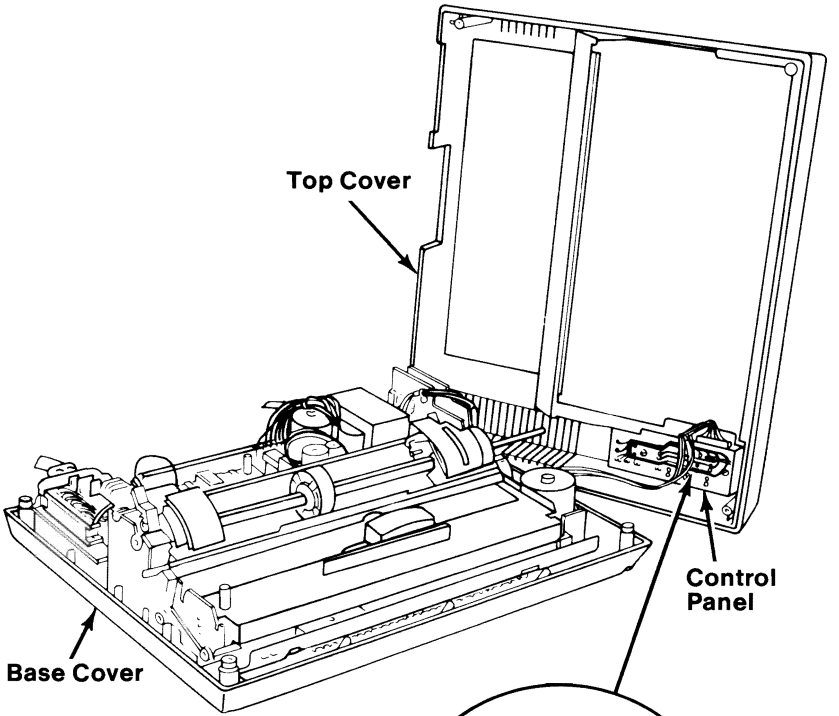
Printer Signal Cable

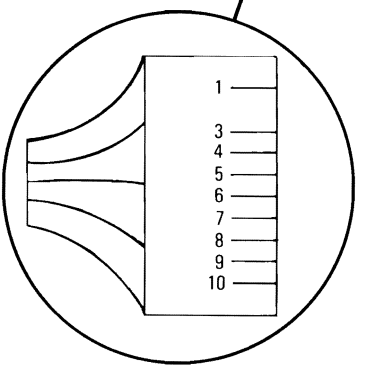


Printer Signal Cable

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

Printer (Top View)



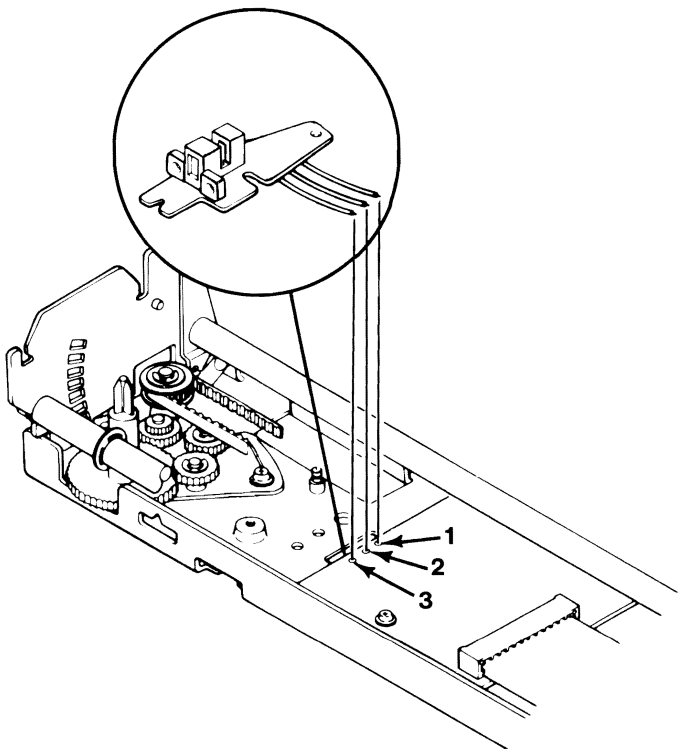


Control Panel Connector

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

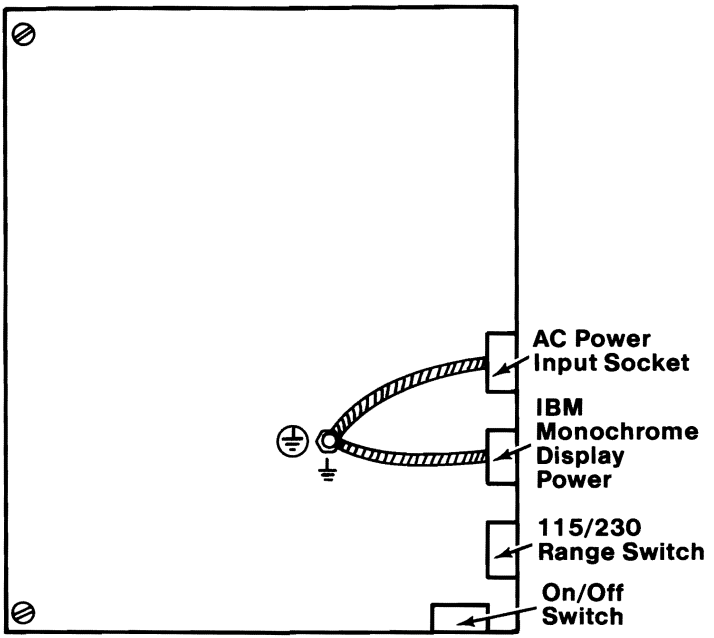
Print Head and Cable (Rear View)

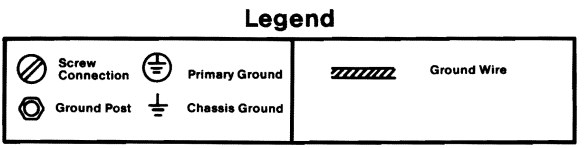
Left Margin Sensor (Front View)



Safety Grounds

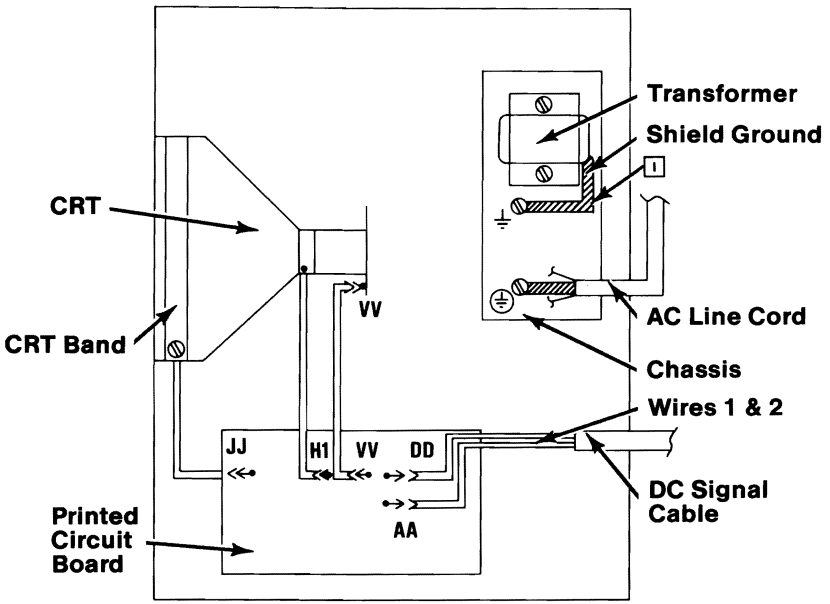
System Unit Power Supply





IBM Monochrome Display

Note: JJ, H1, VV, AA and DD joined printed circuit lands on board.

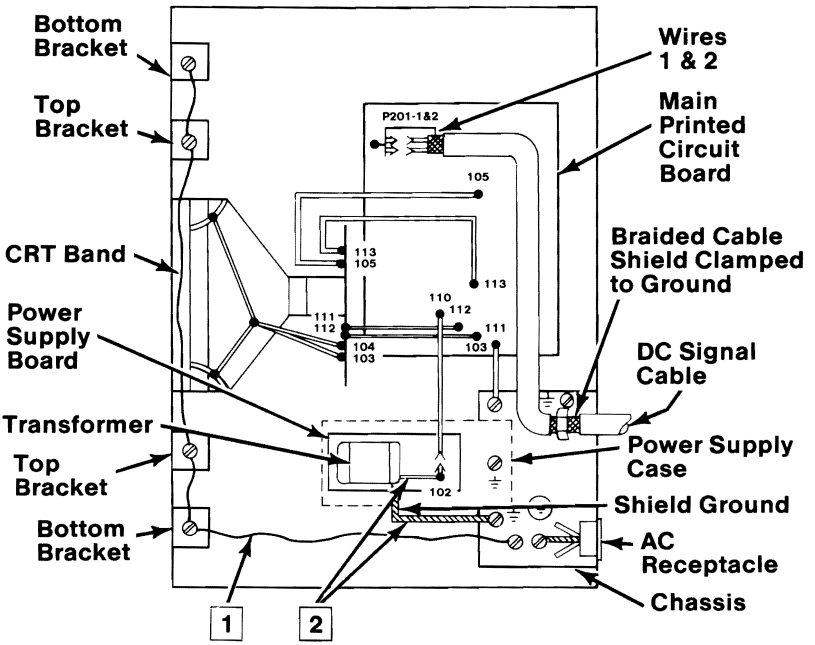


IBM Monochrome Display

Legend

Screw Connection	Ground Lead
Soldered Connection	Primary Ground
Plugged Connection	Chassis Ground
1 This lead only present on 220/240 Vac machines.	

IBM Color Display



IBM Color Display

Legend

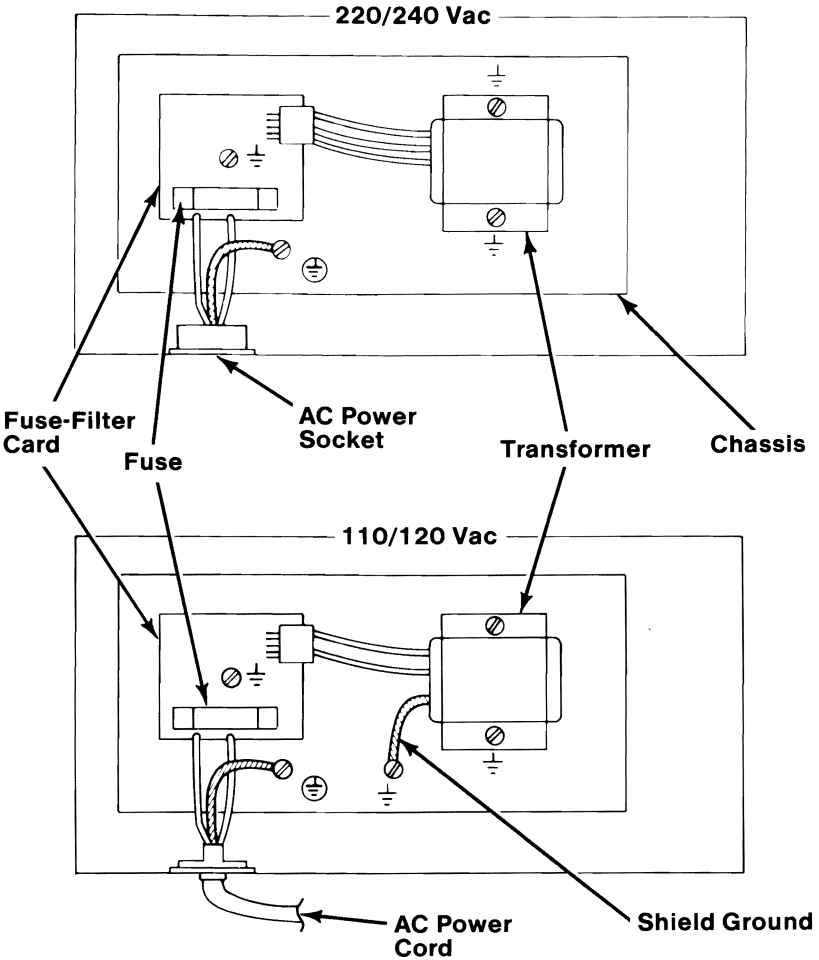
Screw Connection	Ground Lead
Soldered Connection	Primary Ground
Plugged Connection	Chassis Ground

Note: Points 103, 105, 110, 111, 112, 113, and P201 1 & 2 on main board are joined by printed circuit lands.

1 Note present on U.S. only displays

2 Present only on model-002 displays

IBM Graphics Printer

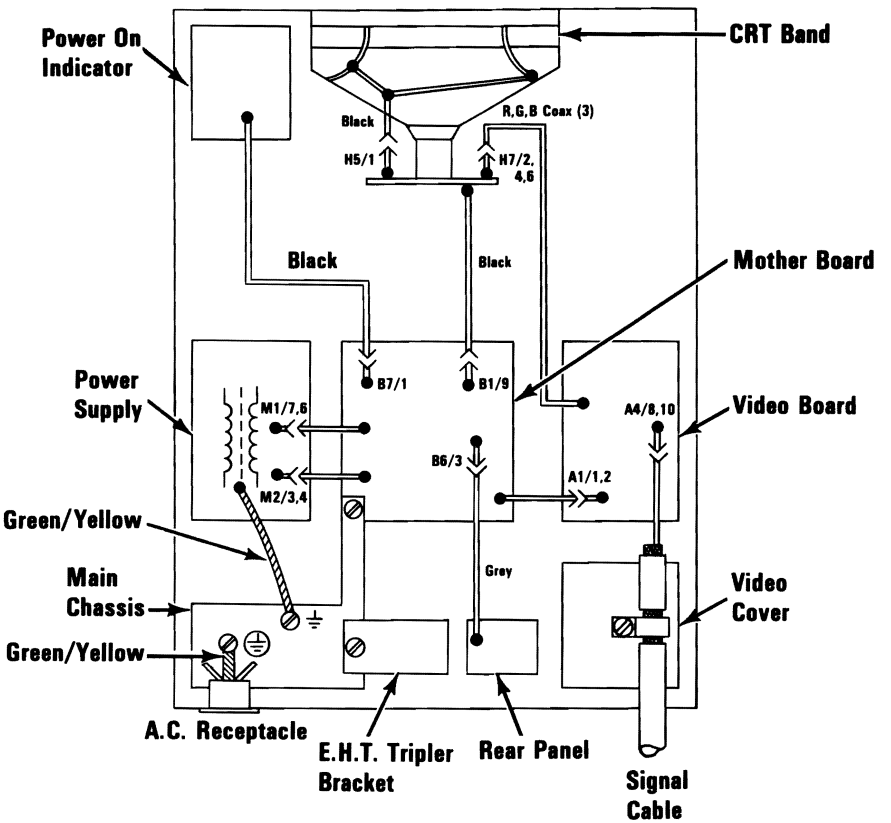


IBM 80 CPS Printer

Legend

Screw Connection	Primary Ground
Ground Lead	Chassis Ground

IBM Enhanced Color Display



IBM Enhanced Color Display

Legend

Screw Connection	Ground Lead
Soldered Connection	Primary Ground
Plugged Connection	Chassis Ground

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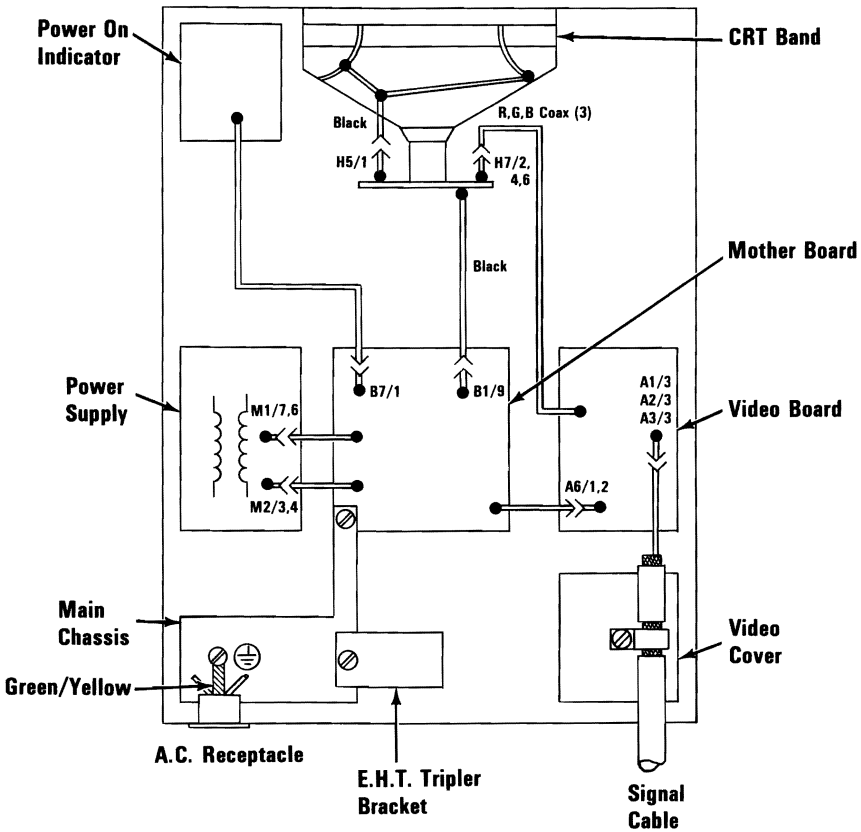
IBM Professional Graphics Display



Legend

Screw Connection	Ground Lead
Soldered Connection	Primary Ground
Plugged Connection	Chassis Ground

August 15,1984

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SECTION 5. REMOVALS, REPLACEMENTS, AND ADJUSTMENTS

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Introduction

This section describes the removal, replacement, and adjustment procedures for all field replaceable units (FRUs) in the IBM Personal Computer AT. Each procedure is assigned a reference number, which appears to the right of its title. If a step is described in another procedure, the reference number for that procedure is in parentheses at the end of the step. For example:

1. Set the system unit's Power switch to Off.

2. Remove the system unit's cover **(1005)**.

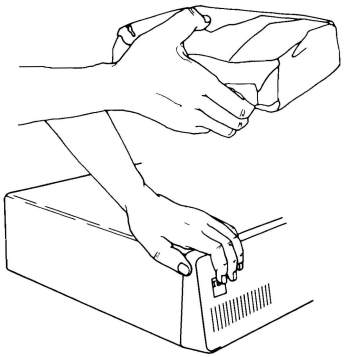
3. Disconnect the speaker connector.

4. Remove the speaker's mounting screw.

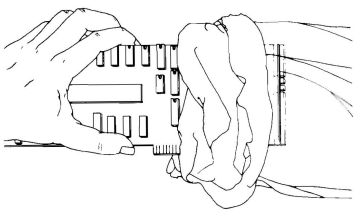
In the example, Step 2 has the reference number **1005**, which means the complete instructions for removing the system unit's cover are in procedure **1005**. The steps after Step 2 are based on the assumption that you followed the specified procedure.

Handling Static-Sensitive Devices

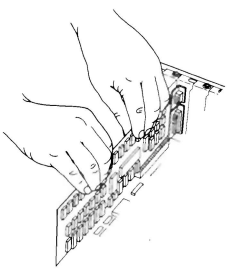
Some of the components that make up the options for your IBM Personal Computer AT can be damaged by electrostatic discharges. To prevent this damage, the options are wrapped in a conductive, anti-static bag; certain precautions must be taken before removing an option from its bag:



Hold the option (still wrapped in its anti-static bag) in one hand and touch a metal part of your system unit with the other hand. This will place your body, the option, and the system unit at the same ground potential, thus preventing an accidental static discharge.



Carefully remove the option from its anti-static bag. Be sure to grasp circuit boards by the edges only; do not touch the component pins or solder joints. Grasp diskette drives by their frames to avoid touching the electronics board. Grasp chips by their narrow ends only, not by their pins.

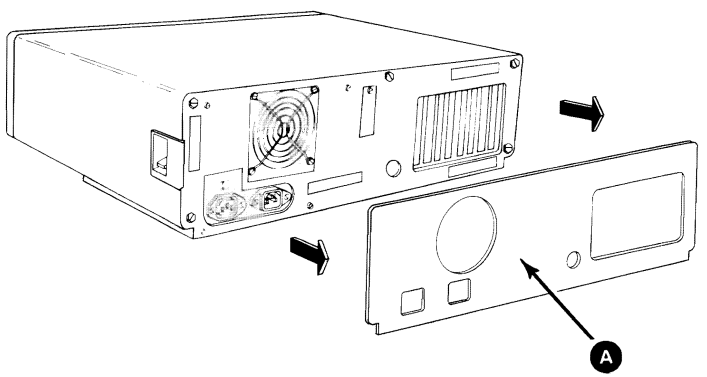


When inserting an option adapter into the system board hold the adapter by its top edge or upper corners.

System Unit

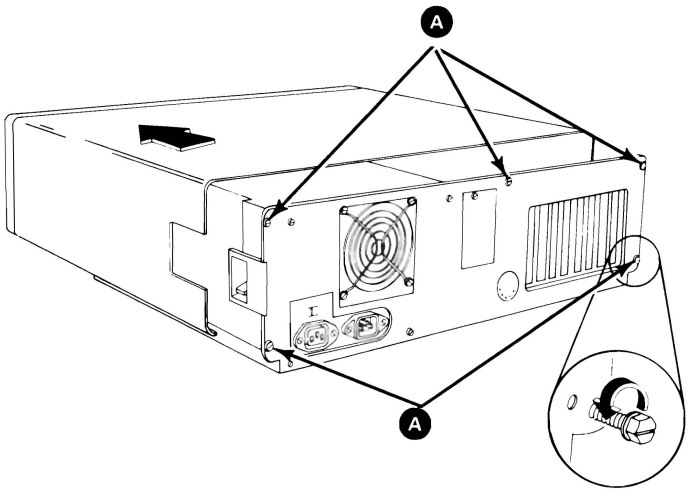
Cover Removal 1005

1. Set the system unit's Power switch to Off.
2. Unplug the power cord from the outlet.
3. Set the Power switch on all external devices to Off (printer, TV, etc.).
4. Disconnect all cables from the system unit.
5. Move all external options away from the system unit.
6. Turn the key to the unlocked position and remove it.
7. Turn the system unit around, as shown.
8. Remove the back panel (A) from the rear of the system unit. The back panel is attached to the system unit by plastic fastener strips.



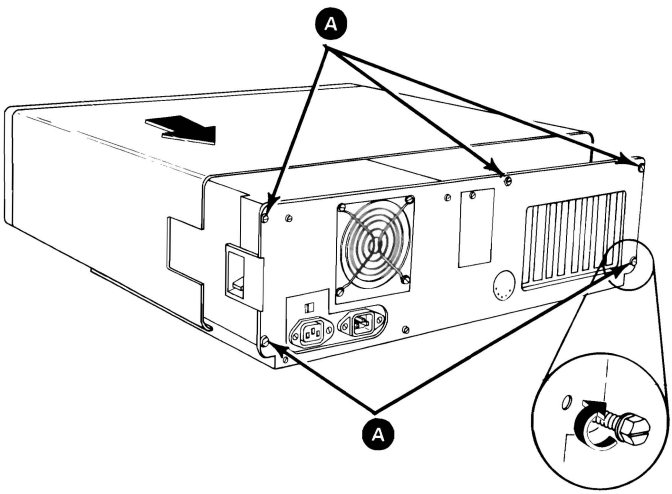
9. Remove the five cover mounting screws (A) .

10. Slide the cover away from the rear panel until it is clear of the system unit.



Cover Replacement 1006

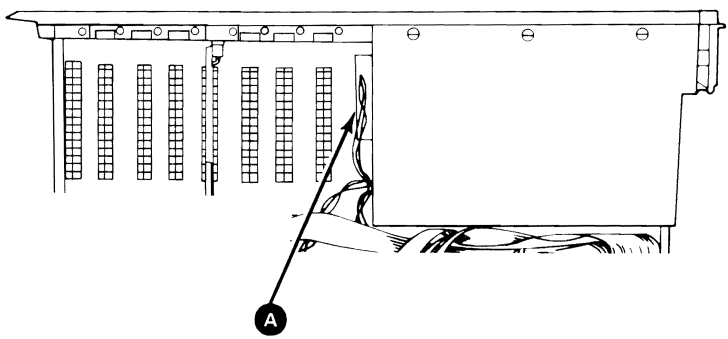
1. Slide the cover toward the rear of the system unit.
2. Align the screws (A) with the threaded tabs and tighten.
3. Attach the back panel to the rear of the system unit.
4. Connect the cables to the system unit.



Power Supply Removal 1010

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Unplug the power cord from the power supply.
4. Disconnect the system board's power cables by pulling the connectors (A) straight up.

   Warning: Do not pull on the wires when disconnecting connectors.

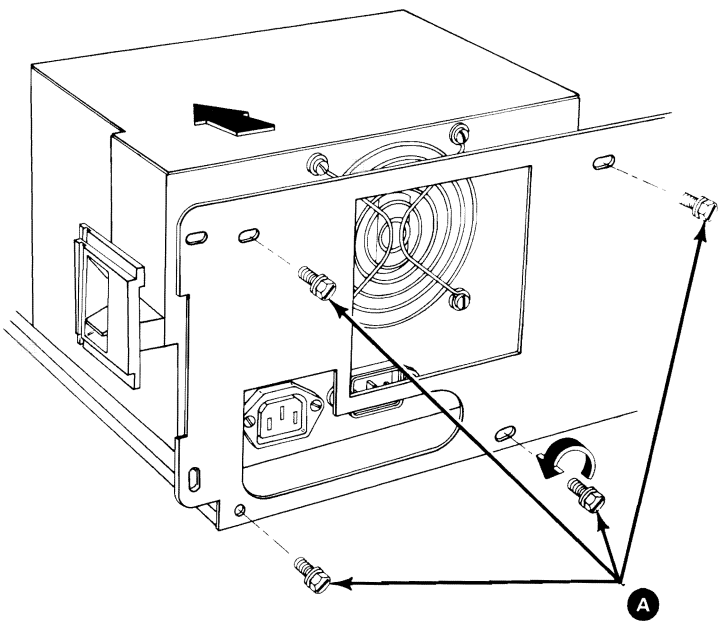


5. Disconnect the power cables from the fixed disk drive **(5016)** and diskette drive **(4005)**.

   Note: If no fixed disk drive is installed in your system unit disconnect the power cable from the power supply load resistor **(1012)**.

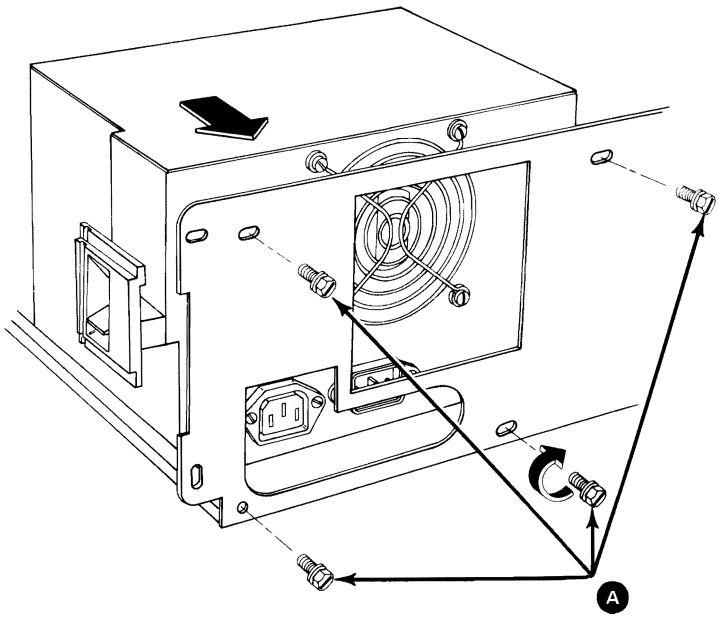
6. Remove the power supply's mounting screws (A) .

7. Slide the power supply 13 mm (1/2 inch) to the front, then lift and remove.



Power Supply Replacement 1011

1. Lower the power supply into the system unit.
2. Slide the power supply to the front of the system unit, then to the rear, to engage the lock-down tabs.
3. Install the power supply's mounting screws (A) .



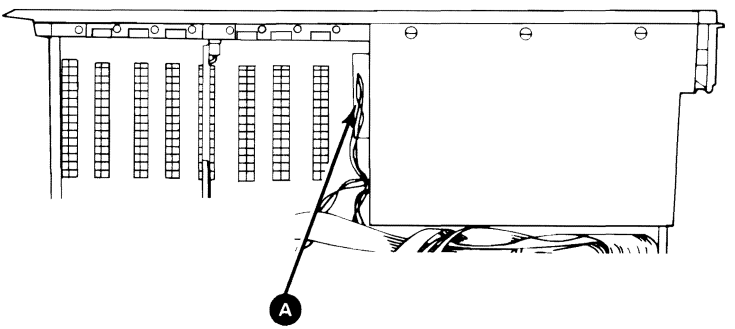
4. Connect the power cables to the fixed disk drive **(5017)** and diskette drive **(4006)**.

   Note: If no fixed disk drive is installed in your system connect the power cable to the power supply load resistor **(1013)**.

5. Connect the system board's power cables (A) .

6. Install the system unit's cover **(1006)**.

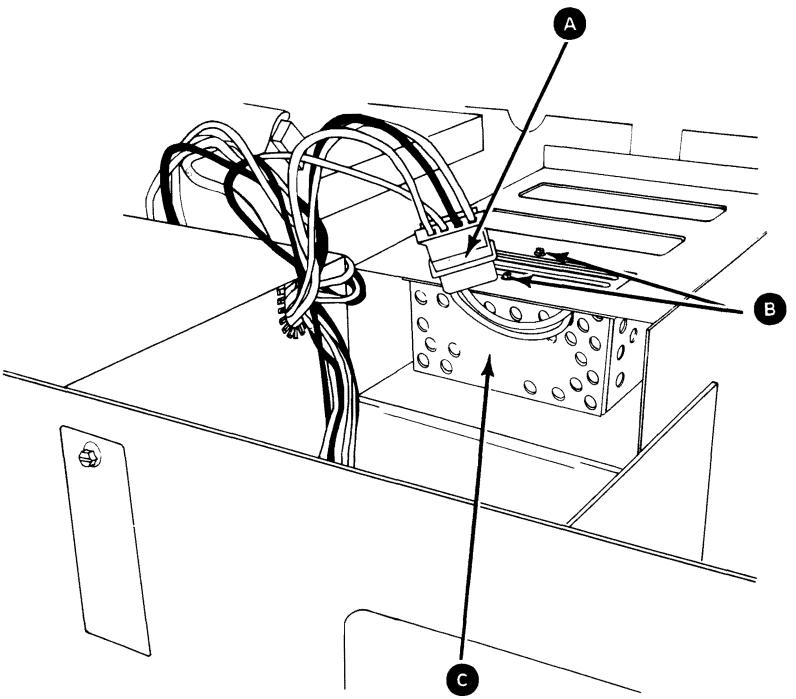
7. Plug the power cord into the power supply.



Power Supply Load Resistor Removal 1012

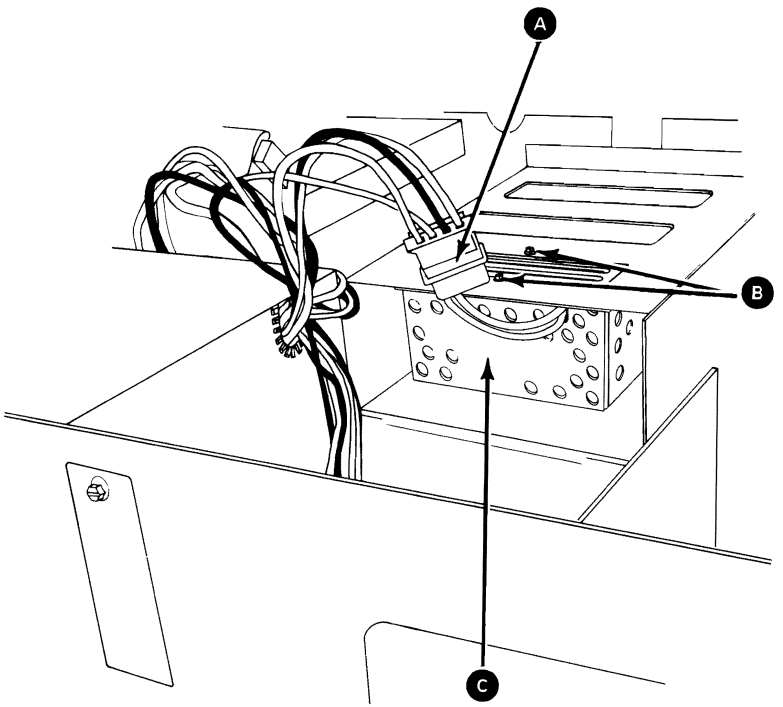
1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Disconnect the power supply's cable from the load resistor (A) .

   Warning: Do not pull on the wires when disconnecting connectors.
4. Remove the load resistor's mounting screws (B) .
5. Remove the power supply load resistor (C) .



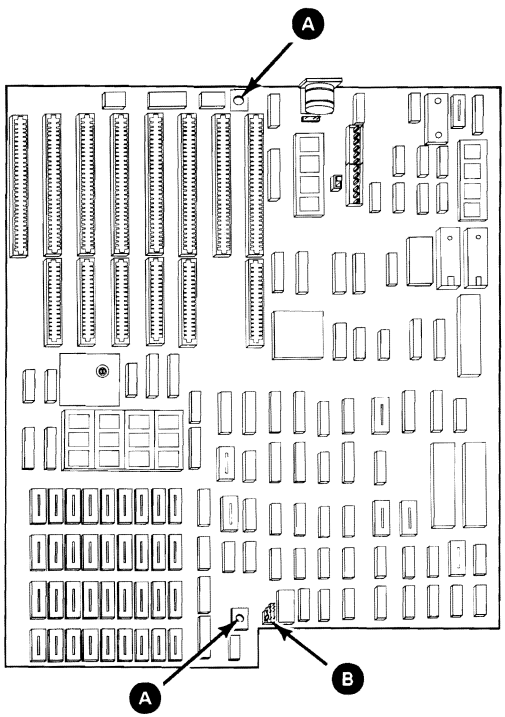
Power Supply Load Resistor Replacement 1013

1. Hold the load resistor (C) in place and install the mounting screws (B) .
2. Connect the power supply's cable to the load resistor (A) .
3. Install the system unit's cover **(1006)**.



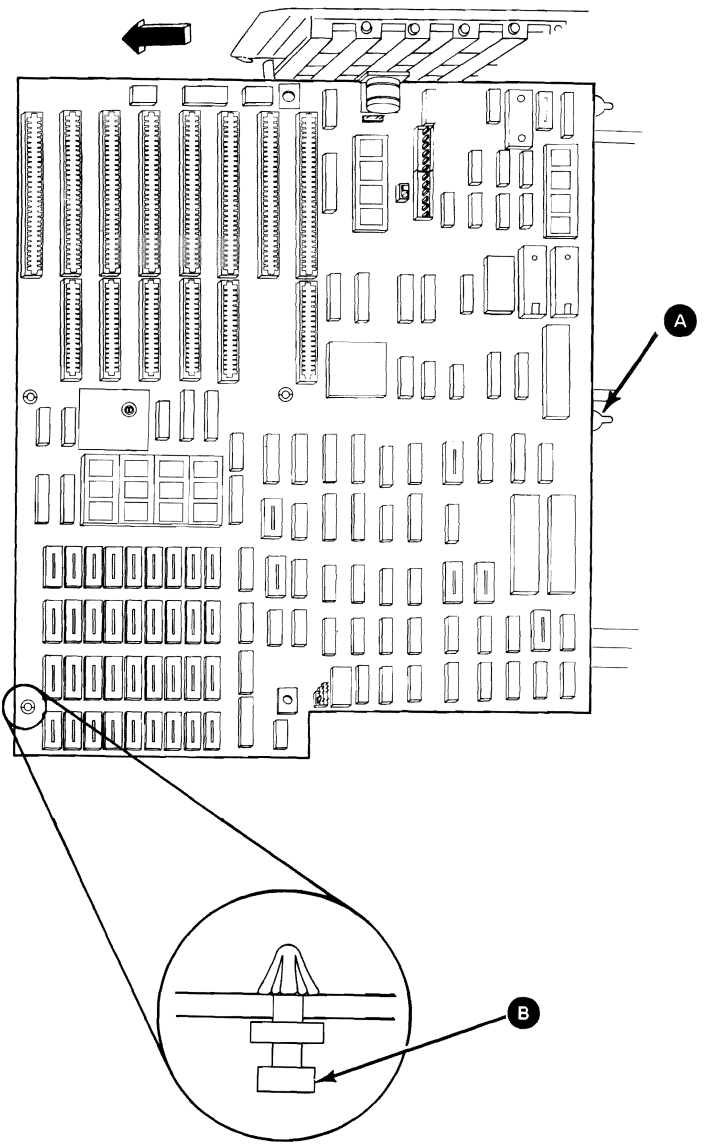
System Board Removal 1015

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Make a note of the adapter slot each option adapter is in.
4. Remove all option adapters **(5005)**.
5. Remove the Fixed Disk and Diskette Drive Adapter **(5010)**.
6. Disconnect the system board's power cables **(1010)**.
7. Disconnect the battery cable **(1030)**.
8. Disconnect the control panel cables from the system board (B) .
9. Remove the system board's mounting screws (A) .



10. Slide the system board away from the power supply until the standoffs (B) can be lifted from the mounting slots (A)

11. Lift the system board up and out the side of the system unit.

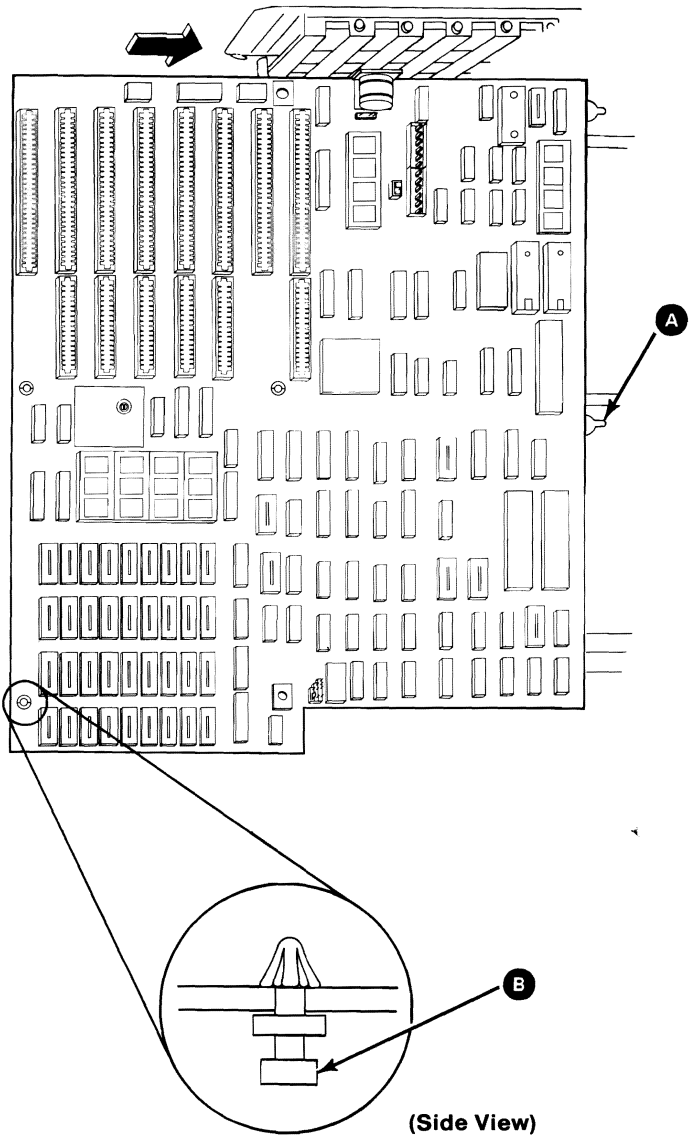


(Side View)

System Board Replacement 1016

1. Slide the system board toward the power supply until the standoffs (B) line up with their mounting slots (A) .

2. Lower the system board until the standoffs (B) fit into their mounting slots (A) .



3. Slide the system board toward the power supply until the mounting screws (A) line up with their holes.

4. Install the system board's mounting screws (A) .

5. Connect the control panel cables to the system board (B) .

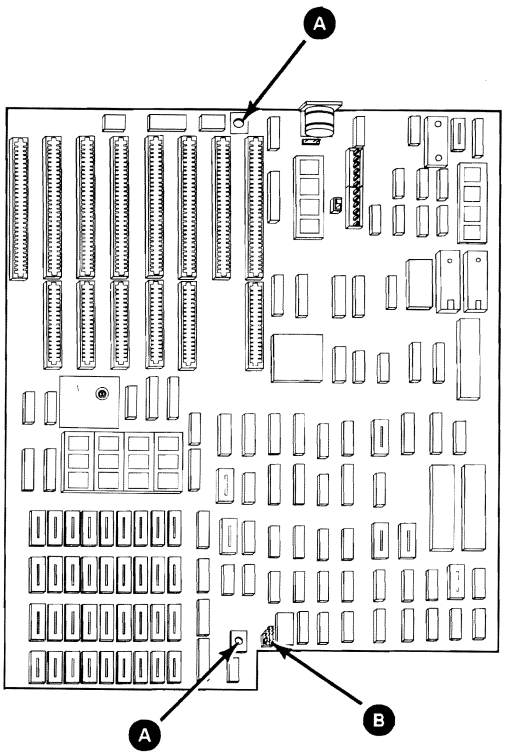
6. Install the option adapters **(5006)**.

7. Install the Fixed Disk and Diskette Drive Adapter **(5011)**.

8. Connect the system board's power cables **(1011)**.

9. Connect the battery cable **(1031)**.

10. Install the system unit's cover **(1006)**.

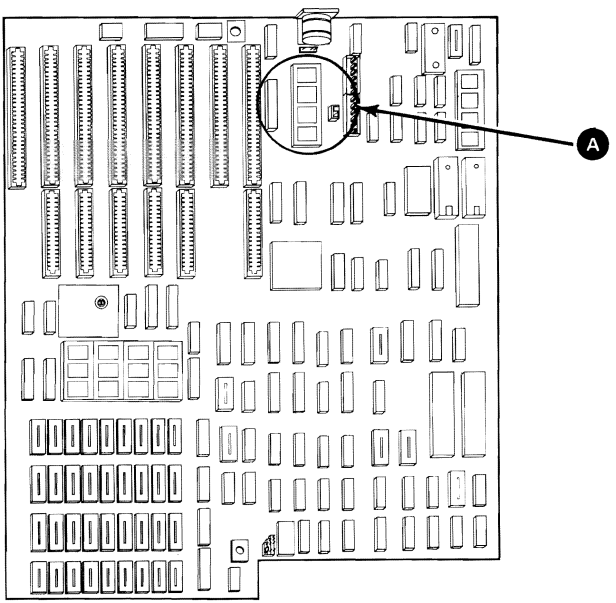


Front

Math Coprocessor Removal 1017

Warning: The pins on the coprocessor are easily bent. Be careful not to bend the pins when removing the coprocessor. The coprocessor is static sensitive. Maintain personal grounding by touching the system unit frame with one hand while removing the coprocessor.

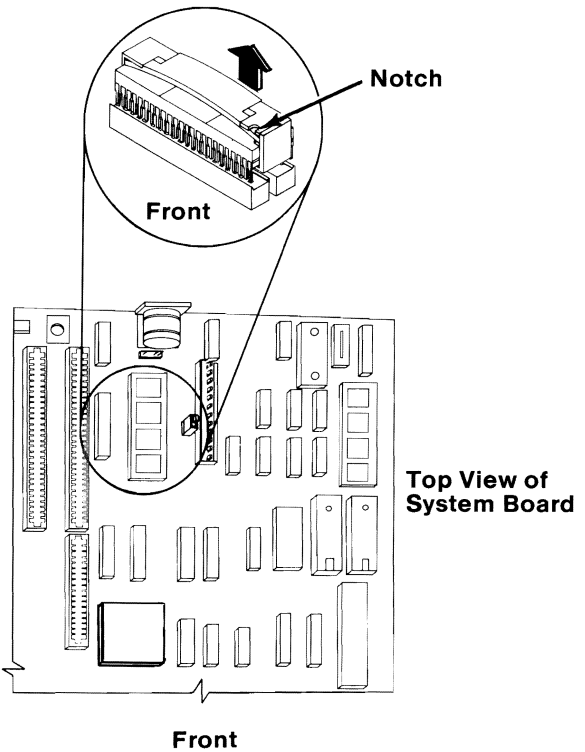
1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Unplug the power supply connectors **(1010)** from the system board and position them out of the way.
4. Find the Math Coprocessor (A) on the system board in the following figure.



Front

5. Using a module puller, carefully remove the coprocessor.

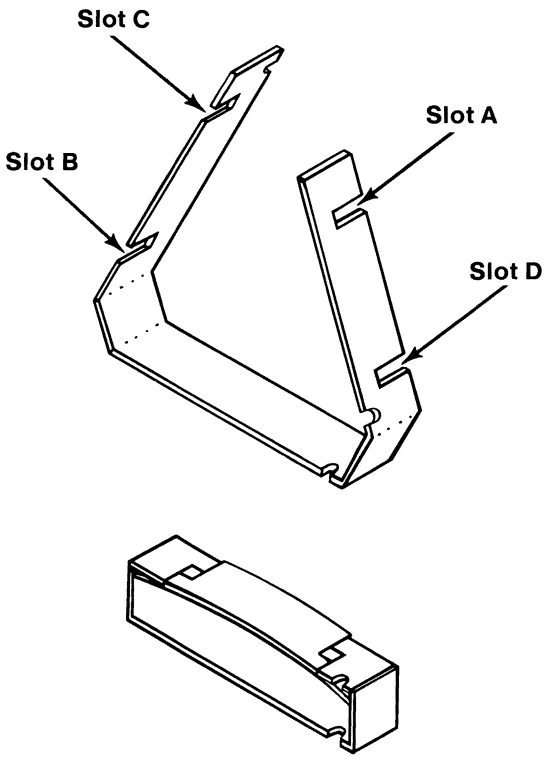
6. Remove the safety protector.



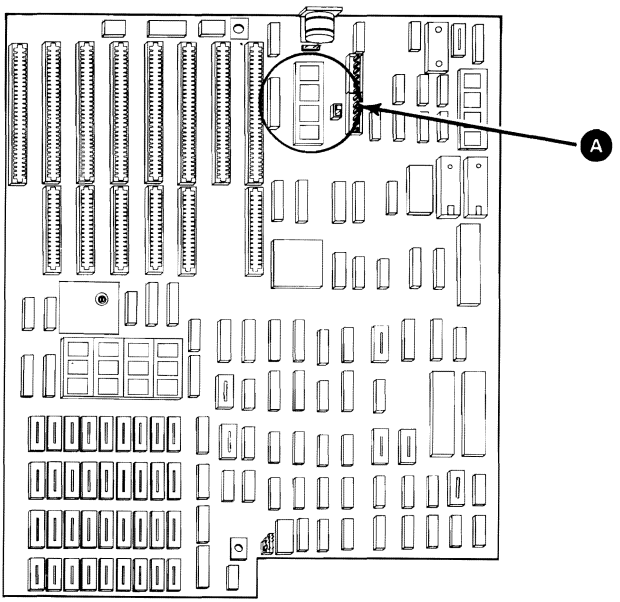
Math Coprocessor Replacement 1018

1. Install the safety protector on the coprocessor. Make sure the notches in the safety protector are on the same end as the notch in the coprocessor. The overlapped portions of the safety protector should be on the top of the coprocessor.

2. Assemble the safety protector as shown by inserting slot A into slot B, and slot C into slot D.



3. Find the Math Coprocessor connector (A) on the system board in the following figure.

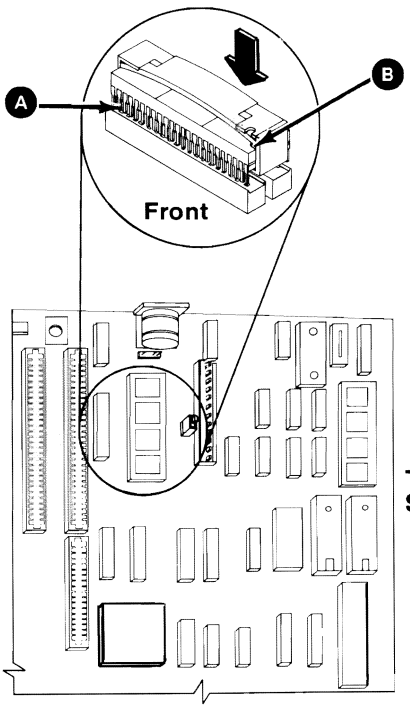


Front

4. Carefully align the pins (A) on the coprocessor with its connector and firmly press the coprocessor into place. Be sure the notch (B) on the coprocessor lines up with the notch on its connector.

5. Reconnect the power supply connectors **(1011)** to the system board.

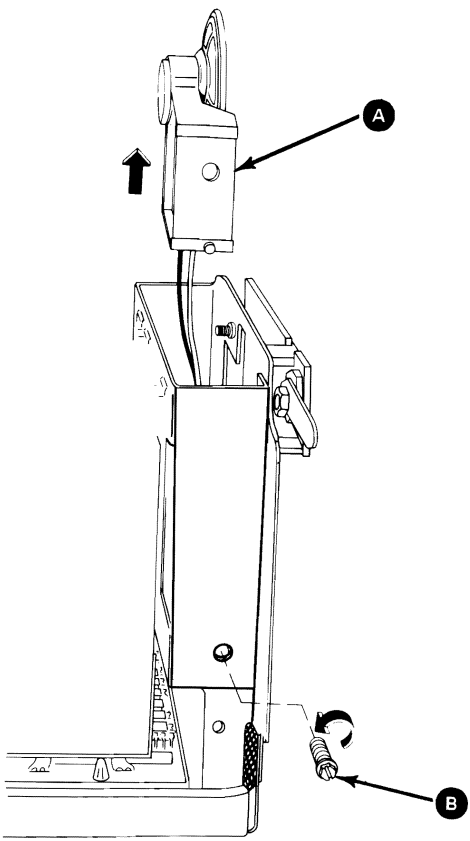
6. Replace the system unit's cover **(1006)**.



Top View of System Board

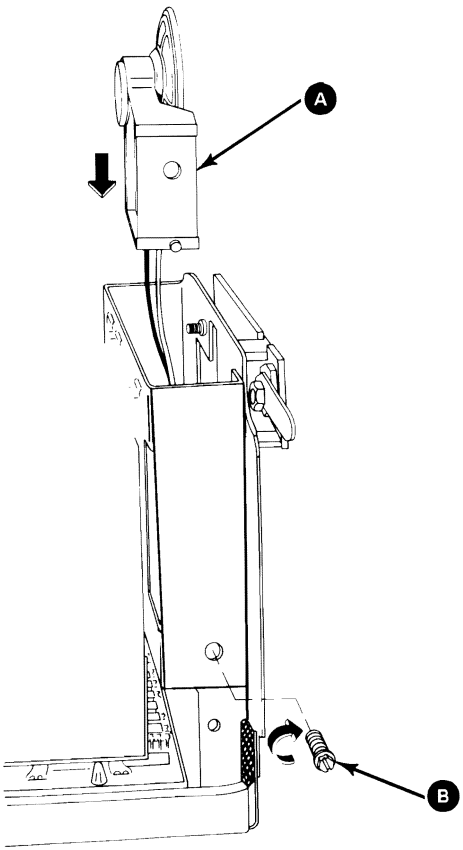
Speaker Removal 1020

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Remove the Fixed Disk and Diskette Drive Adapter **(5010)**.
4. If required, remove the option adapters **(5005)** to gain access to the speaker cable .
5. Disconnect the speaker cable .
6. Remove the speaker's mounting screw (B) .
7. Remove the speaker (A) .



Speaker Replacement 1021

1. Hold the speaker (A) in place and install the mounting screw (B).
2. Connect the speaker cable.
3. Install the Fixed Disk and Diskette Drive Adapter **(5011)**.
4. Install any of the option adapters that were removed **(5006)**.
5. Install the system unit's cover **(1006)**.

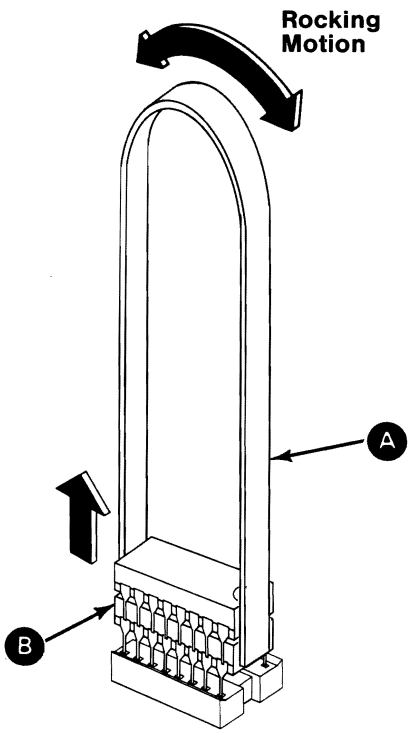


System Board Memory Module Removal 1025

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover (**1005**).
3. Remove the option adapters (**5005**).
4. Remove the Fixed Disk and Diskette Drive Adapter (**5010**).
5. Find the failing module (see Section 3).

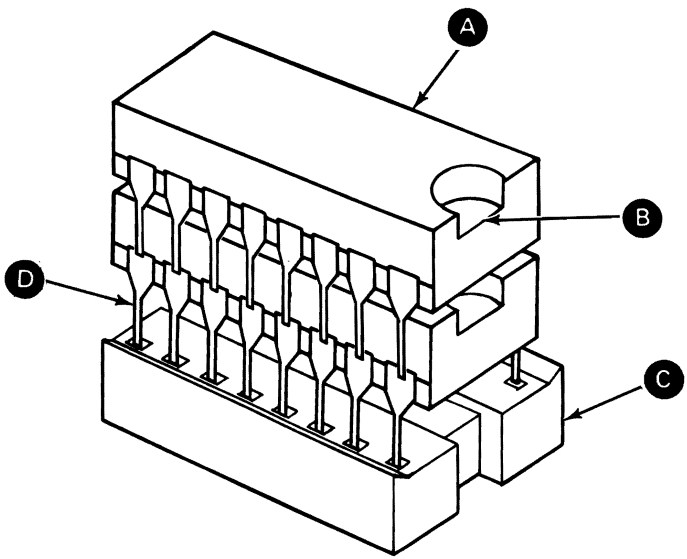
   Note: Depending on the location of the failing module, you may have to remove the system board (**1015**).

6. Grasp the module (B) with the module puller (A) and gently lift one end and then the other, to avoid bending the pins.



System Board Memory Module Replacement 1026

1. Line up the module (A) so the notch (B) faces the same direction as those on other modules.
2. Line up the module pins (D) with the sockets on the connector (C).
3. Gently press the module onto the connector.
4. If the system board was removed, reinstall it (**1016**).
5. Install the option adapters (**5006**).
6. Install the Fixed Disk and Diskette Drive Adapter (**5011**).
7. Install the system unit's cover (**1006**).

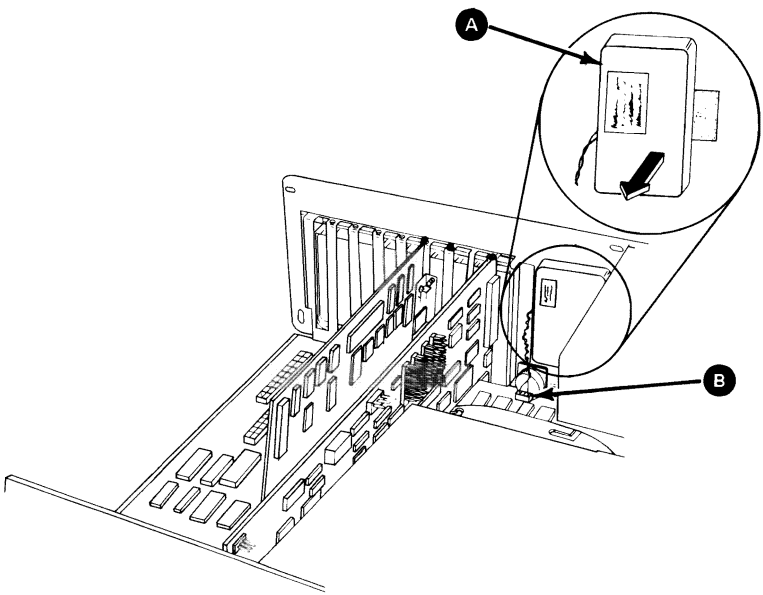


Battery Removal 1030

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Disconnect the battery cable (B) from the system board.
4. The battery is attached to the back panel by a plastic fastener strip. Gently pull the battery (A) loose, and out of your system unit.

   Note: Early models of the battery may have two screws to attach it to the system unit. Remove these screws; they are no longer needed.

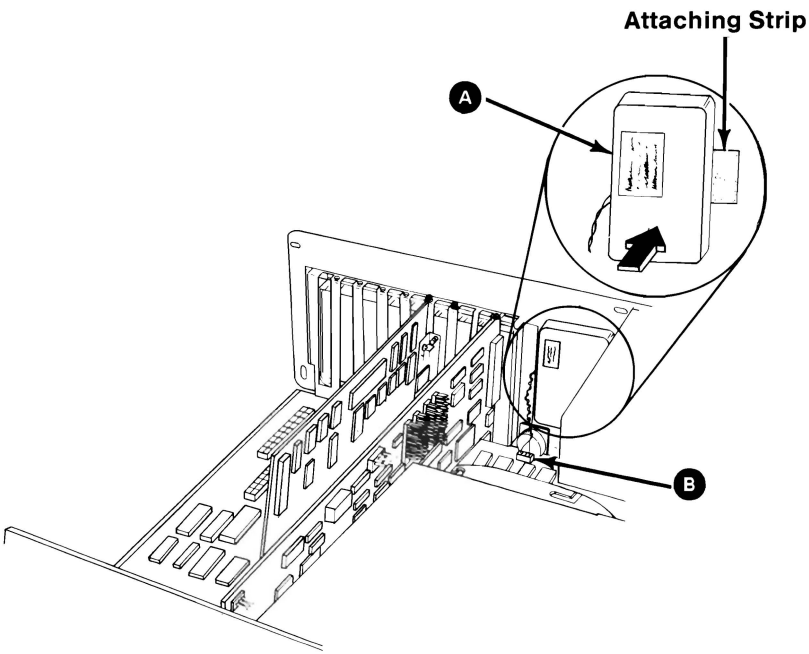
CAUTION
Fire, explosion, and severe burn hazard may be caused by the battery. **DO NOT** recharge, disassemble, heat above 212° F, solder directly to the cell, incinerate, or expose battery cell contents to water.



Battery Replacement 1031

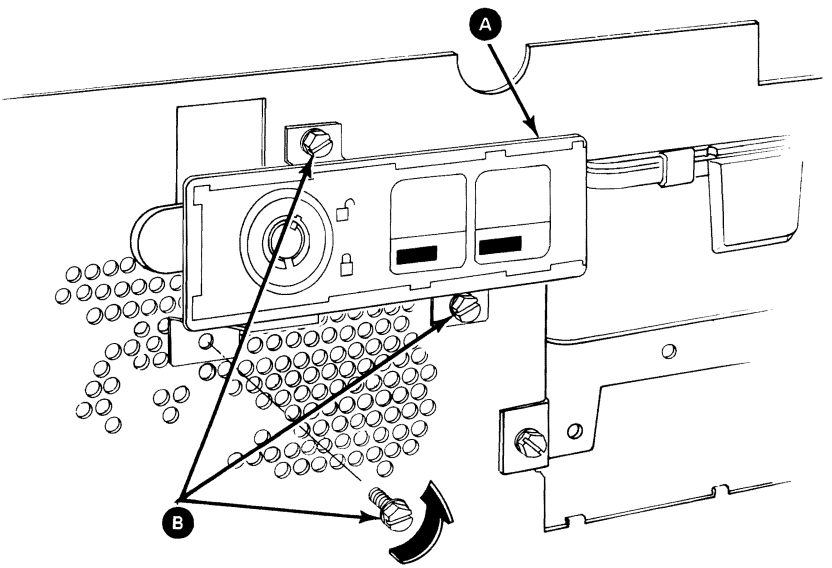
1. Align the battery attaching strip with it's mounting position and press the battery (A) to secure it.
2. Connect the battery cable (B) to the system board.
3. Install the system unit's cover **(1006)**.
4. Go to Section 6 and do the "Setup" program.

CAUTION
Fire, explosion, and severe burn hazard may be caused by the battery. **DO NOT** recharge, disassemble, heat above 212° F, solder directly to the cell, incinerate, or expose battery cell contents to water.



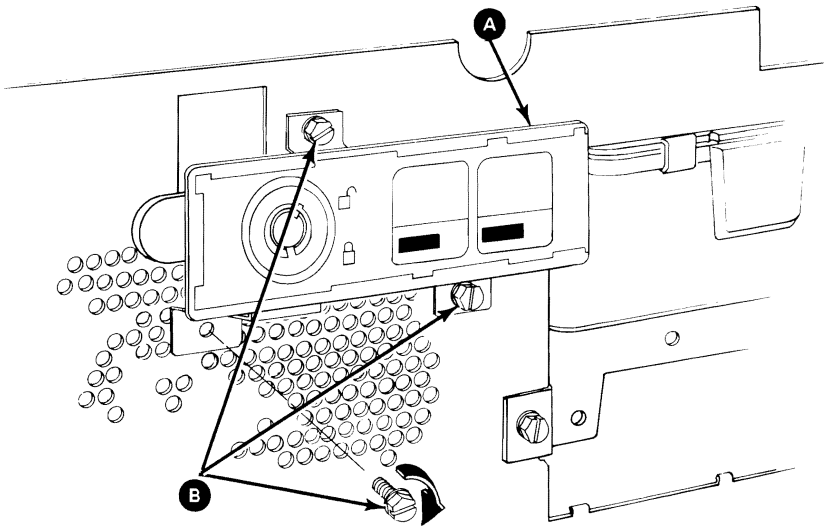
Control Panel Removal 1035

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Remove the Fixed Disk and Diskette Drive Adapter **(5010)**.
4. If required, remove the option adapters **(5005)** to gain access to the control panel cables.
5. Disconnect the control panel cables from the system board.
6. Remove the mounting screws (B) and the control panel (A) .



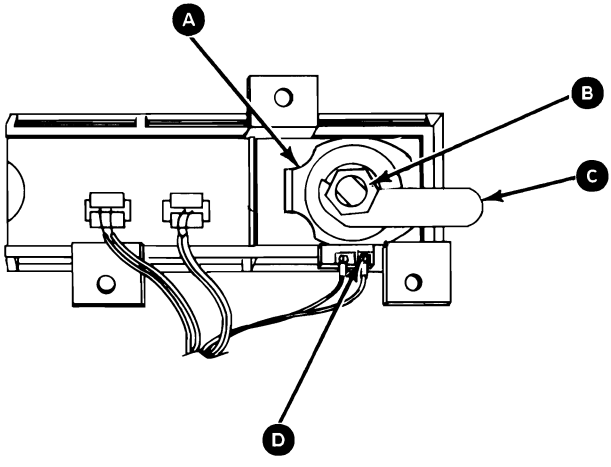
Control Panel Replacement 1036

1. Install the control panel (A) and the mounting screws (B) .
2. Connect the control panel cables to the system board.
3. Install the Fixed Disk and Diskette Drive Adapter **(5011)**.
4. Install any of the option adapters that were removed **(5006)**.
5. Install the system unit's cover **(1006)**.



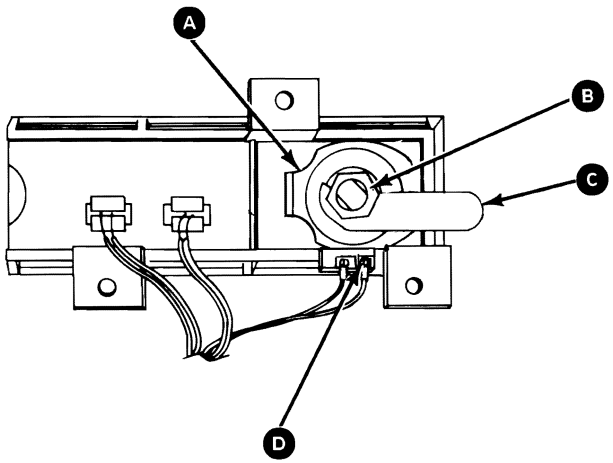
Key Lock Removal 1040

1. Remove the control panel **(1035)**.
2. Remove the two screws (D) and position the microswitch away from the control panel.
3. Remove the locknut (B) .
4. Remove the cover latch (C) .
5. Remove the Key Lock mounting clip (A) .
6. Remove the Key Lock.



Key Lock Replacement 1041

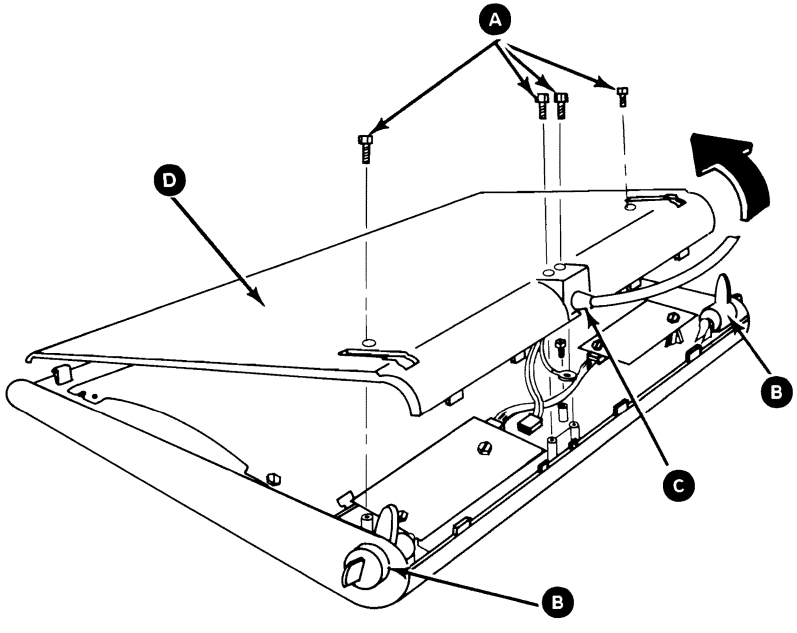
1. Set the Key Lock into the mounting plate.
2. Install the Key Lock's mounting clip (A) .
3. Install the cover latch (C) .
4. Install the locknut (B) .
5. Position the microswitch on the control panel and install the two mounting screws (D) .
6. Install the control panel **(1036)**.



Keyboard

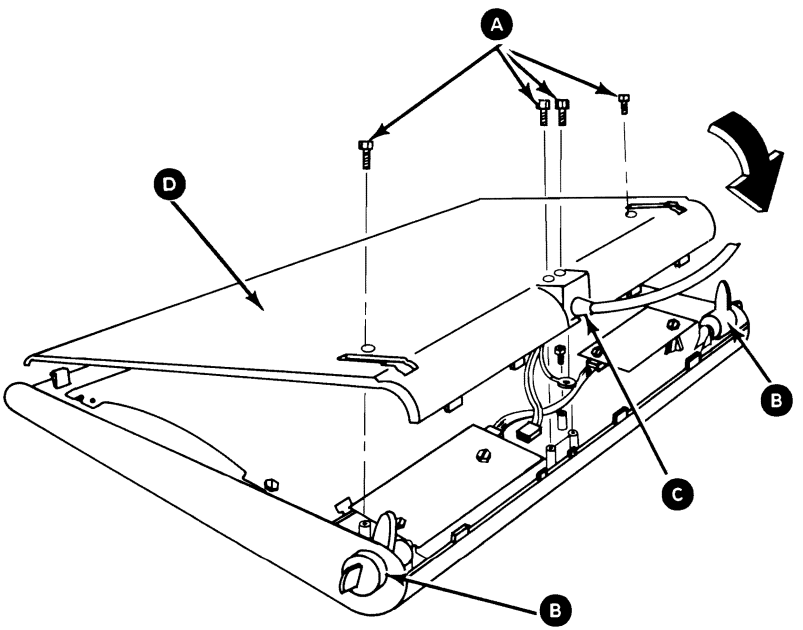
Keyboard Base Removal 2005

1. Set the system unit's Power switch to Off.
2. Disconnect the keyboard cable from the rear of the system unit.
3. Place the keyboard with the base (D) facing up, and remove the four mounting screws (A) .
4. Turn the adjustable feet (B) up to clear the base.
5. Raise the base up approximately 51 mm (2 inches) and remove the cable (C) from the keyboard base.
6. Lift the base up and out of the top cover.



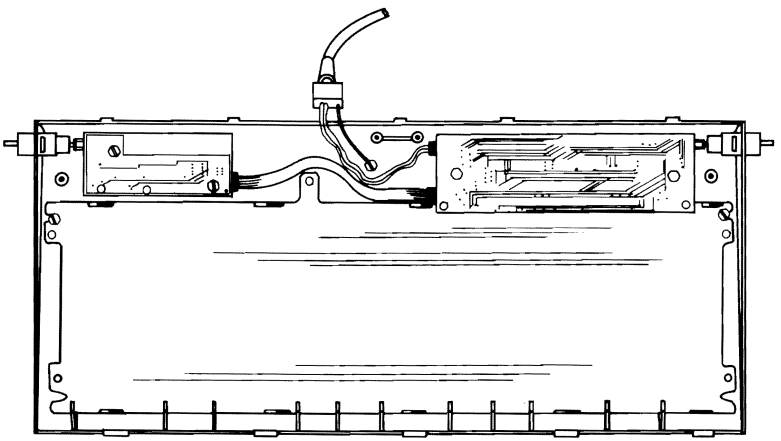
Keyboard Base Replacement 2006

1. Turn the adjustable feet (B) up to clear the base.
2. Place the tabs on the front of the base (D) into the locating slots on the top cover and lower the base until it is approximately 51 mm (2 inches) from the cover.
3. Attach the cable (C) to the keyboard base.
4. Lower the base into the top cover.
5. Install the four mounting screws (A) .
6. Connect the keyboard cable to the rear of the system unit.



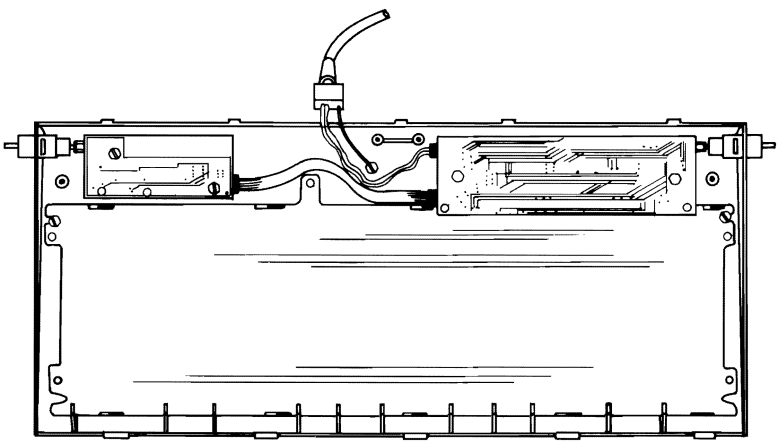
Keyboard Top-Cover Removal 2007

1. Remove the keyboard cable **(2010)**.
2. Remove the LED driver card **(2020)**.
3. Remove the keyboard assembly **(2015)**.
4. Remove the keyboard feet **(2025)**.



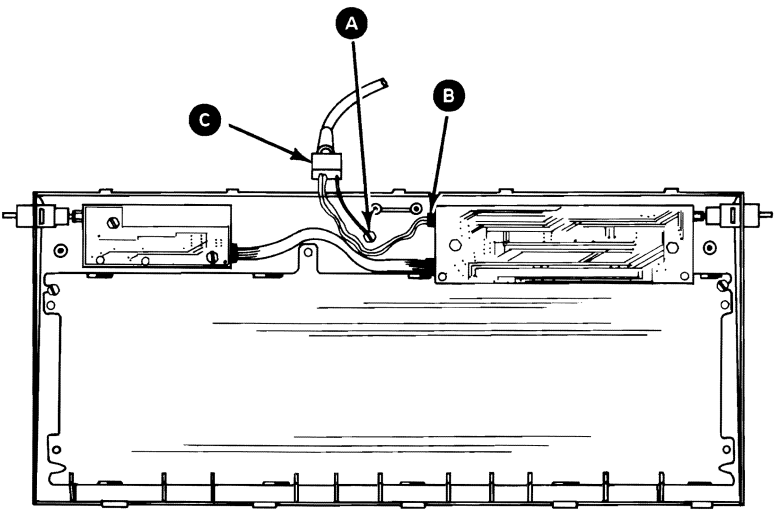
Keyboard Top-Cover Replacement 2008

1. Install the keyboard feet **(2026)**.
2. Install the keyboard assembly **(2016)**.
3. Install the keyboard cable **(2011)**.
4. Install the LED driver card **(2021)**.
5. Install the keyboard base **(2006)**.



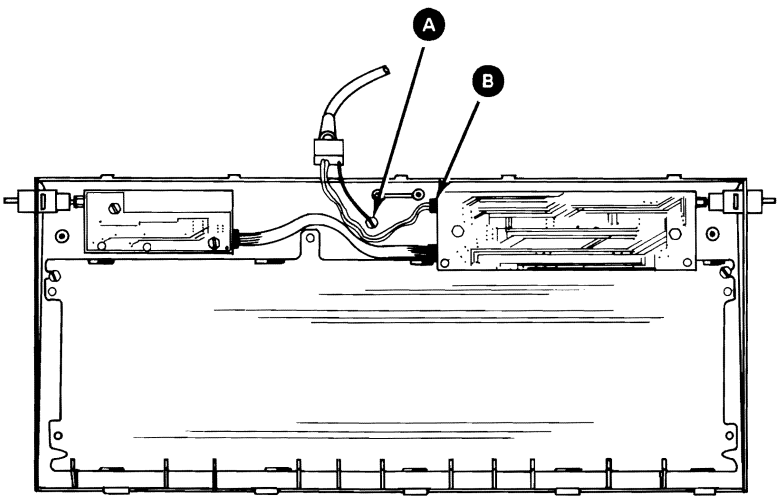
Keyboard Cable Removal 2010

1. Remove the keyboard base **(2005)**.
2. Remove the ground wire's mounting screw (A) .
3. Disconnect the cable connector (B) .
4. Remove the keyboard cable (C) .



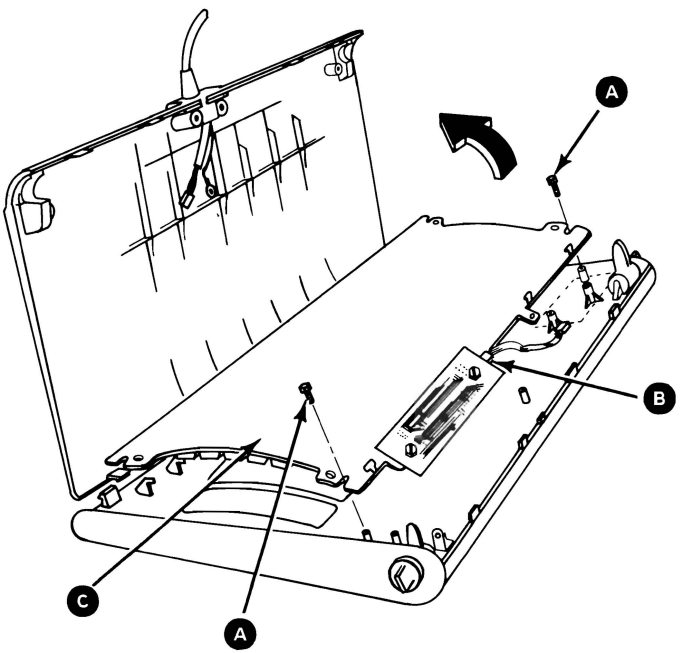
Keyboard Cable Replacement 2011

1. Connect the keyboard cable (B) .
2. Install the ground wire's mounting screw (A) .
3. Install the keyboard base **(2006)**.



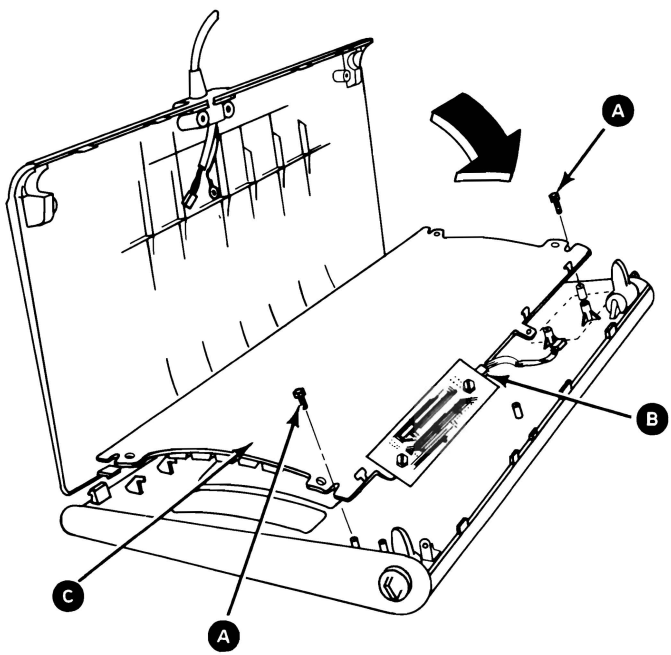
Keyboard Assembly Removal 2015

1. Remove the keyboard base **(2005)**.
2. Remove the two mounting screws (A) .
3. Remove the keyboard cable **(2010)**.
4. Disconnect the cable from the keyboard assembly driver board (B) .
5. Lift the rear of the keyboard assembly (C) up and out of the cover.



Keyboard Assembly Replacement 2016

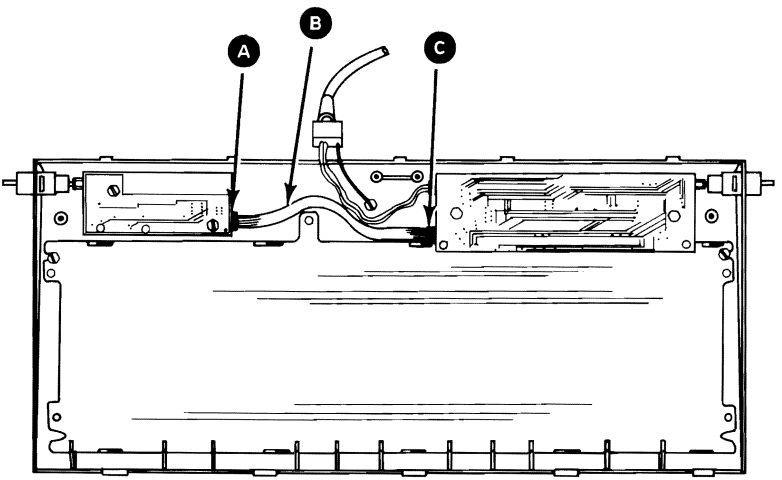
1. Place the front of the keyboard assembly (C) into the cover.
2. Install the keyboard cable **(2011)**.
3. Connect the cable to the keyboard assembly driver board (B) .
4. Lower the rear of the keyboard assembly into the cover.
5. Center the keyboard assembly left-to-right in the top cover. (Ensure the keybuttons do not bind against the top cover.)
6. Install the two mounting screws (A) .
7. Install the keyboard base **(2006)**.



Keyboard Internal Cable Removal 2017

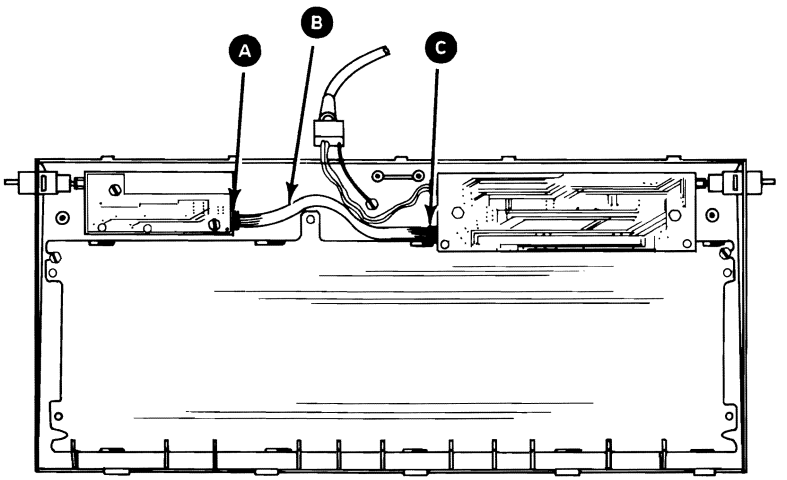
1. Remove the keyboard base **(2005)**.

2. Disconnect the internal cable (B) attached to the LED card (A) and the keyboard assembly (C).



Keyboard Internal Cable Replacement 2018

1. Connect the internal cable (B) to the LED card (A) and the keyboard assembly (C).
2. Install the keyboard base **(2006)**.

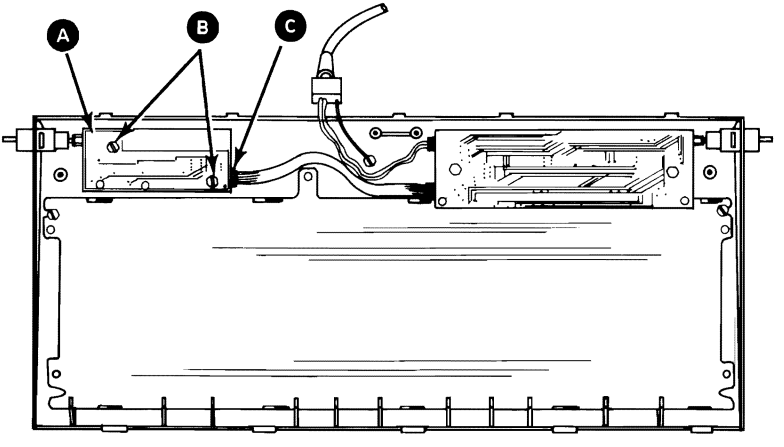


Keyboard LED Driver Card Removal 2020

1. Remove the keyboard base **(2005)**.
2. Disconnect the internal cable attached to the LED card (C) .
3. Remove the mounting screws (B) .

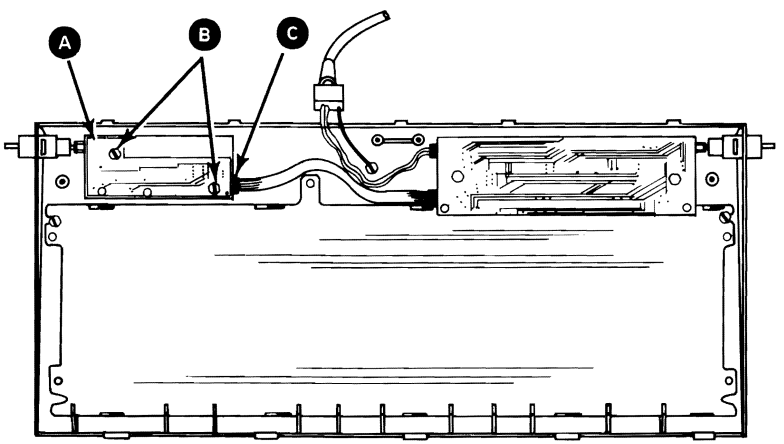
   Warning: The LED's are positioned in the keyboard top cover. Be careful not to bend or break these when removing the LED driver card.

4. Remove the LED driver card (A) .



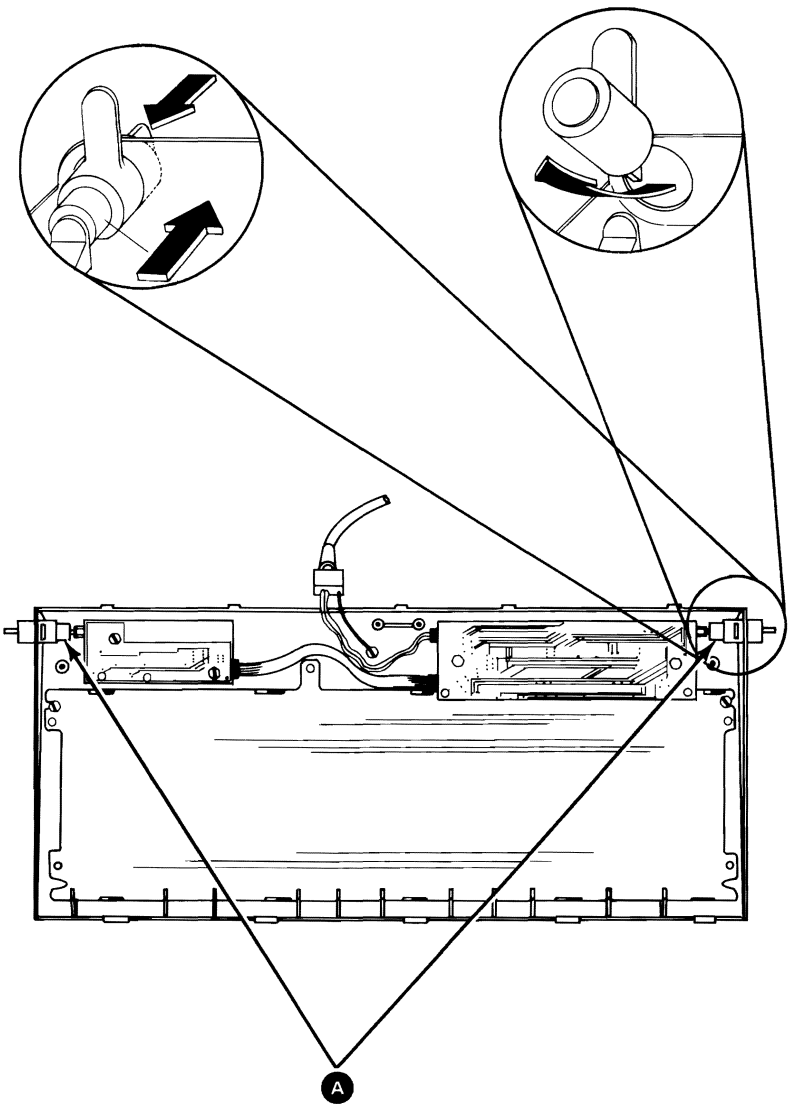
Keyboard LED Driver Card Replacement 2021

1. Align the LED's with the keyboard top cover.
2. Set the LED driver card (A) into the top cover.
3. Install the mounting screws (B) .
4. Connect the internal cable to the LED card (C) .
5. Install the keyboard base **(2006)**.



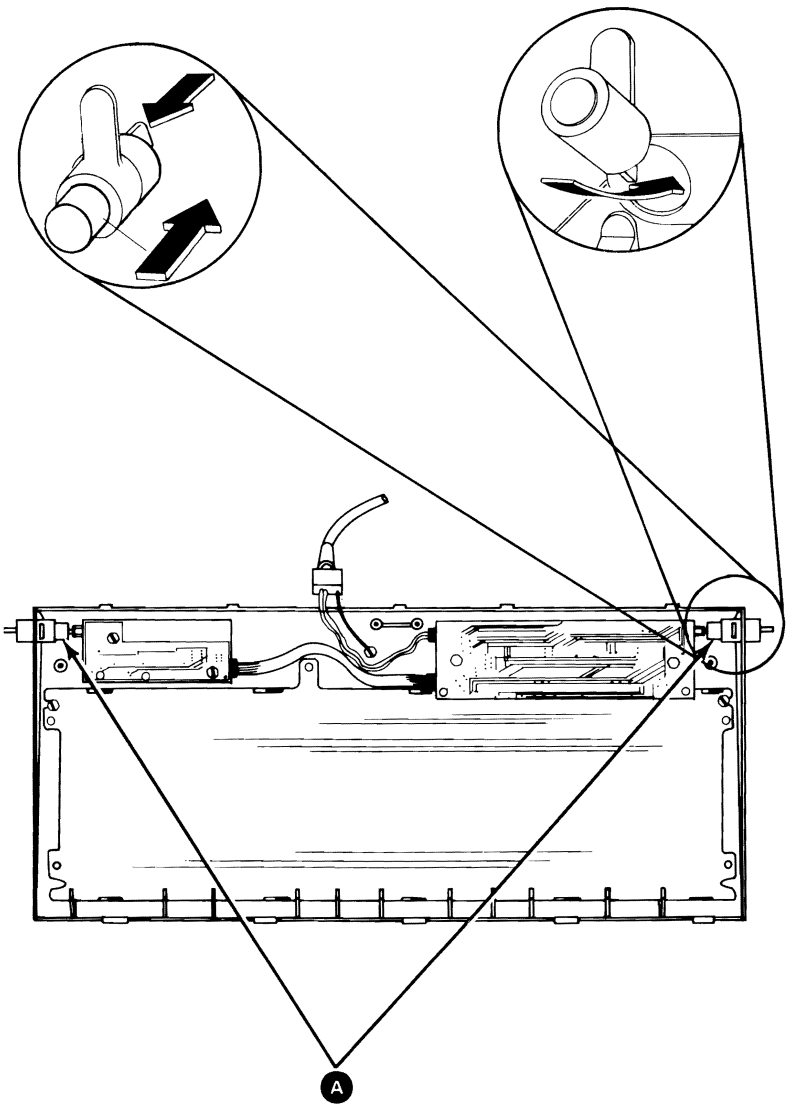
Adjustable Keyboard-Feet Removal 2025

1. Remove the keyboard base **(2005)**.
2. Compress the keyboard foot assembly (A) .
3. Move the foot assembly up and out of the keyboard top cover.



Adjustable Keyboard-Feet Replacement 2026

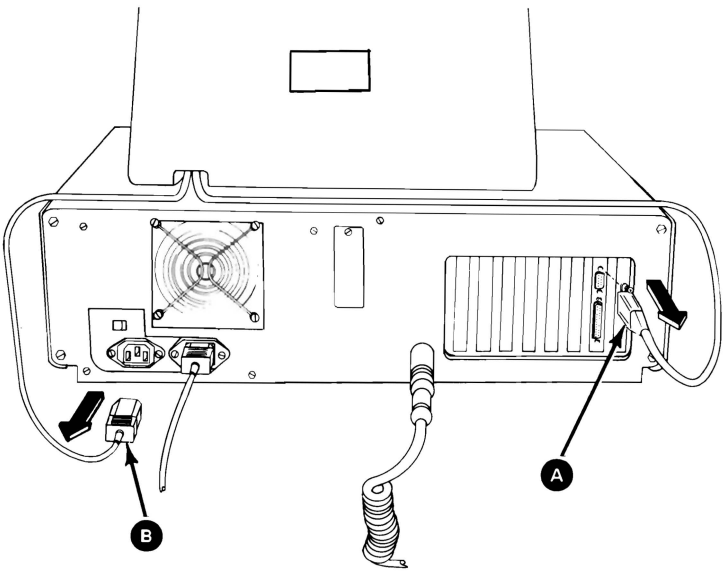
1. Compress the keyboard foot assembly (A) .
2. Insert the foot assembly through the hole in the keyboard top cover.
3. Install the keyboard base **(2006)**.



Displays

IBM Monochrome Display Removal 3005

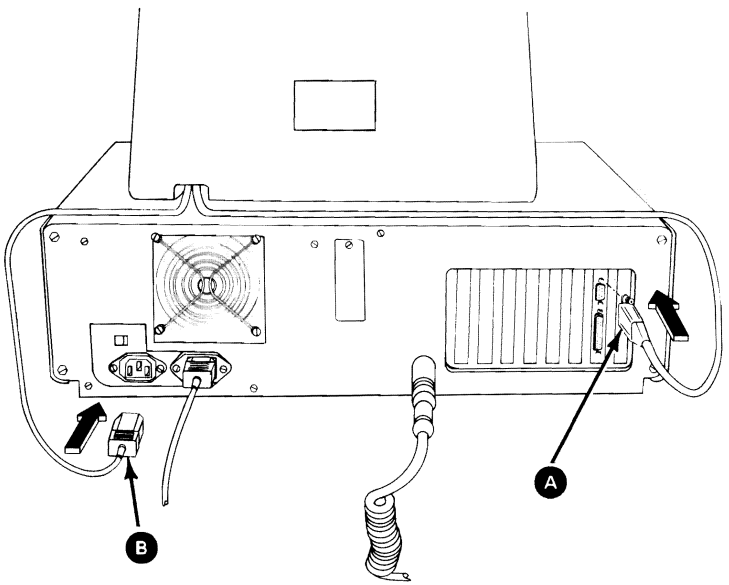
1. Set the system unit's Power switch to Off.
2. Unplug the display's power cord (B) from the back of the system unit.
3. Disconnect the signal cable (A) from the system unit.



IBM Monochrome Display Replacement 3006

1. Connect the display's signal cable (A) to the display adapter.

2. Plug the display's power cord (B) to the rear of the system unit.



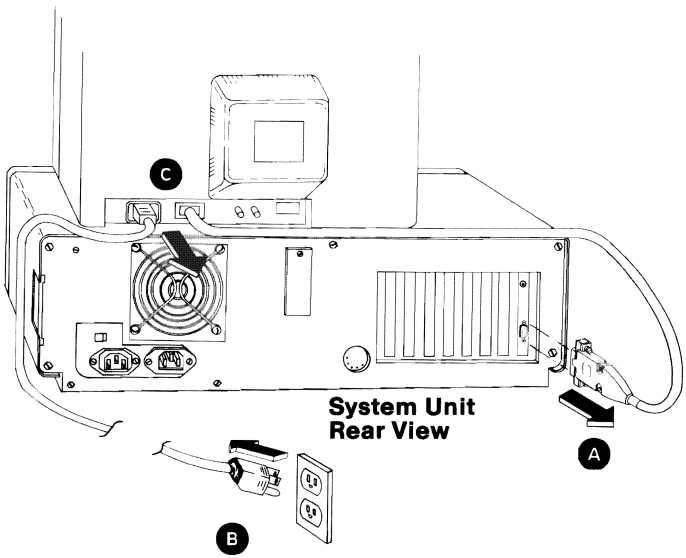
IBM Color Display Removal 3010

1. Set the Power Switches on the system unit and Color Display to Off.

2. Unplug the display's power cord (B) from the outlet.

3. Disconnect the signal cable (A) from the system unit.

4. Unplug the display's power cord (C) from the rear of the display.

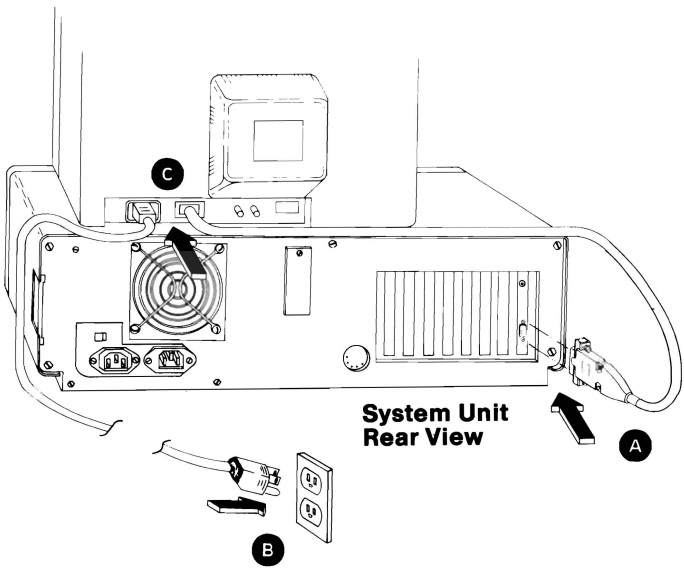


IBM Color Display Replacement 3011

1. Connect the display's signal cable (A) to the system unit.

2. Plug the display's power cord (C) into the rear of the display.

3. Plug the display's power cord (B) into the outlet.

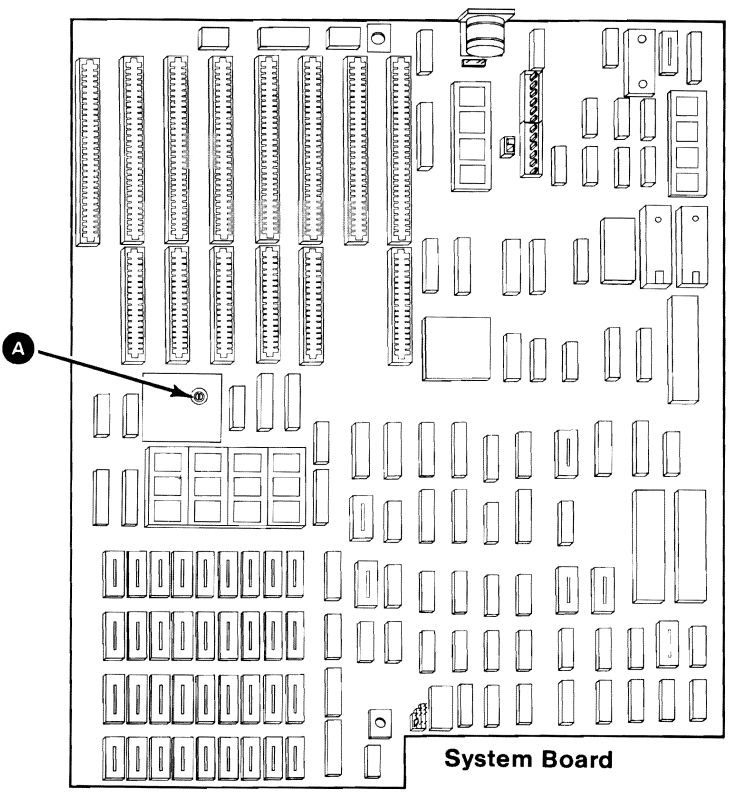


Variable Capacitor Adjustment 3020

Note: This adjustment is effective for composite displays only.

If your display works correctly, except the color is incorrect or absent, adjust the variable capacitor (A) on the system board as follows:

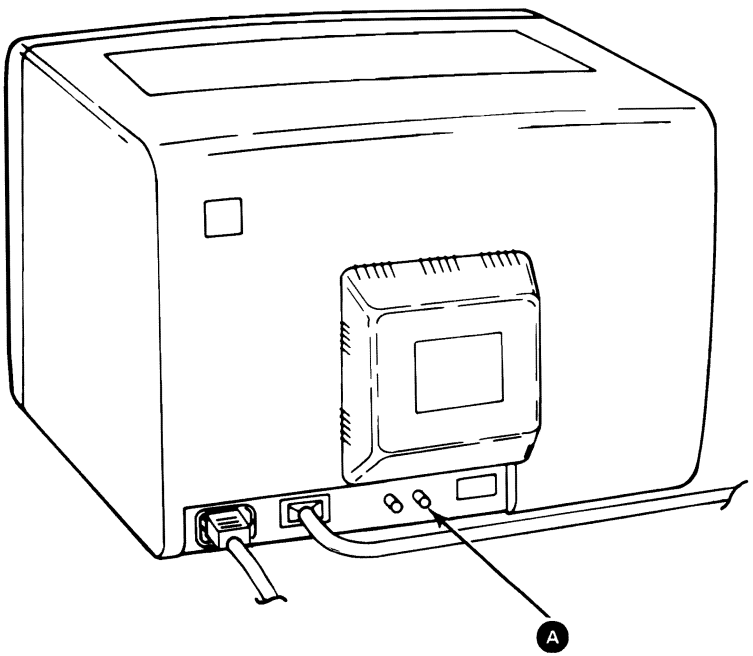
1. Remove the system unit's cover **(1005)**.
2. Find the variable capacitor adjustment control.
3. Using a small, nonmetallic screwdriver, adjust the variable capacitor in small increments until the correct color returns.
4. Adjust the Tint and Color controls on the display.



Vertical-Hold Adjustment 3025

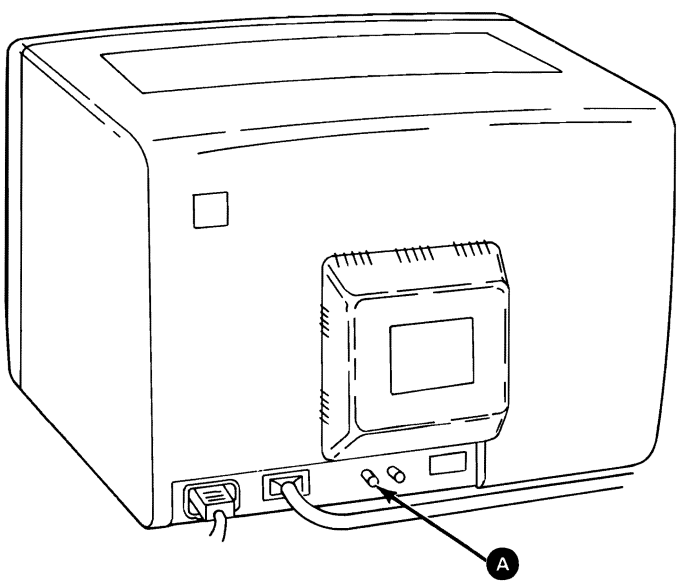
If your IBM Color Display has a vertical hold problem (image rolling), adjust the Vertical Hold control (A) as follows:

1. Set the Color Display's Power switch to On.
2. Set the system unit's Power switch to On.
3. Wait for the POST to finish.
4. Turn the Vertical Hold control fully clockwise.
5. Turn the Vertical Hold control counterclockwise until the image stops rolling and is steady.



Vertical Size Adjustment 3030

1. Set the system unit's Power switch to Off.
2. Set the Color Display's Power Switch to On.
3. Turn the Brightness and Contrast controls fully clockwise.
4. Turn the Vertical Size control (A) fully counterclockwise. A black area appears across the top and bottom of the screen.
5. Turn the Vertical Size control clockwise until both black areas disappear.
6. Adjust the Brightness and Contrast controls for eye comfort.



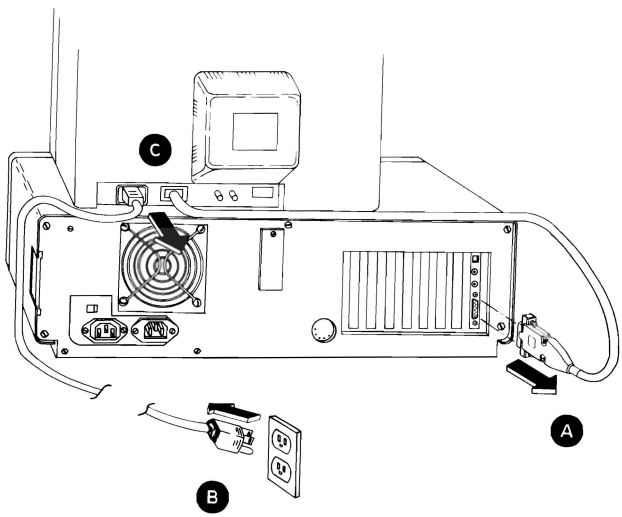
Enhanced Color Display Removal 3035

1. Set the power switches on the system unit and Enhanced Color Display to Off.

2. Unplug the display's power cord (B) from the outlet.

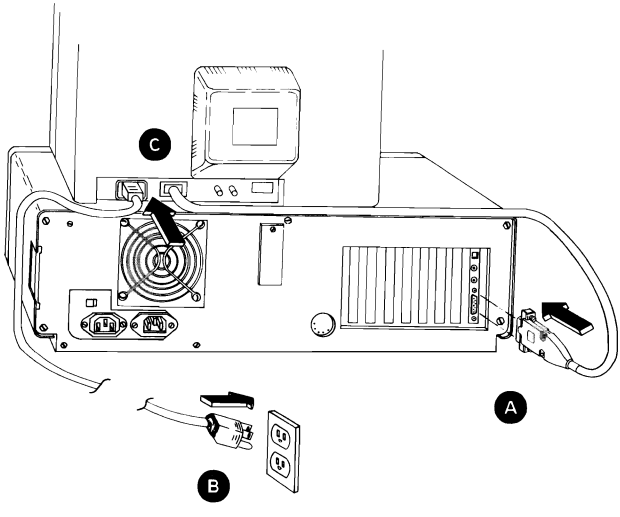
3. Disconnect the signal cable (A) from the system unit.

4. Unplug the display's power cord (C) from the rear of the display.



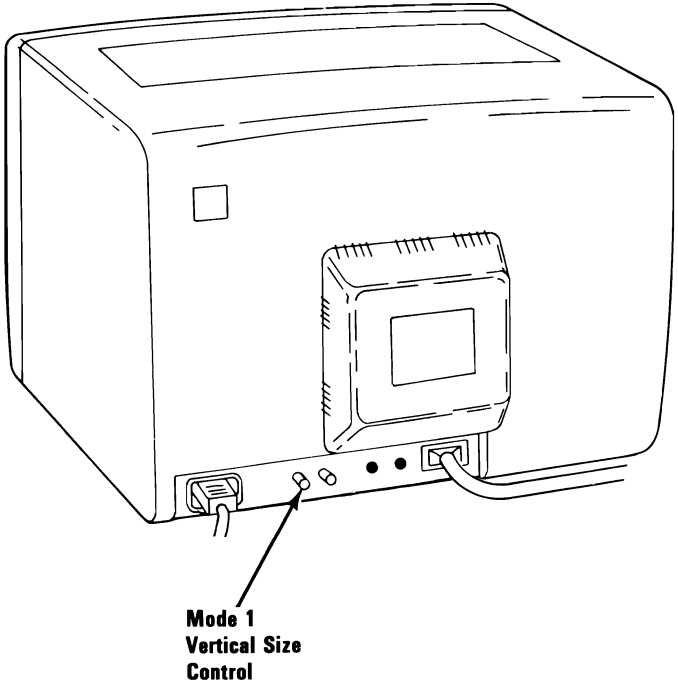
Enhanced Color Display Replacement 3040

1. Connect the display's signal cable (A) to the system unit.
2. Plug the display's power cord (C) into the rear of the display.
3. Plug the display's power cord (B) into the outlet.



Enhanced Color Display Vertical Size Adjustment (Mode 1) 3045

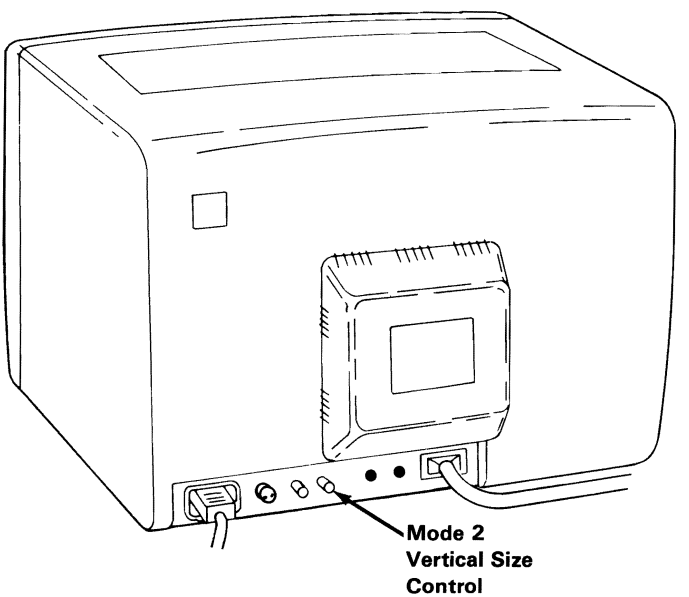
1. Set the system unit's Power switch to Off.
2. Set the Enhanced Color Display's Power switch to On.
3. Turn the Brightness control fully clockwise.
4. Turn the Vertical Size 1 control fully counterclockwise. A black area appear at the top and bottom of the screen.
5. Turn the Vertical Size control clockwise until both black areas disappear.
6. Adjust the Brightness control for eye comfort.



Enhanced Color Display Vertical Size Adjustment (Mode 2) 3050

In order to make this adjustment, the display must be connected to an IBM Enhanced Graphics Adapter operating in the Enhanced Color Mode. See Section 6 "System Setup, Jumpers, and Switch Settings".

1. Set the Enhanced Color Display's Power switch to On.
2. Turn the Brightness control fully clockwise.
3. Set the system unit's Power switch to On.
4. Wait for the POST to finish.
5. Adjust the Vertical Size 2 control until the black areas at the top and bottom of the screen are approximately the same size as the black areas at the sides.
6. Adjust the Brightness control for eye comfort.



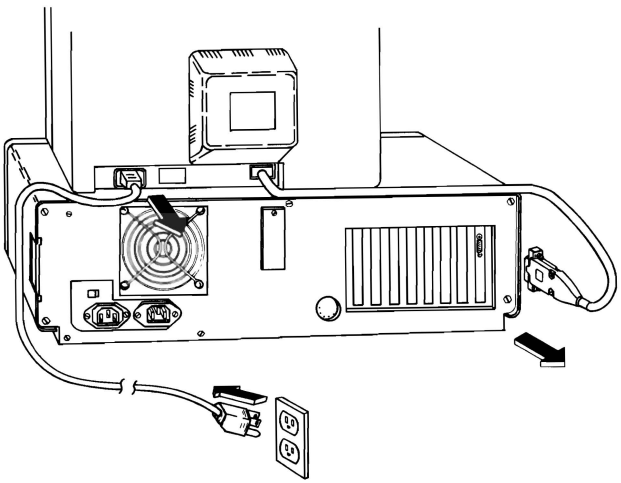
Professional Graphics Display Removal 3055

1. Set the Power switch on the system unit and the Power control on the display to Off.

2. Unplug the display power cord from the outlet.

3. Disconnect the display signal cable from the Professional Graphics Adapter.

4. Disconnect the power cord from the rear of the display.



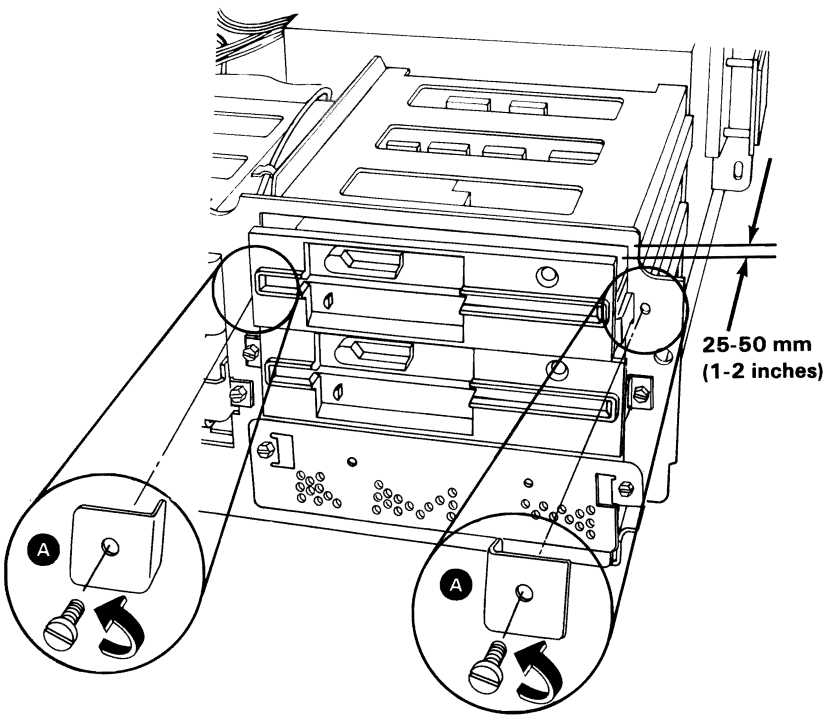
Professional Graphics Display Replacement 3056

1. Connect the signal cable from the display to the Professional Graphics Adapter.
2. Connect the power cord to the rear of the display.
3. Plug the power cord into the outlet.

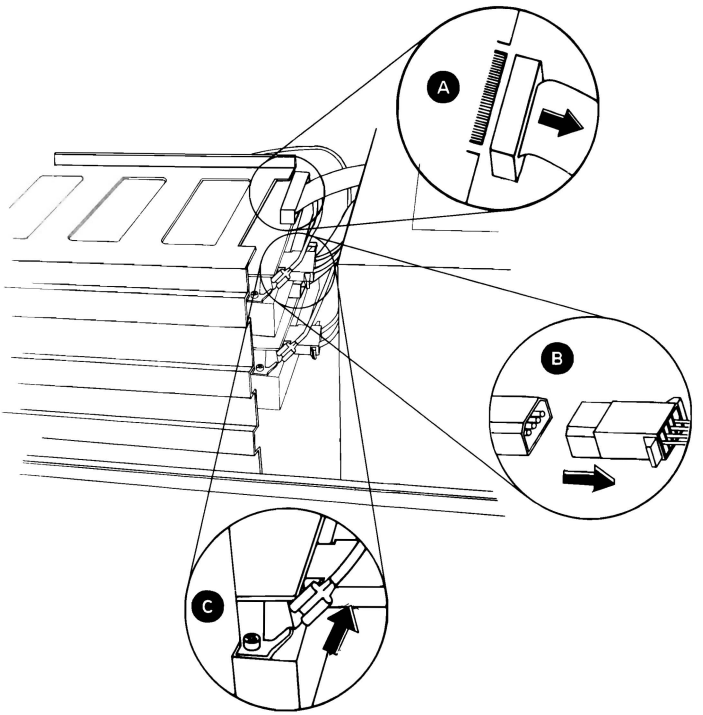
Diskette Drive Removal 4005

If you have two diskette drives, you may have to remove the diskette drive in the top slot to gain access to the diskette drive connectors in the bottom slot.

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Remove the mounting screws and clips (A).
4. Slide the diskette drive approximately 25-50 mm (1-2 inches) toward the front.



5. Disconnect the diskette drive's power cable (B) .
6. Disconnect the diskette drive's signal cable (A) .
7. Disconnect the diskette drive's ground wire (C) .
8. Slide the diskette drive out through the front of the system unit.



Diskette Drive Replacement 4006

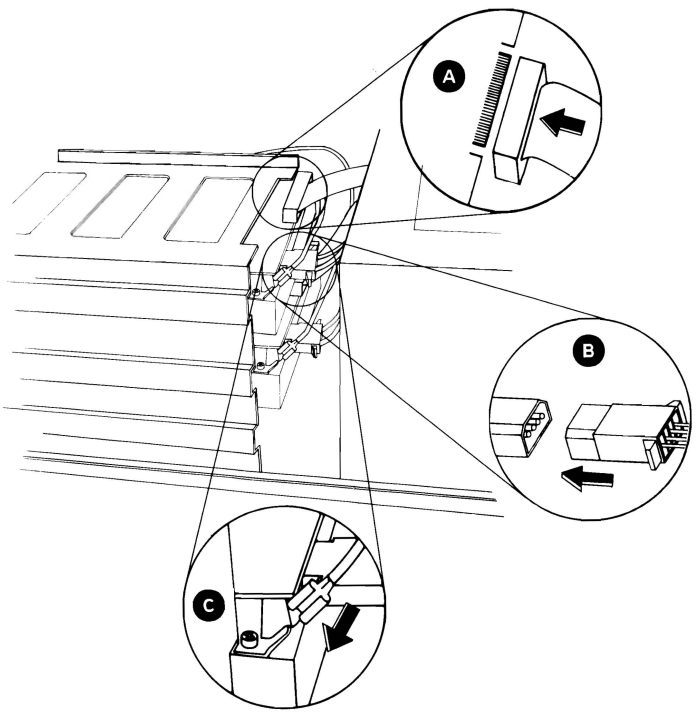
1. Slide the diskette drive into the system unit until the front panel is approximately 25-50 mm (1-2 inches) from the frame.

2. Connect the diskette drive's power cable (B) .

3. Connect the diskette drive's signal cable (A) .

   Note: Be sure to align the locating key on the signal cable connector with the locating slot on the diskette drive board.

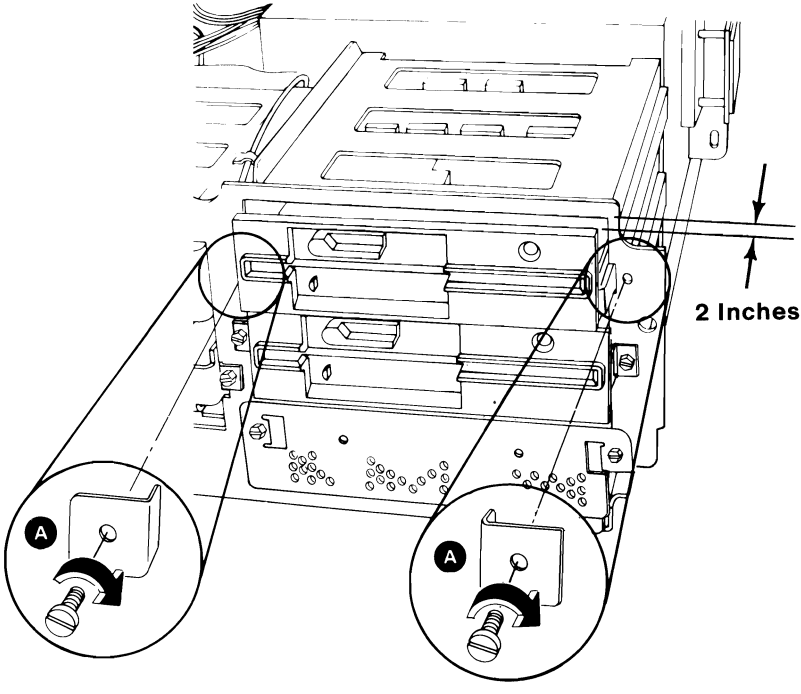
4. Connect the diskette drive's ground wire (C) .



5. Slide the diskette drive all the way into the system unit.

6. Install the clips and mounting screws (A) .

7. Install the system unit's cover **(1006)**.



Drive-Motor Speed Adjustment 4008

1. Insert the Advanced Diagnostics diskette into drive A.

2. Set the system unit's Power switch to On.

3. Advance to diagnostic menu 9 (see Section 2).

4. In menu 9, select option **4 (SPEED TEST)**, for the diskette drive you are testing. The drive-motor speed and the adjustment specification appear on the screen.

5. The indicated speed should be within the range displayed on your screen. If it is not, continue on the next page.

```
SPEED IS 1660

SHOULD BE 1640 TO 1695
PRESS ANY KEY TO EXIT

SPEED IS 1660

SHOULD BE 1640 TO 1695
PRESS ANY KEY TO EXIT
```

6. Set the system unit's Power switch to Off.

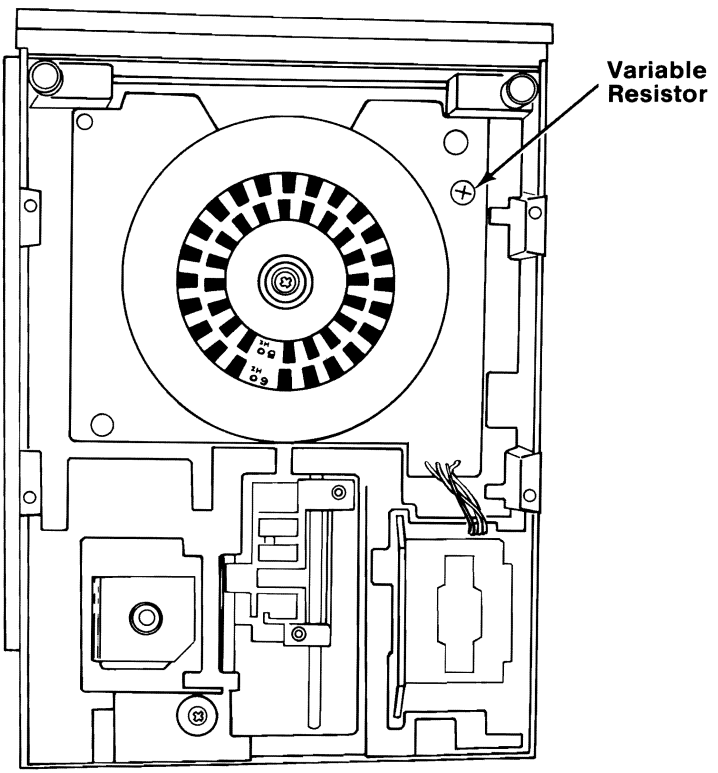
7. Remove the system unit's cover **1005**.

8. Reconnect all cables.

9. Remove the diskette drive's mounting screws and clips **(4005)**.

10. Slide the diskette drive approximately 78 mm (3 inches) toward the front.

11. The adjustment for the drive-motor speed is a variable resistor on the diskette drive circuit board (on the underside of the diskette drive). To adjust the speed, carefully insert an insulated screwdriver into the resistor's slot.



12. Turn the screw until the speed shown on the screen is within the required specifications.

```
SPEED IS 1660

SHOULD BE 1640 TO 1695
PRESS ANY KEY TO EXIT

SPEED IS 1660

SHOULD BE 1640 TO 1695
PRESS ANY KEY TO EXIT
```

13. Set the system unit's Power switch to Off.

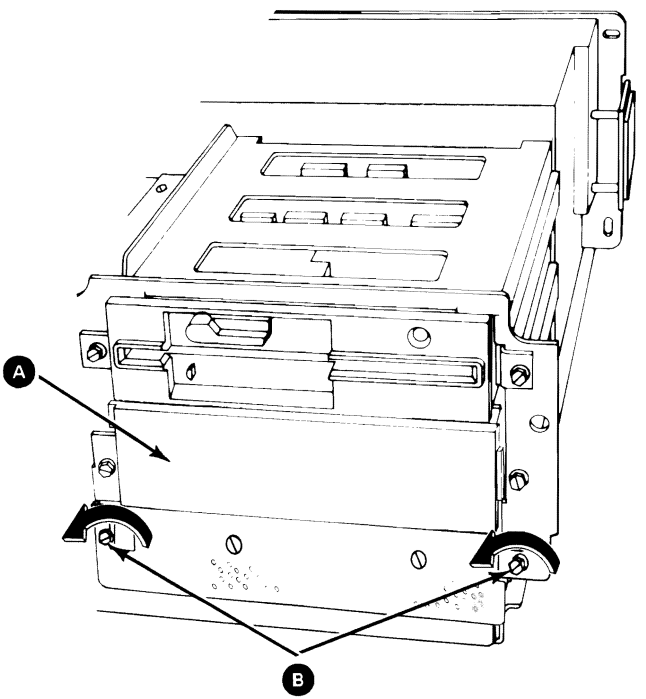
14. Unplug the power cord from the outlet.

15. Disconnect all cables from the system unit.

16. Replace the system unit's cover **(1006)**.

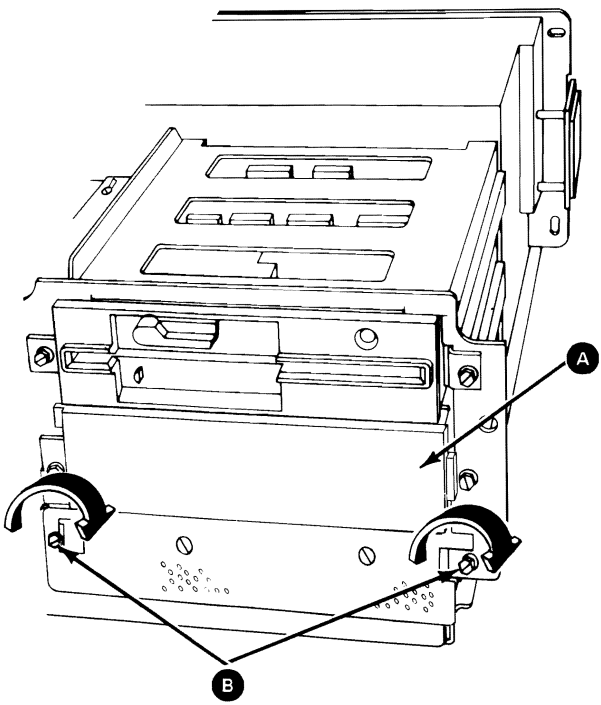
Diskette Drive Cover-Plate Removal 4010

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Remove the mounting screws (B) and cover plate (A).



Diskette Drive Cover-Plate Replacement 4011

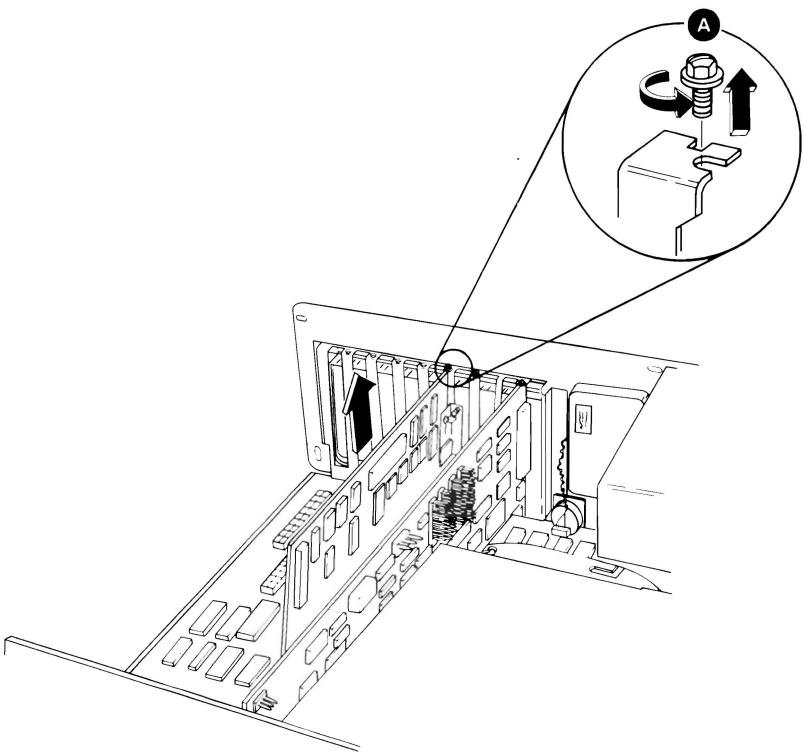
1. Install the cover plate (A) and mounting screws (B) .
2. Install the system unit's cover **(1006)**.



Adapters

Option Adapter Removal 5005

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Make a note of which slot the adapter is in.
4. Remove any cables attached to the adapter.
5. Remove the adapter mounting screw (A) .
6. Grasp the adapter by the top corners and lift straight up.



Option Adapter Replacement 5006

1. Insert the adapter into the same option slot from which it was removed.

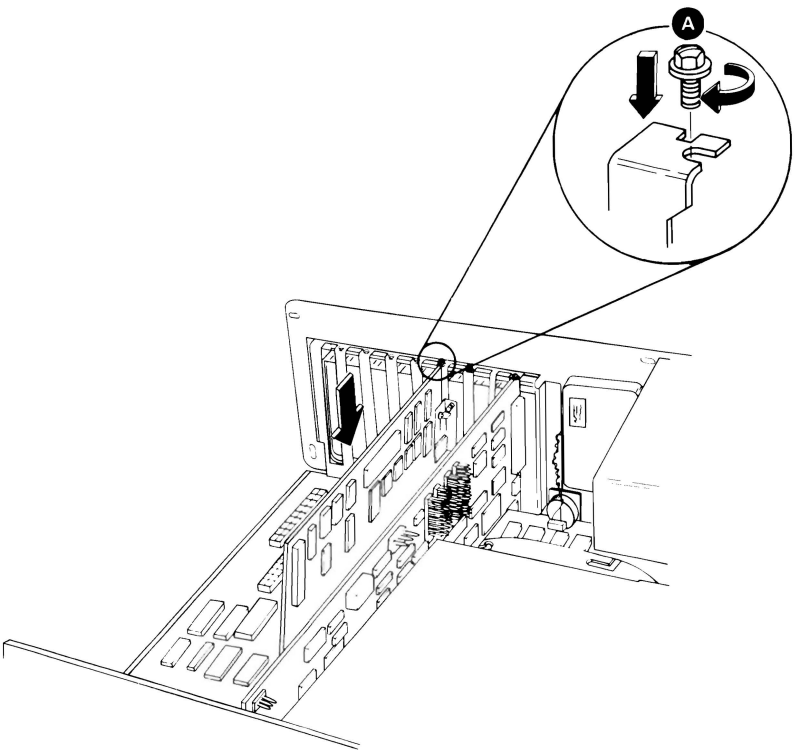
   Note: Make any necessary switch or jumper settings before installing the adapter.

2. Press down firmly on the adapter to seat the connector.

3. Install the adapter mounting screw (A) .

4. Install any cables removed from the adapter.

5. Install the system unit's cover **(1006)**.



Memory Module Removal 5007

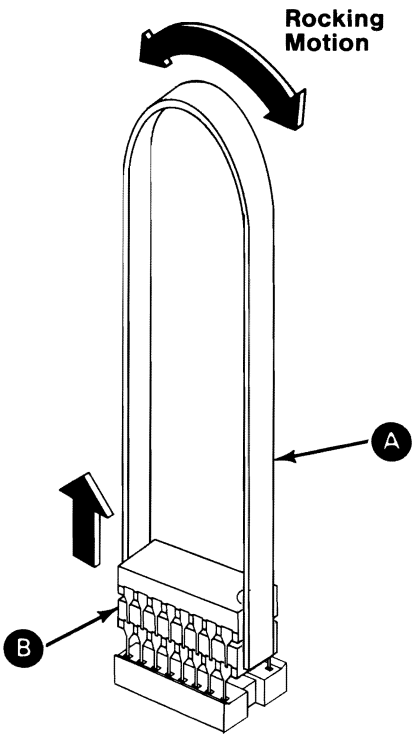
1. Set the system unit's Power switch to Off.

2. Remove the system unit's cover (**1005**).

3. Find the failing memory expansion adapter (see Section 3).

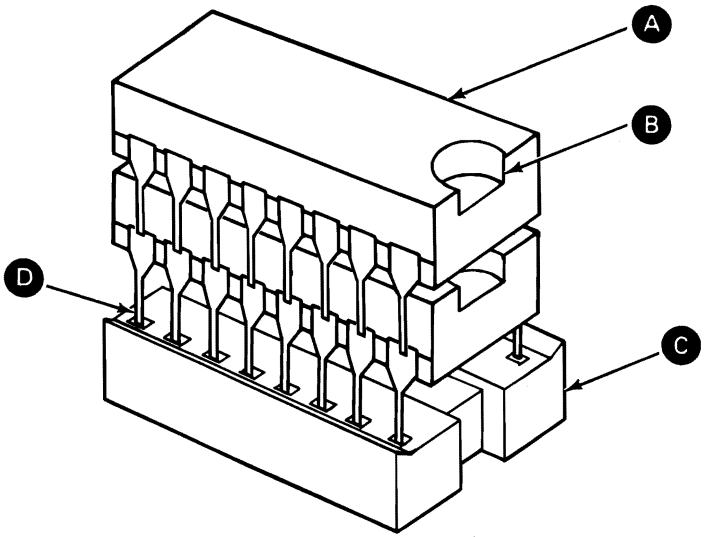
4. Remove the memory expansion adapter (**5005**) and find the failing module (see Section 3).

5. Grasp the module (B) with the module puller (A) and gently lift one end and then the other, to avoid bending the pins.



Memory Module Replacement 5008

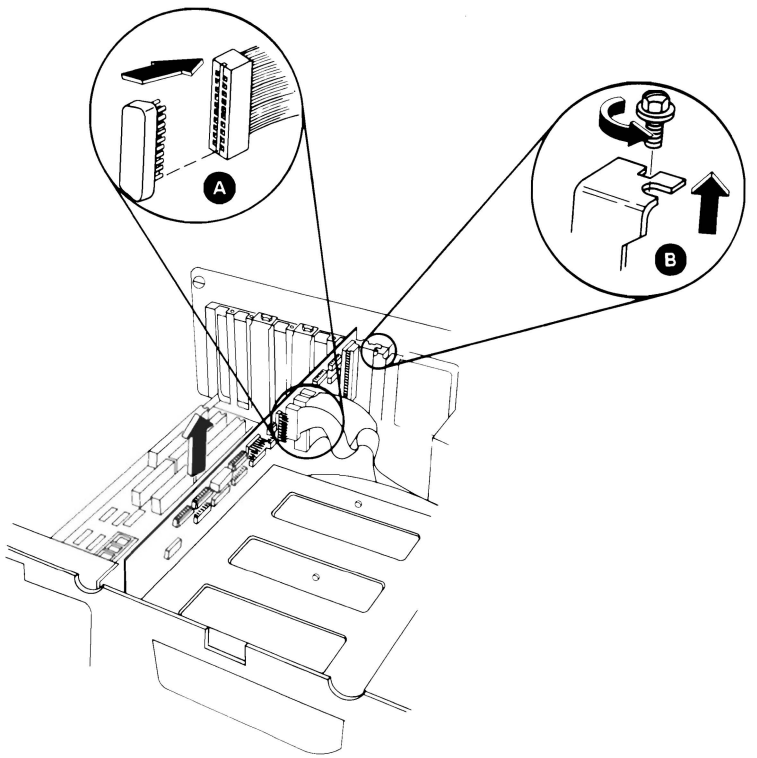
1. Line up the module (A) so the notch (B) faces the same direction as those on other modules.
2. Line up the module pins (D) with the sockets on the connector (C).
3. Gently press the module onto the connector.
4. Install the memory expansion adapter (**5006**).
5. Install the system unit's cover (**1006**).



128Kb Module

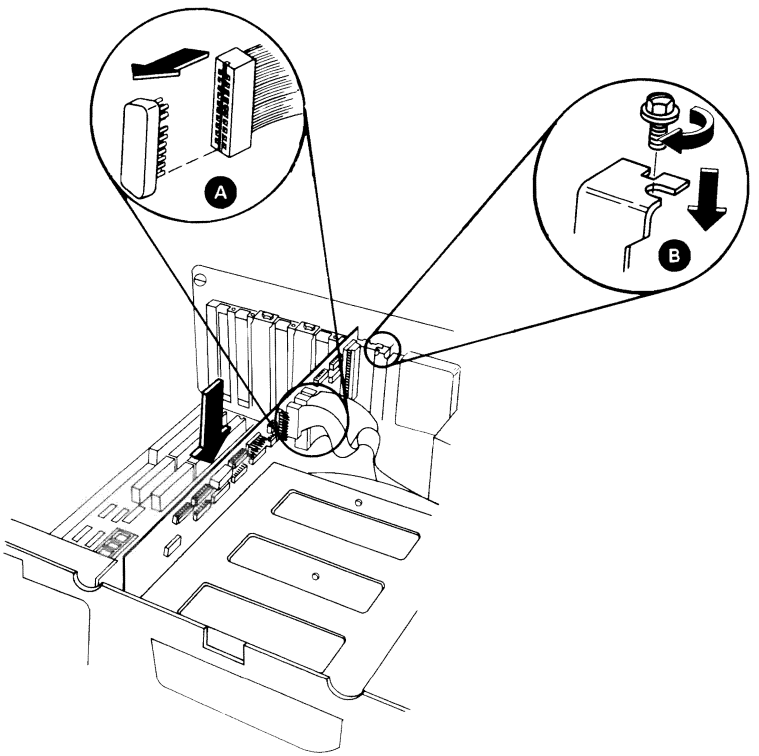
Fixed Disk and Diskette Drive Adapter Removal 5010

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Make a note of which slot the adapter is in.
4. Disconnect all cables (A) from the adapter.
5. Remove the Fixed Disk and Diskette Drive Adapter's mounting screw (B) .
6. Grasp the adapter by the top corners and lift straight up.



Fixed Disk and Diskette Drive Adapter Replacement 5011

1. Insert the Fixed Disk and Diskette Drive Adapter into the same option slot from which it was removed from.
2. Press down on the adapter to seat the connector.
3. Install the adapter's mounting screw (B) .
4. Connect all cables (A) to the adapter.
5. Install the system unit's cover **(1006)**.



Graphics Memory Expansion Card Removal 5011A

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

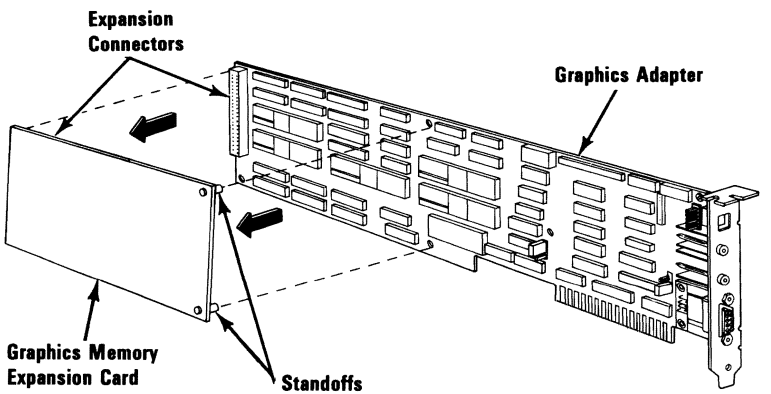
2. Set all external Power switches to Off (printer, display, etc.).

3. Unplug the system unit's (and expansion unit's) power cord from the wall outlet and disconnect all cables from the rear of the system unit.

4. Remove the system unit cover **(1005)**.

5. Remove the Enhanced Graphics Adapter **(5005)**.

6. Remove the Expansion Card by pressing on the ends of the standoffs (on the pin side of the adapter) to release them from the adapter. Then carefully separate the Expansion Card from the adapter.



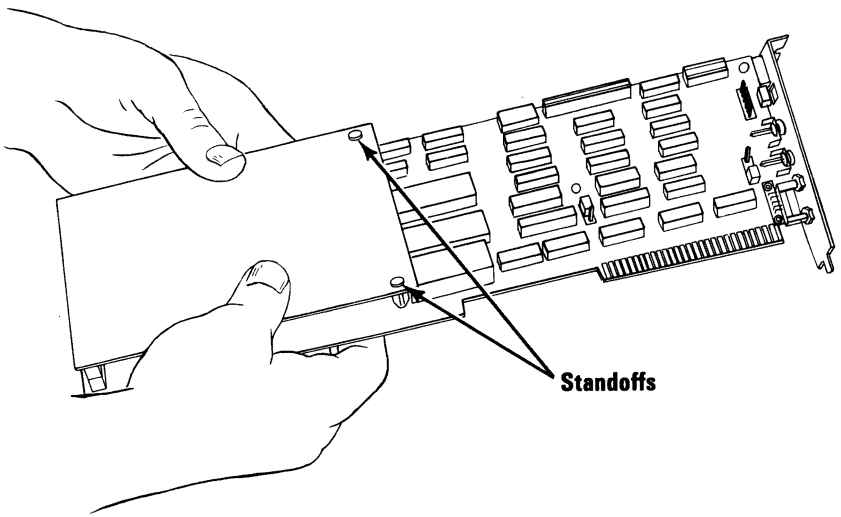
Graphics Memory Expansion Card Replacement 5011B

1. Align the Expansion Card with the graphics adapter. Pay close attension to the location of the standoffs and expansion connectors.

2. Carefully press the Expansion Card and graphics adapter together.

3. Replace the Enhanced Graphics Adapter **(5006)**.

4. Replace the system unit cover **(1006)**.



Graphics Memory Module Removal 5011C

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

2. Set all external Power switches to Off (printer, display, etc.).

3. Unplug the system unit's (and expansion unit's) power cord from the wall outlet and disconnect all cables from the rear of the system unit.

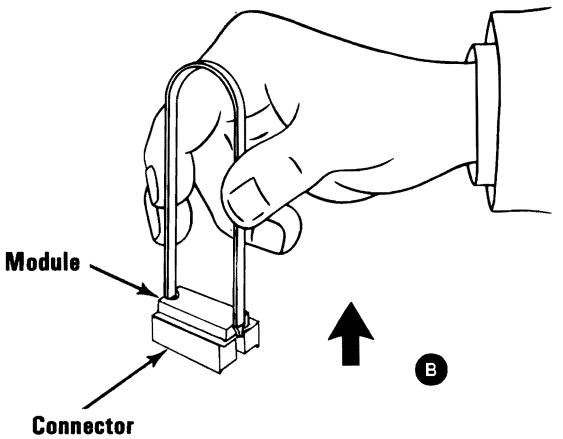
4. Remove the system unit cover **(1005)**.

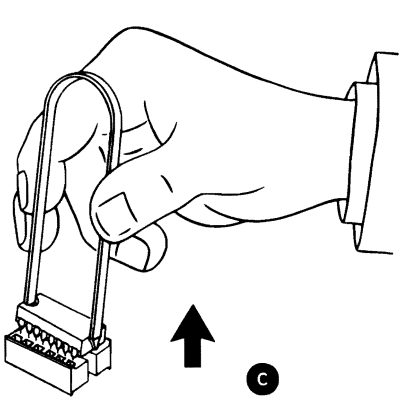
5. Remove the Enhanced Graphics Adapter **(5005)**.

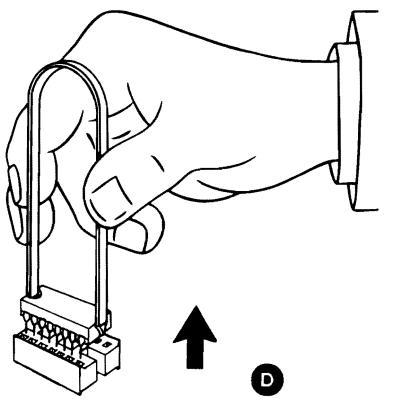
6. Remove the Graphics Memory Expansion Card **(5011A)**

7. Locate the module to be removed.

8. To separate the module from the connector, Grasp the module as shown in B. Lift in a two step motion, as shown in C and D, to avoid bending pins.







Graphics Memory Module Replacement 5011D

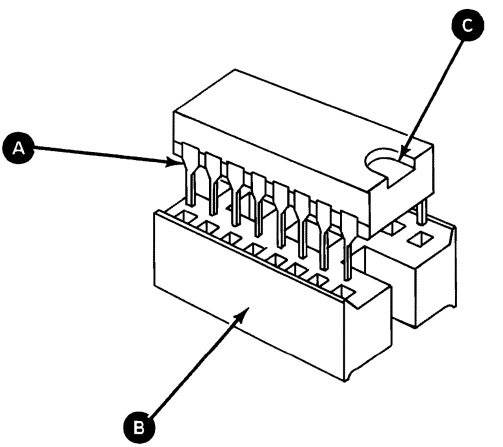
1. Align the module pins (A) with the connector (B) and firmly press the module into place. The notch (C) on the module should face the bottom of the card.

2. Replace the Graphics Memory Expansion Card. **(5011B)**

3. Replace the Enhanced Graphics Adapter **(5006)**.

4. Replace the system unit cover **(1006)**.

   Warning: Damage to the module or expansion card may result if the modules are installed incorrectly. The module must be installed with the notch facing the bottom of the card.

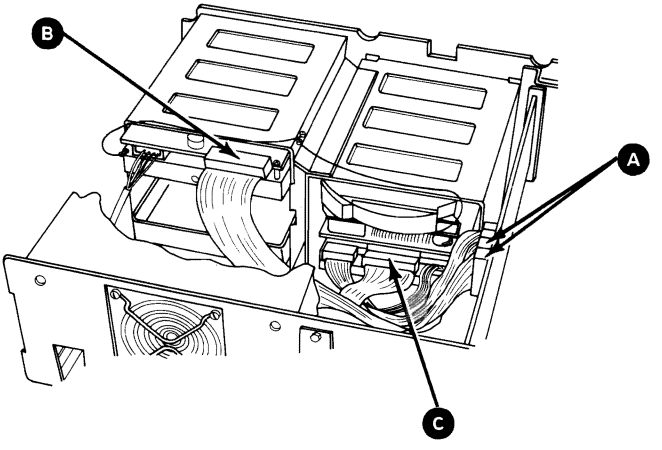


Notes:

Fixed Disk and Diskette Drive Signal Cable

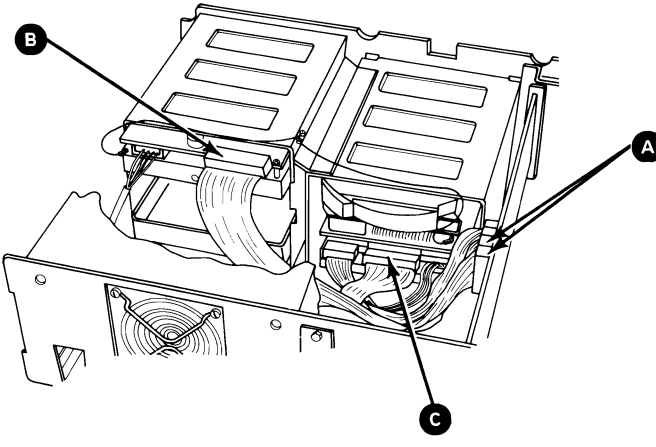
Fixed Disk and Diskette Drive Signal Cable Removal 5012

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Make a note of where each cable is attached to the Fixed Disk and Diskette Drive Adapter, and to the diskette drives and fixed disk drives installed.
4. Disconnect the cables from the adapter (A), the diskette drives (B), and fixed disk drives (C).
5. Remove the signal cable from the system unit.



Fixed Disk and Diskette Drive Signal Cable Replacement 5013

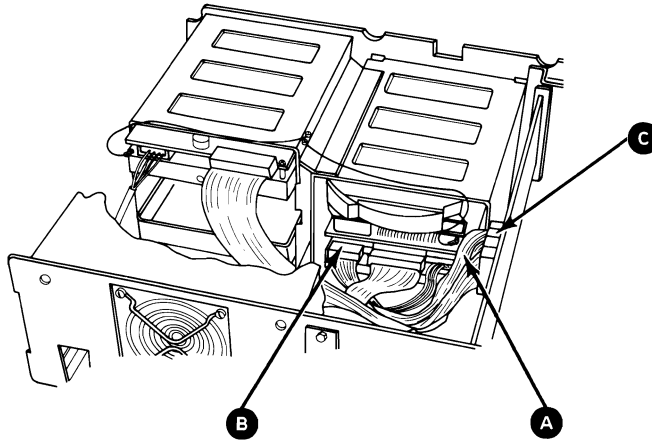
1. Connect the cables to the Fixed Disk and Diskette Drive Adapter (A) .
2. Connect the cables to the diskette drives (B) and fixed disk drives (C) installed.
3. Install the system unit's cover **(1006)**.



Fixed Disk Drive Data Cable

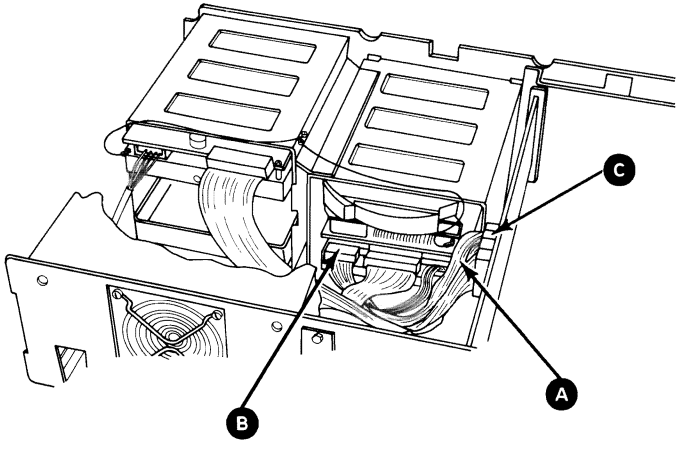
Fixed Disk Drive Data Cable Removal 5014

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover **(1005)**.
3. Make a note of where the data cable (A) is attached to the Fixed Disk and Diskette Drive Adapter (C) and the fixed disk drive (B) .
4. Disconnect the cable from the adapter and fixed disk drive.
5. Remove the data cable from the system unit.



Fixed Disk Drive Data Cable Replacement 5015

1. Connect the data cable (A) to the Fixed Disk and Diskette Drive Adapter (C).
2. Connect the data cable to the fixed disk drive (B).
3. Replace the system unit's cover **(1006)**.



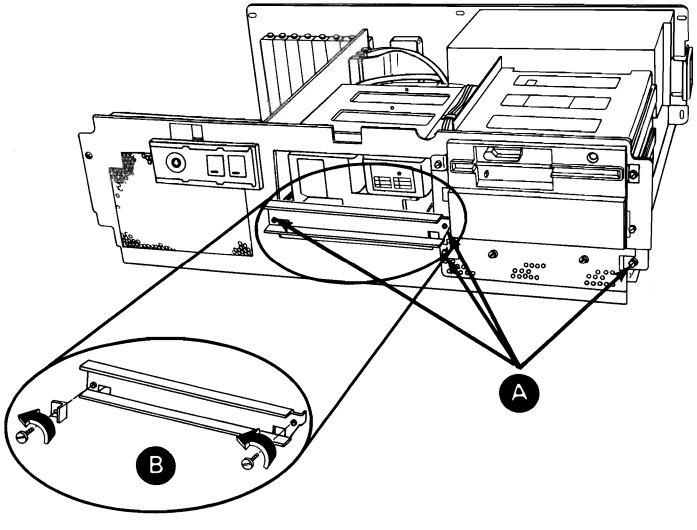
Fixed Disk Drive Removal 5016

Warning: Normal shipping and handling can result in permanent loss of all data and formatting on the fixed disk drive; refer to your DOS manual and backup all information. Before removing the fixed disk drive, perform the "Prepare System For Relocation" function with the Advanced Diagnostics diskette.

If your system has two fixed disk drives and one diskette drive, you may have to remove the diskette drive to gain access to the connectors of the second fixed disk drive.

1. Set the system unit's Power switch to Off.
2. Remove the the system unit's cover **(1005)**.
3. Remove the mounting screws and clips (A) .

   Note: A keeper bar (B) may replace the mounting clips for drive C.



4. If required, remove the diskette drive **(4005)**.

5. Disconnect the fixed disk drive's ground wire (A) .

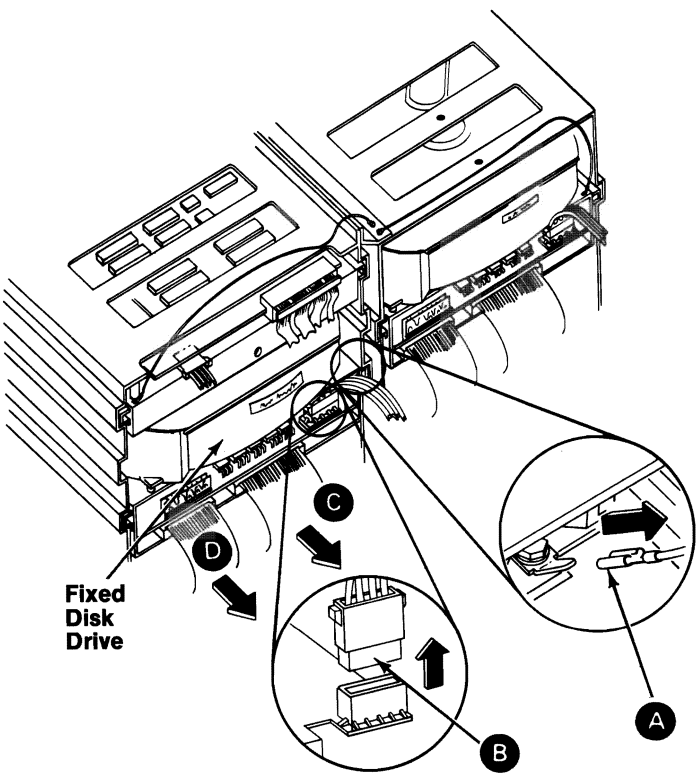
6. Disconnect the fixed disk drive's power cable (B) .

7. Disconnect the fixed disk drive's signal cable (C) .

8. Disconnect the fixed disk drive's data cable (D) .

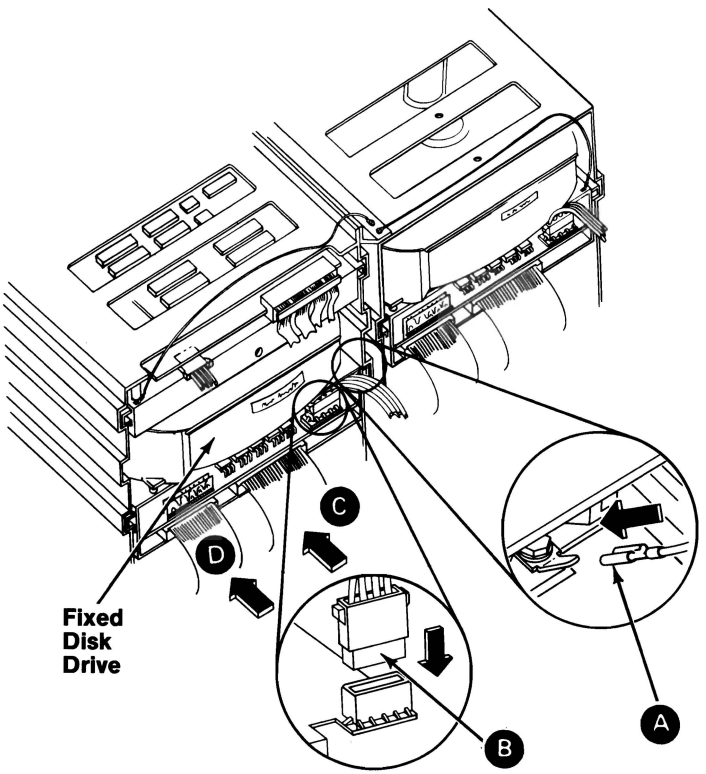
9. Grasp the fixed disk drive by the frame and slide it toward the front and out of the system unit.

   Warning: Do not lift the fixed disk drive by the printed circuit board.



Fixed Disk Drive Replacement 5017

1. Grasp the fixed disk drive by the frame and slide it into the system unit.
2. Connect the fixed disk drive's data cable (D) .
3. Connect the fixed disk drive's signal cable (C) .
4. Connect the fixed disk drive's power cable (B) .
5. Connect the fixed disk drive's ground wire (A) .

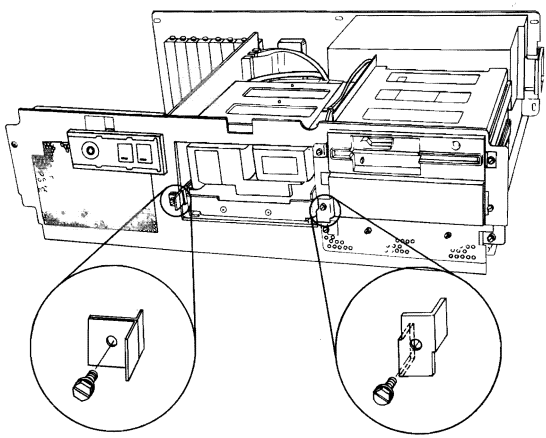


6. If the diskette drive was removed, reinstall it **(4006)**.

7. Install the mounting screws and clips.

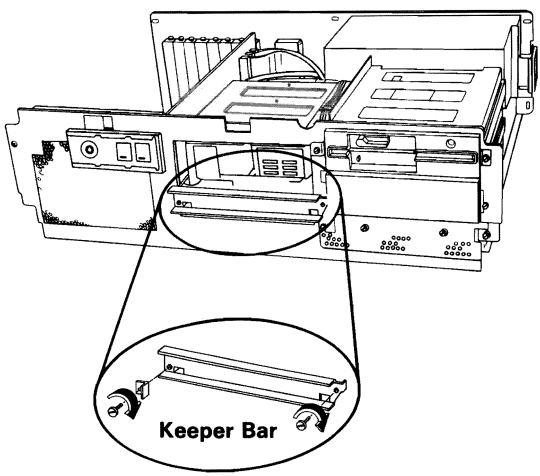
8. Install the keeper bar if present.

9. Install the system unit's cover **(1006)**.



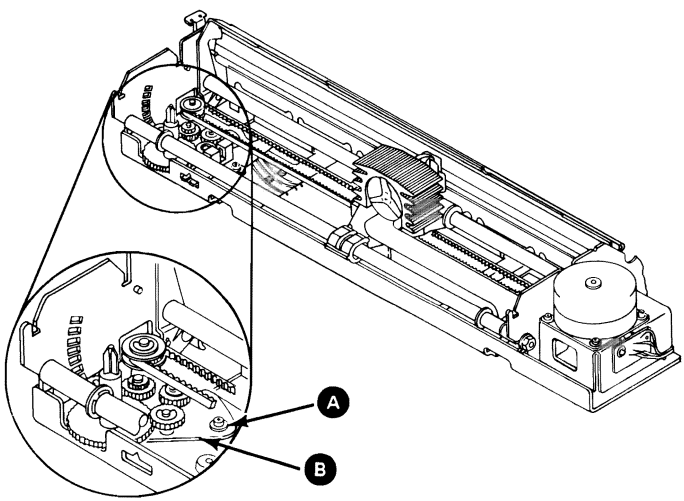
Mounting Screws and Clips

Front View



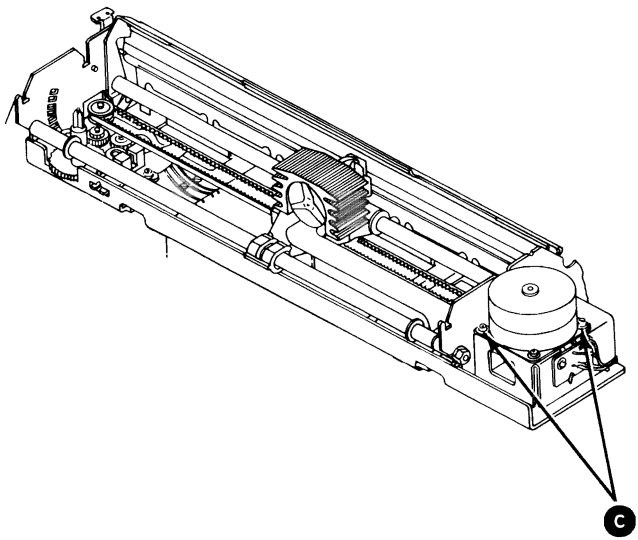
Carriage Belt Adjustment 5600

1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove 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. Loosen the hold-down screw **A** in the carriage drive assembly.
8. Pivot the carriage drive assembly **B** to the left to tighten the belt.



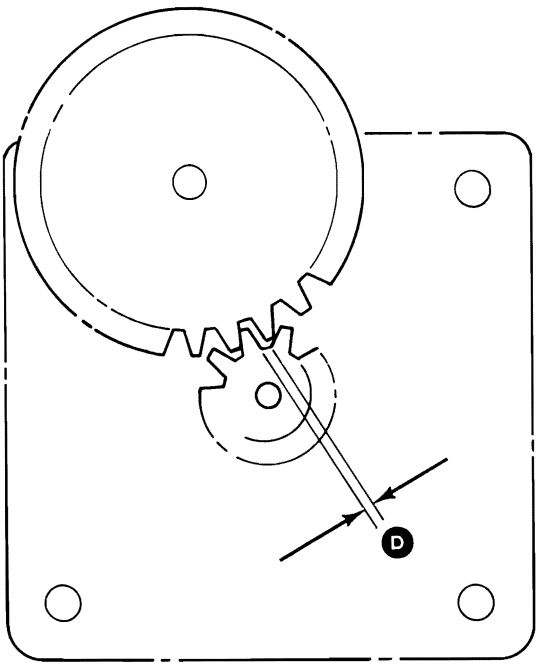
9. Tighten the hold-down screw.

10. Loosen the screws (C) in the carriage motor mounts.



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

12. Adjust the motor for minimum backlash between the gears (D).

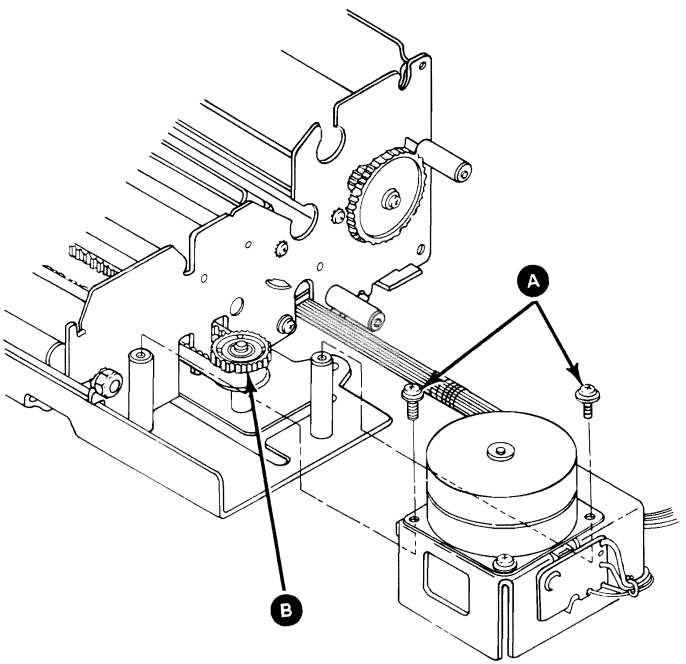


13. Tighten the motor mounting screws.

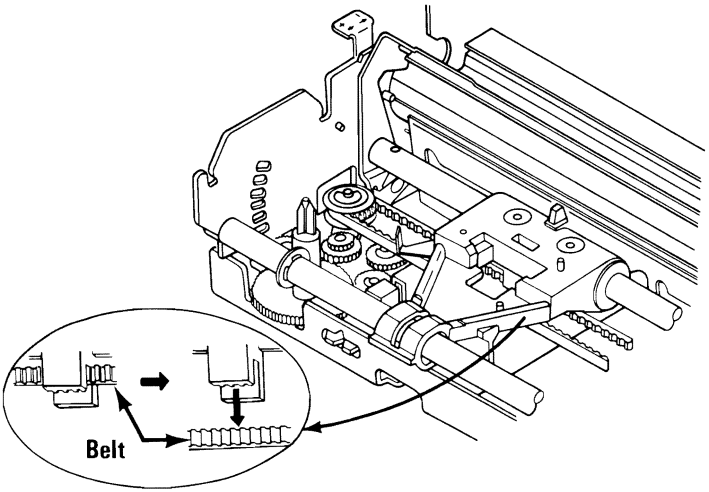
14. Move the print head back and forth and check that the gear operates without binding.

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 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 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**.

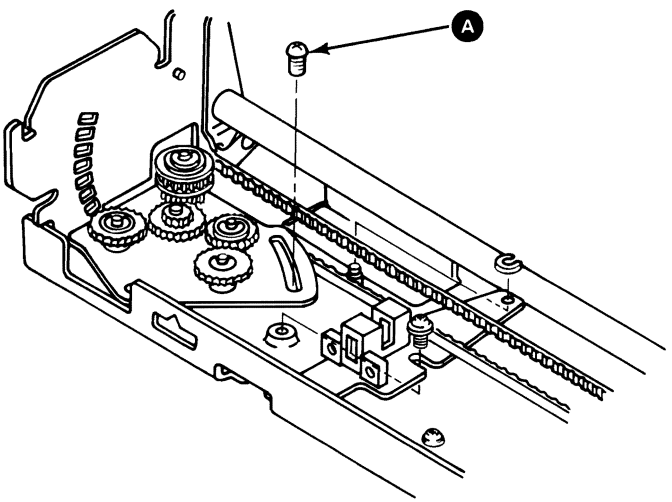


9. Pull the belt from the clip underneath the print head carriage by pulling down on the belt.



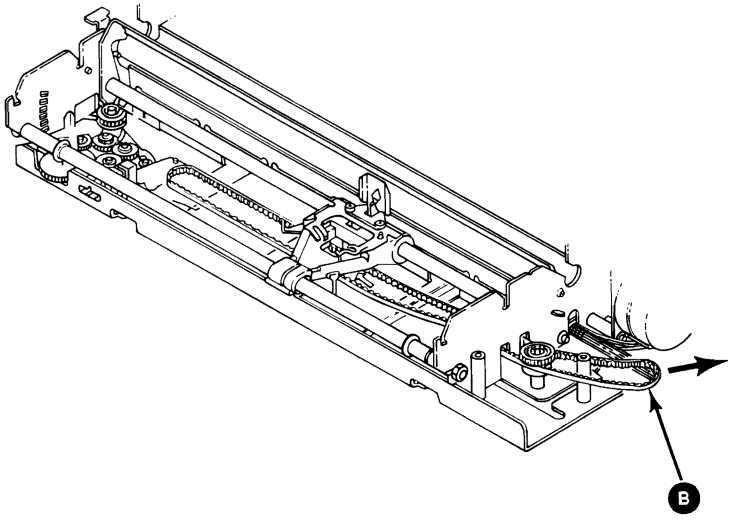
10. Loosen the screw in the slot of the carriage drive assembly (A).

11. Pivot the carriage drive assembly to the right.



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

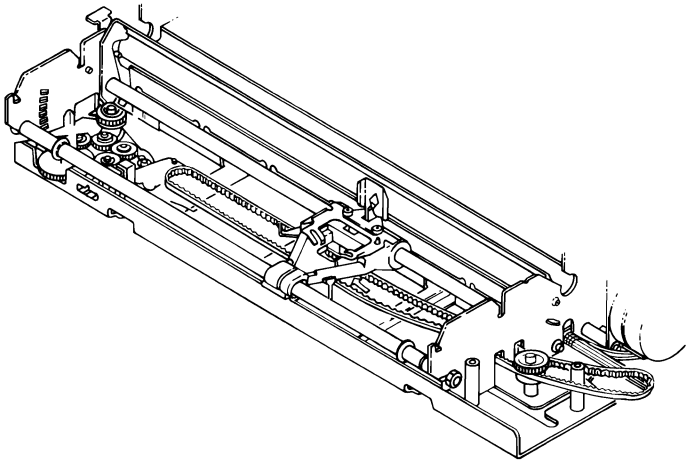
13. Guide the belt (B) through the opening in the right side of the print mechanism assembly frame.



Carriage Belt Replacement 5602

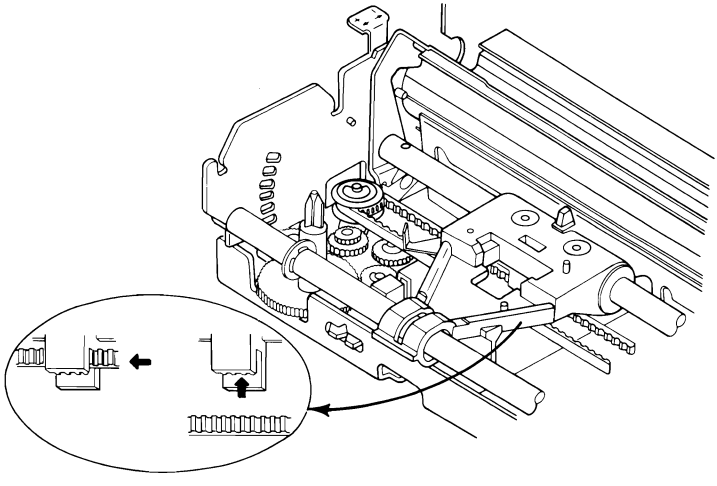
1. Insert the belt through the opening in the right side of the print mechanism assembly.

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



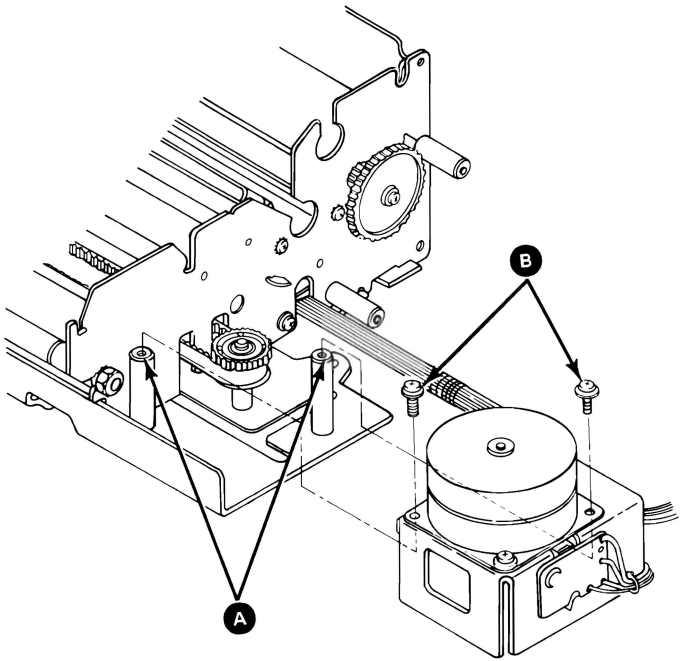
3. Place the belt onto the pulleys at both ends.

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



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

6. Insert the screws into the motor base (do not tighten) (B).



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

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

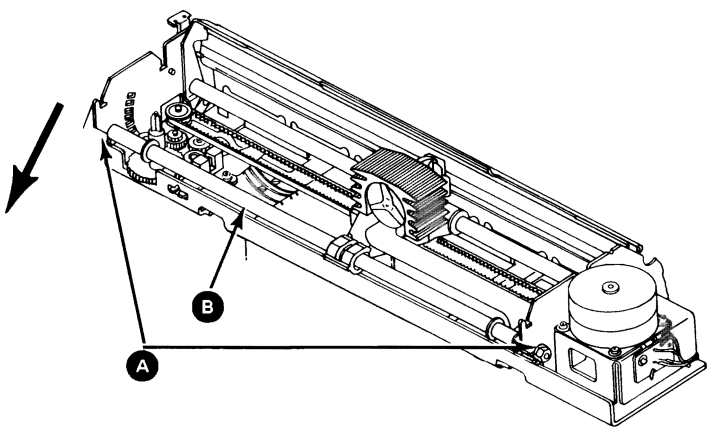
9. Install the ribbon cartridge.

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

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

Carriage Drive Assembly Removal 5605

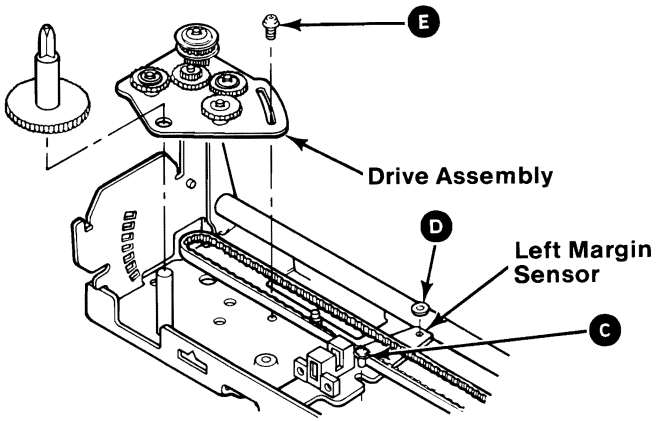
1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove the forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the ribbon cartridge.
6. Remove the top cover **(5631)**.
7. Move the carriage 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 Ⓒ and clamp Ⓓ from the left margin sensor.

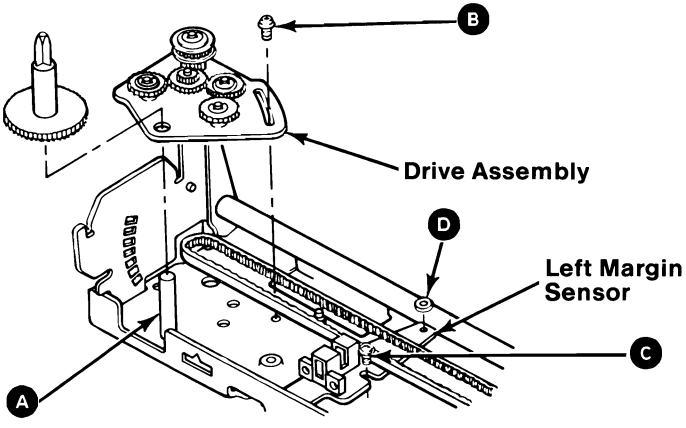
10. Remove the carriage drive assembly retaining screw Ⓔ.

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.



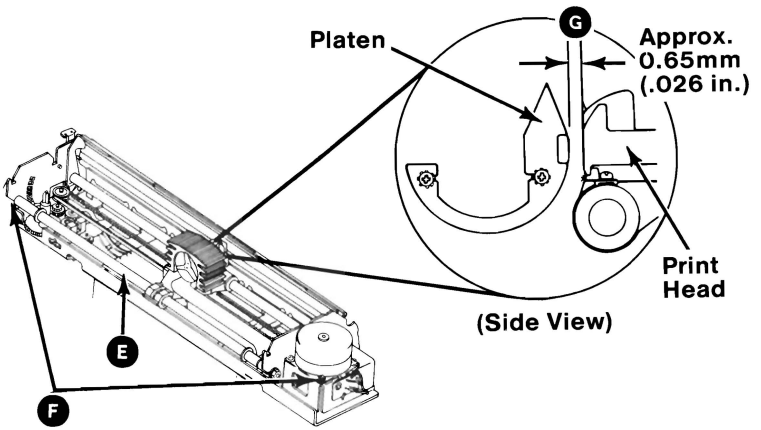
Carriage Drive Assembly Replacement 5606

1. Adjust the carriage drive assembly by inserting the post (A) through the pivot hole.
2. Install the carriage drive assembly retaining screw (B).
3. Install the left margin sensor, screw (C), and clip (D).
4. Place the belt over the drive pulley and perform the carriage belt adjustment **(5600)**.



5. Pivot the carrier shaft (E) into the slots on the frame. Tighten the nuts (F).

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 Setting 5615

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

Note: The graphics printer Switch No.1-7 must be set for local requirements. This switch selects Table 1 or 2 and is factory set to Off for U.S. English speaking countries.

Functions and Conditions of Dip Switch No. 1

Graphics Printer

Switch No.	Function	On	Off	Factory Set
11	Not Applicable	—	—	On
12	CR	Print Only	Print & Line Feed	On
13	Buffer Full	Print Only	Print & Line Feed	Off
14	Cancel Code	Invalid	Valid	Off
15	Not Applicable	—	—	On
16	Error Buzzer	Sound	Does Not Sound	On
17	Character Generator	Table 2	Table 1	On
18	Select in Signal	Fixed Internally	Not Fixed Internally	On

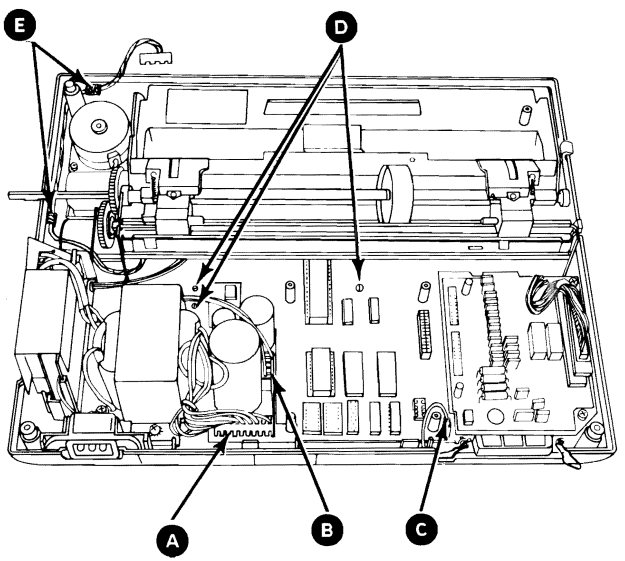
Functions and Conditions of Dip Switch No. 2

Graphics Printer

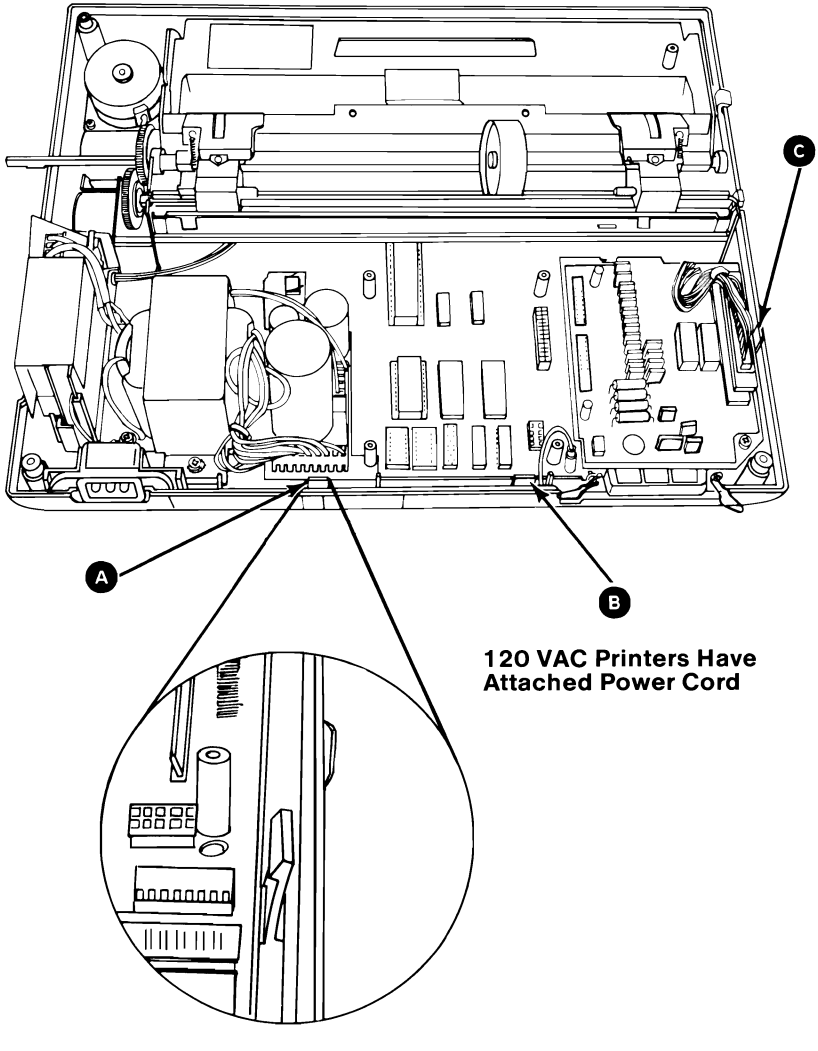
21	Form Length	12" 304.8mm	11" 279.4mm	Off
22	Line Spacing	1/8" 3.175mm	1/6" 4.23mm	Off
23	Auto Feed XT Signal	Fixed Internally	Not Fixed Internally	Off
24	1 in. Skip Over Perforation	Valid	Not Valid	Off

Control Circuit Card Removal 5616

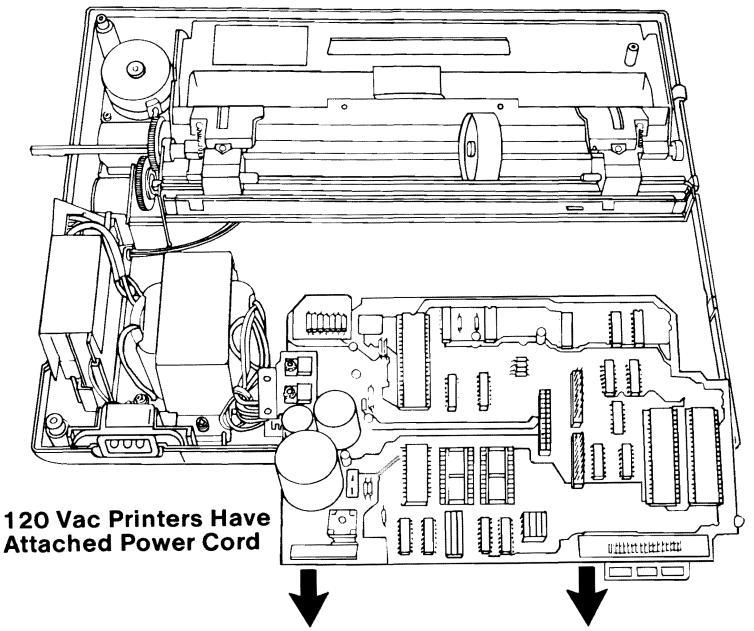
1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove the forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.
6. Remove the driver circuit card **(5620)**.
7. 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 out from under the retaining clips (E).



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

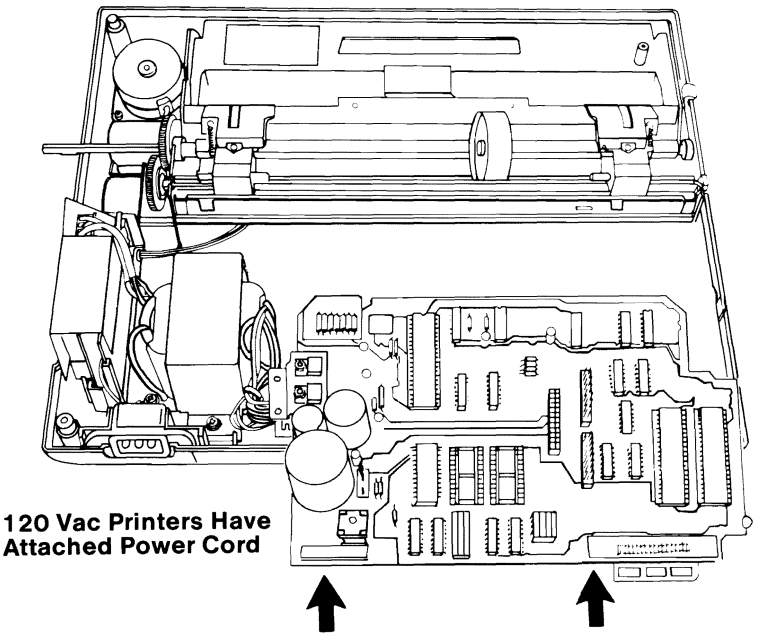


13. Lift the control circuit card to clear the six posts. Carefully pull the control circuit card away from the print mechanism assembly.



Control Circuit Card Replacement 5617

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



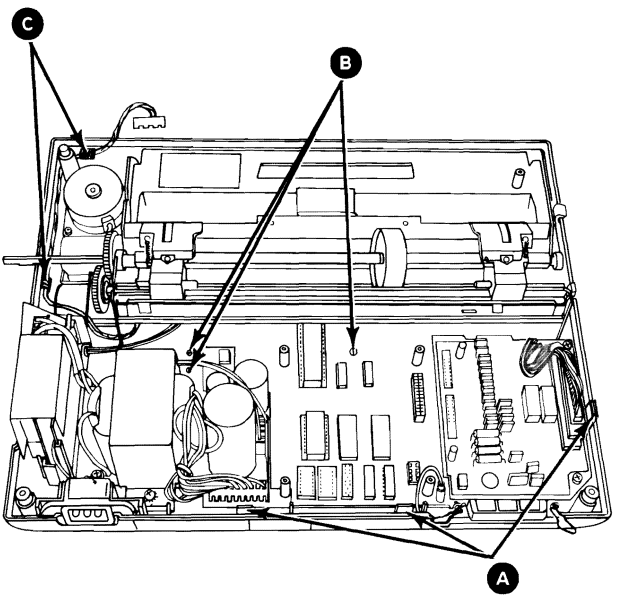
2. Align the six holes in the control circuit card with the six posts in the base cover.

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

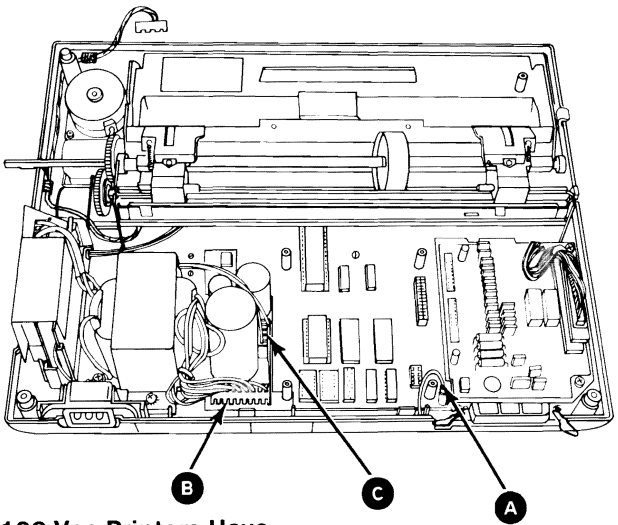
4. Install the 3 hold-down screws (B).

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).

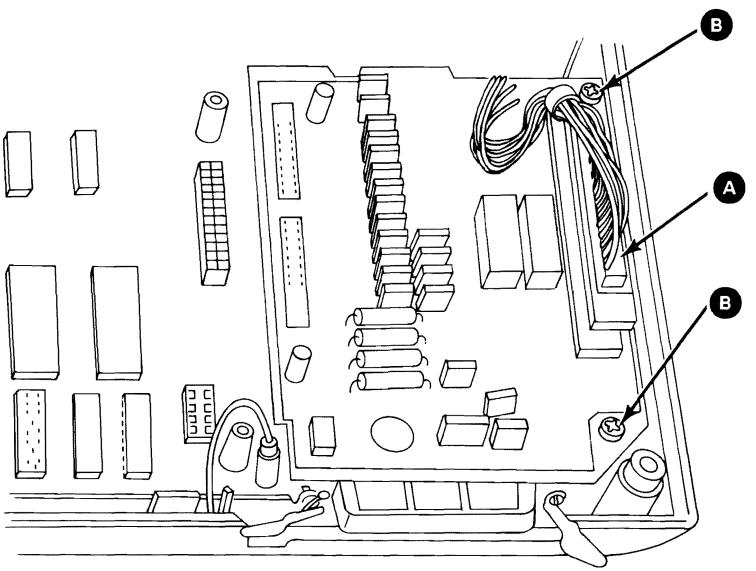


120 Vac Printers Have Attached Power Cord

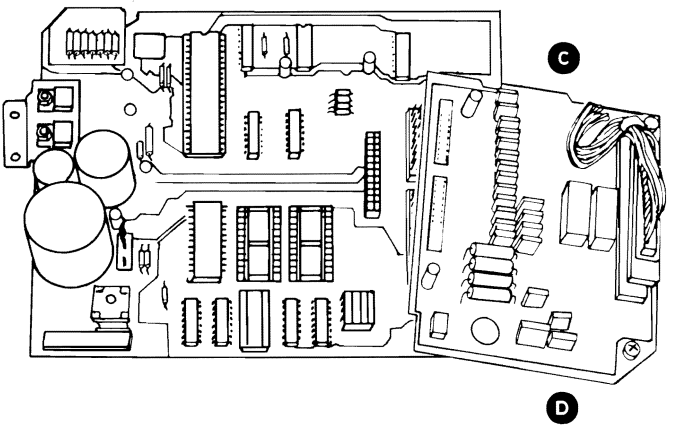
10. Install the driver circuit card **(5621)**.
11. Install the top cover **(5632)**.
12. Install the access cover **(5630)**.
13. Install the forms rack **(5640)**.

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 the 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 C, then at D.



Driver Circuit Card Replacement 5621

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

   Warning: CN4 and CN5 are not keyed. Verify proper alignment before turning power on to the unit, to prevent circuit card damage.

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.

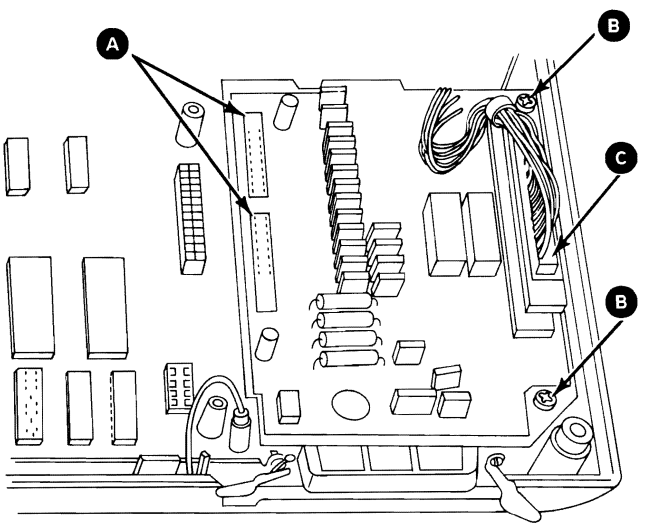
3. Install the two screws (B).

4. Install connector CN6 (C).

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

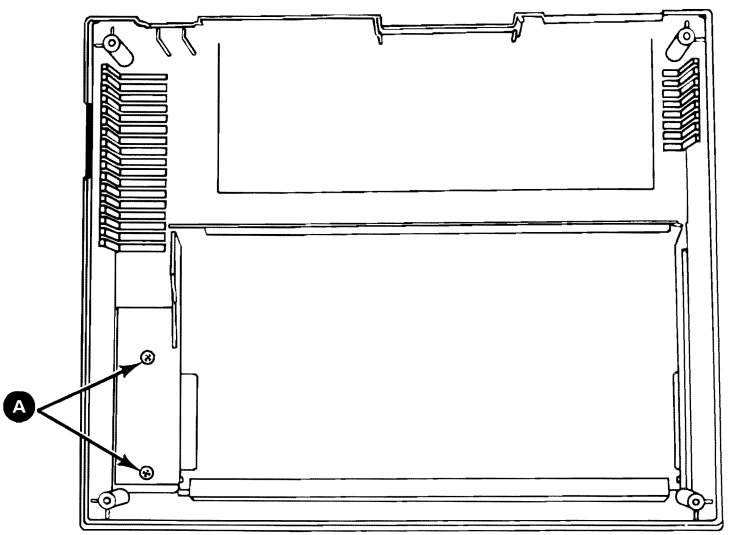
6. Install the access cover **(5630)**.

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



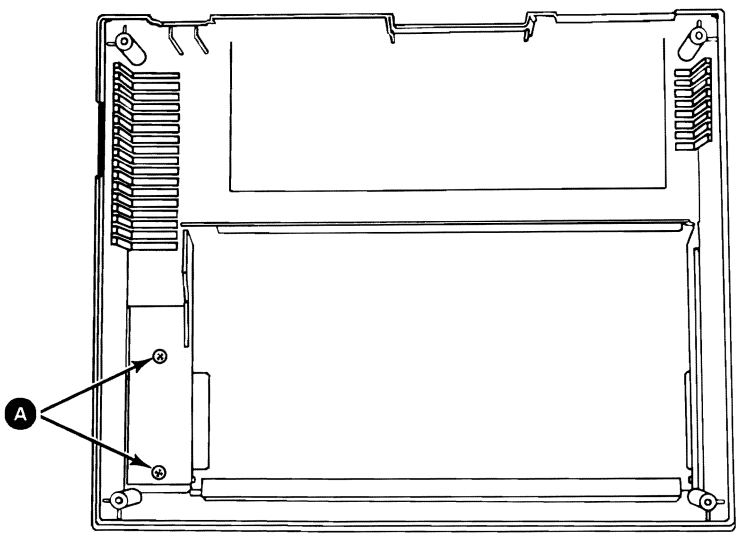
Control Panel Removal 5625

1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove the 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.



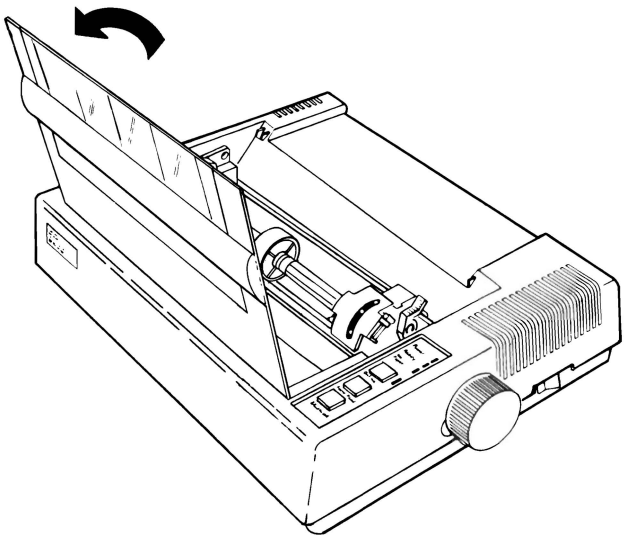
Control Panel Replacement 5626

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

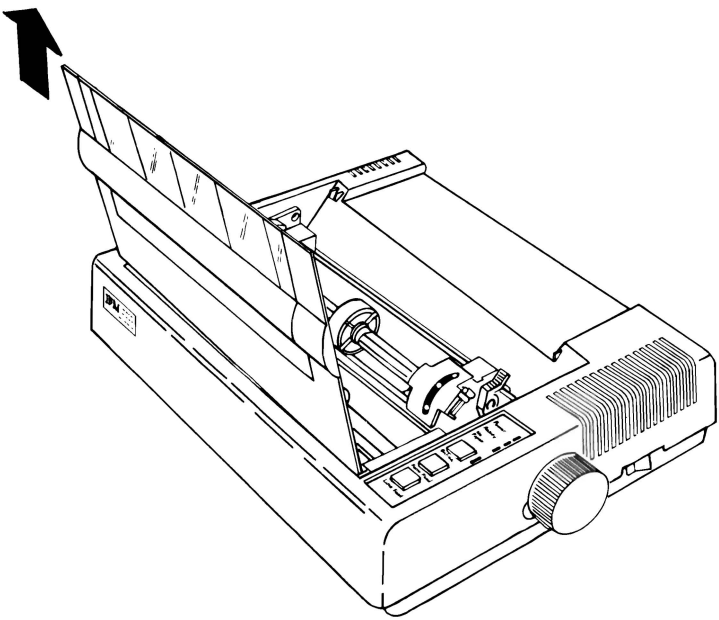


Access Cover Removal 5630

1. Raise the access cover.

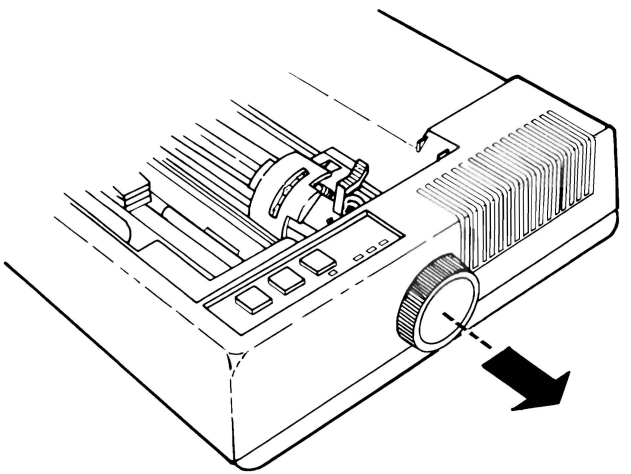


2. Lift the cover from the base as shown.



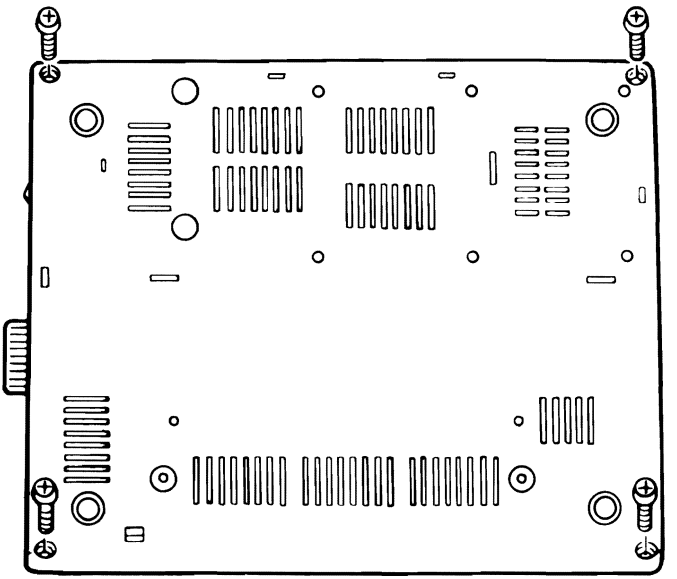
Top Cover Removal 5631

1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet.
2. Remove the 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 on a smooth surface.

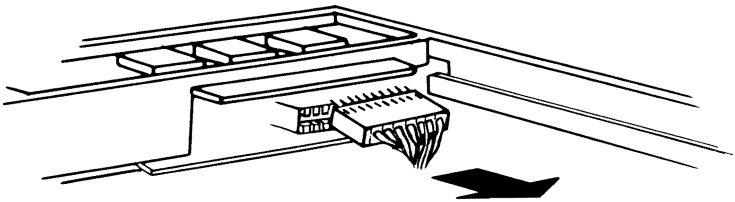
7. Using a Phillips screwdriver, completely loosen the four screws in the corners of the base.



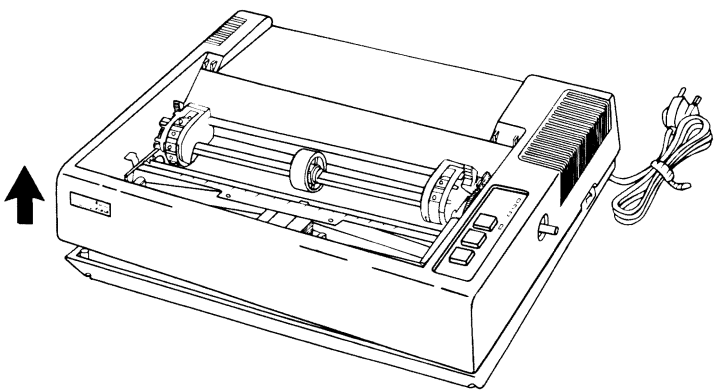
8. Turn the printer right-side up.

CAUTION
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.

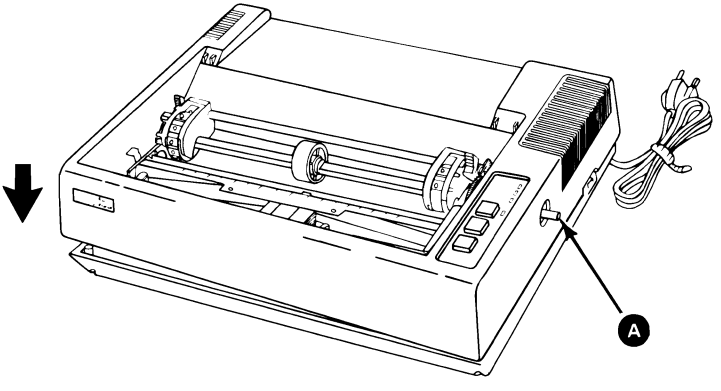


10. Lift the top cover away from the base cover. Lift the left side first. Then slide the top cover to the right to clear the forms feed shaft.

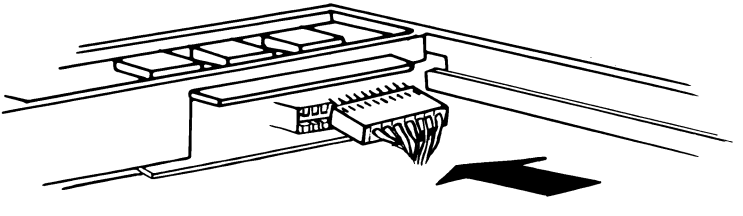


Top Cover Replacement 5632

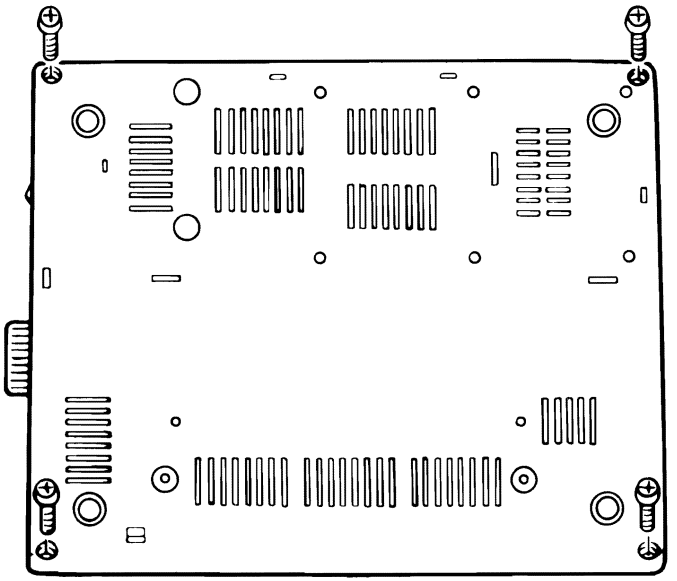
1. Insert the forms feed shaft through the opening (A) in the top cover and lower the top cover onto the base cover.



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



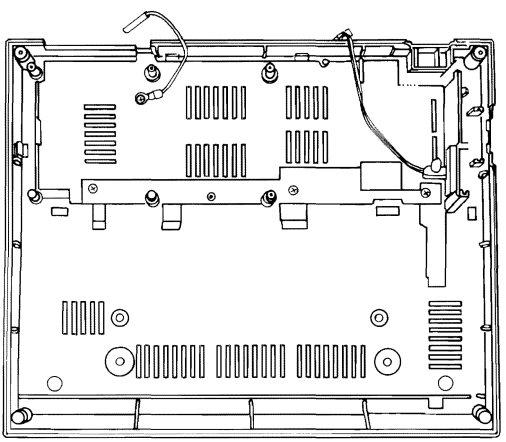
3. Turn the printer upside down.
4. Install the four screws.



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)**.

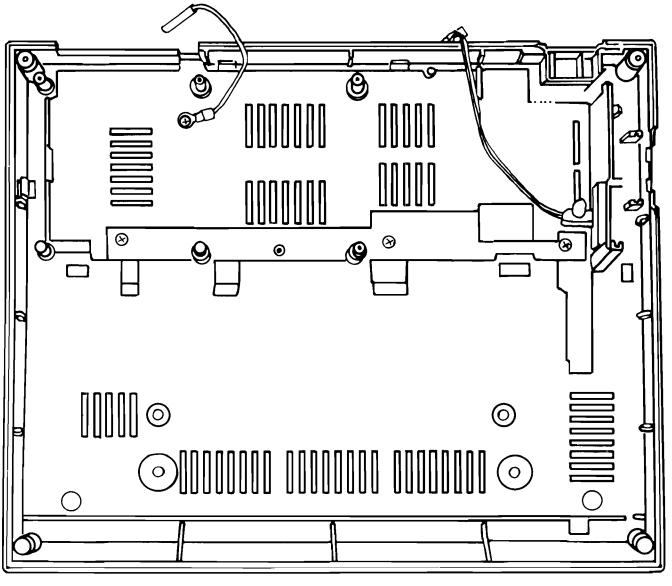
Base Cover Removal 5633

1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove the 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 **(5678)**.
7. Remove the fuse-filter card/Power cord **(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/power transistor assembly **(5660)**.
12. The base cover is now completely detached from the other FRUs.



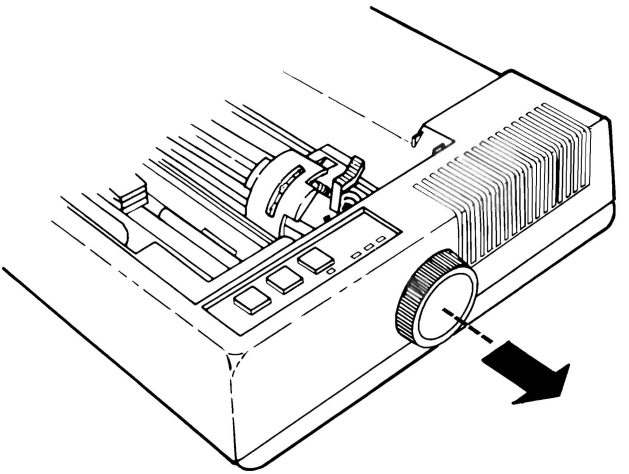
Base Cover Replacement 5634

1. Set the base cover on your work surface.
2. Install the heat sink/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/Power cord **(5656)**.
7. Install the power transformer **(5676)** or **(5679)**.
8. Install the top cover **(5632)**.
9. Install the access cover **(5630)**.
10. Install the forms rack **(5640)**.



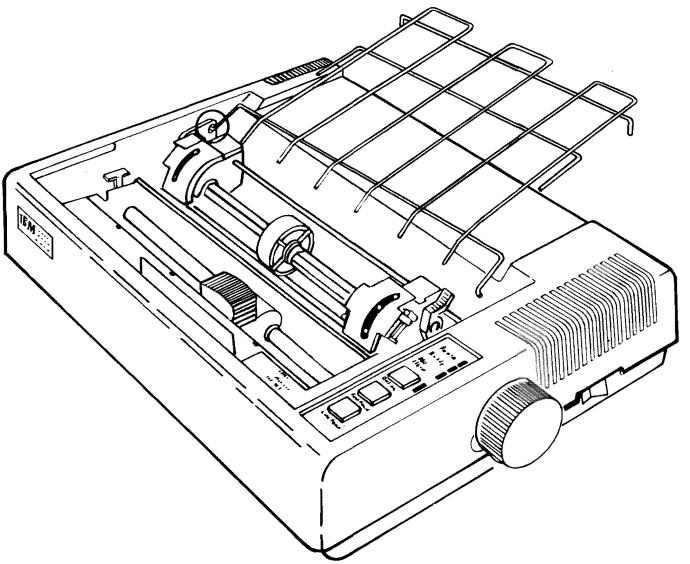
Forms Feed Knob Removal 5635

Pull the forms feed knob from the shaft using a steady, firm pull.



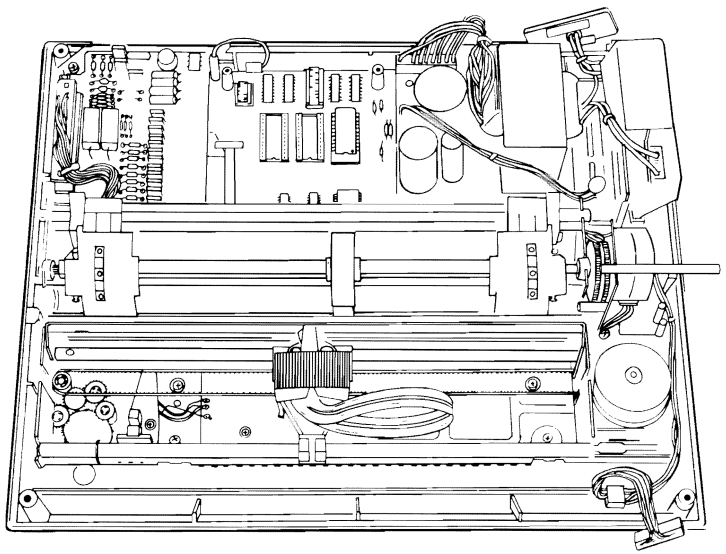
Forms Rack Removal 5640

1. Remove the forms.
2. Compress the rack on one side to unhook the rack from the printer 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 the forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.



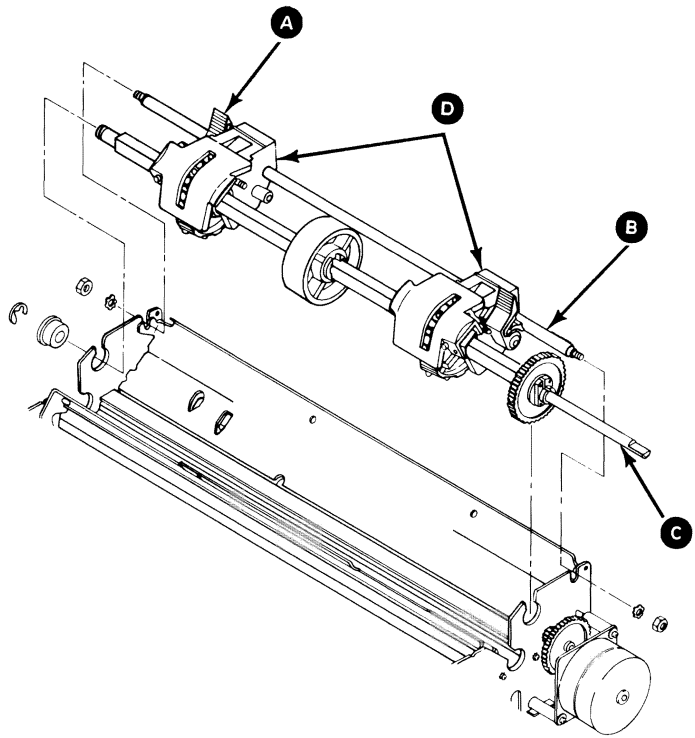
6. Rotate the lock levers (A) forward (released position).

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.

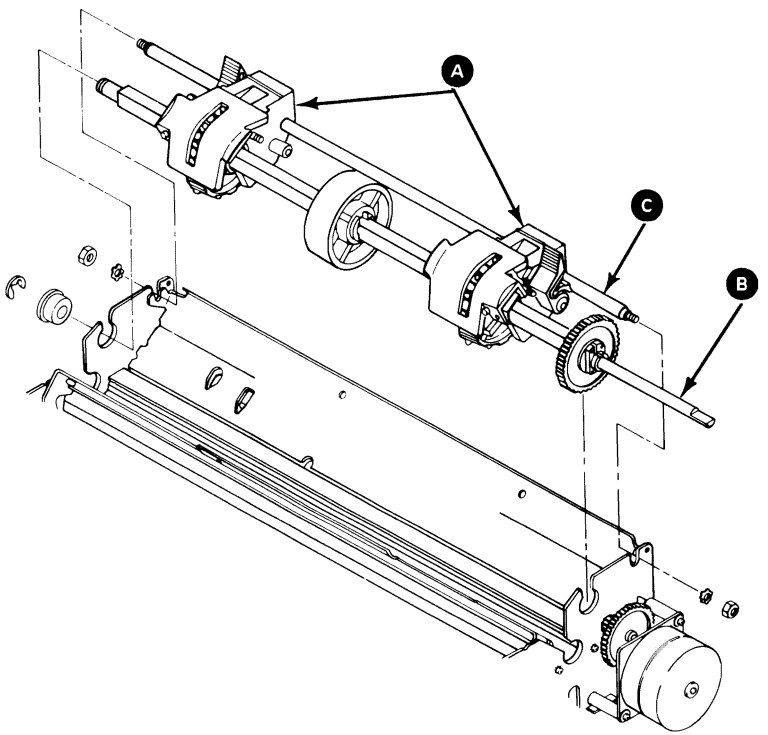
9. Lift the guide shaft, the support shaft and the forms tractors from the machine.

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 the support shaft (C).
2. Place the guide shaft and the support shaft into the slots on the frame.
3. Slide the bushings on the guide shaft into the frame and replace 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 outlet and disconnect the printer cable.

2. Remove the forms.

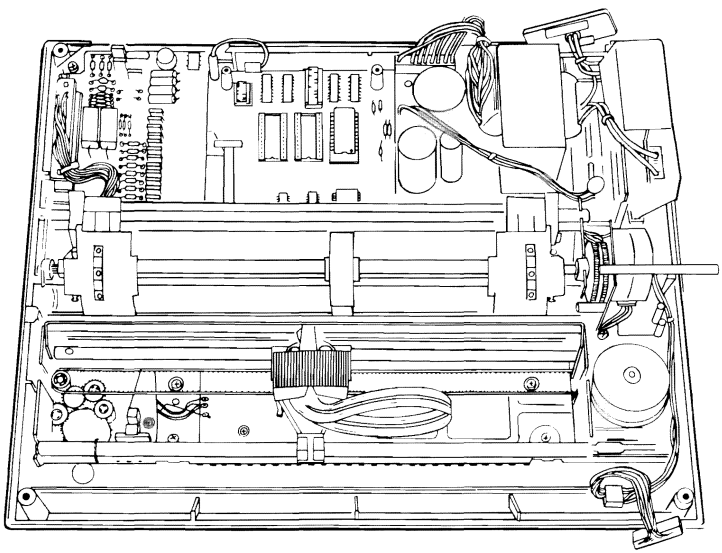
3. Remove the forms rack **(5640)**.

4. Remove the access cover **(5630)**.

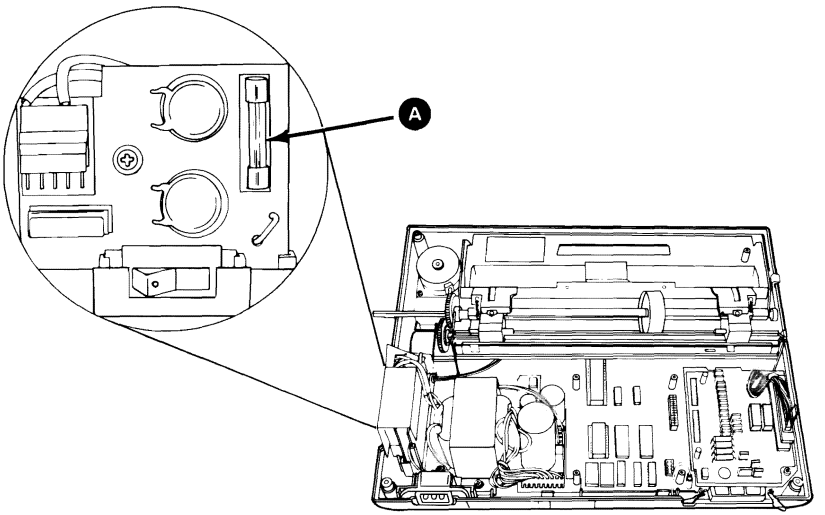
5. Remove the top cover **(5631)**.

> **DANGER**
> **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.**

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



7. Pull the fuse (A) from the holder.

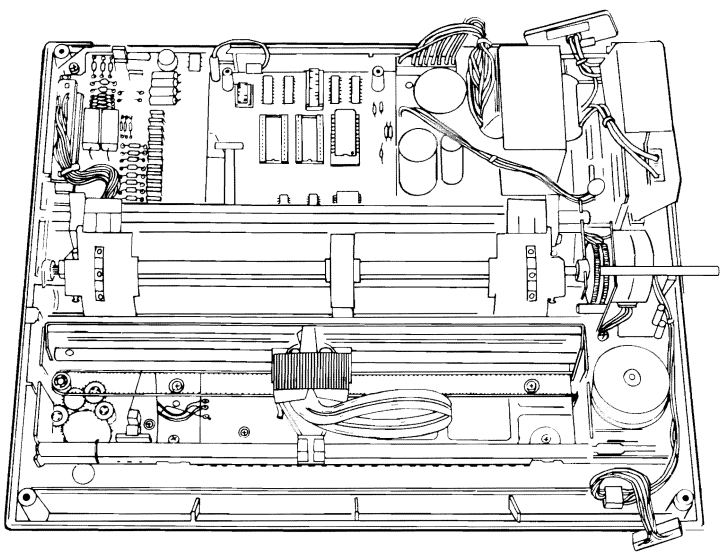


Fuse-Filter Card/AC Socket Removal 220/240 Volt 5653

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)**.

DANGER
STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.

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



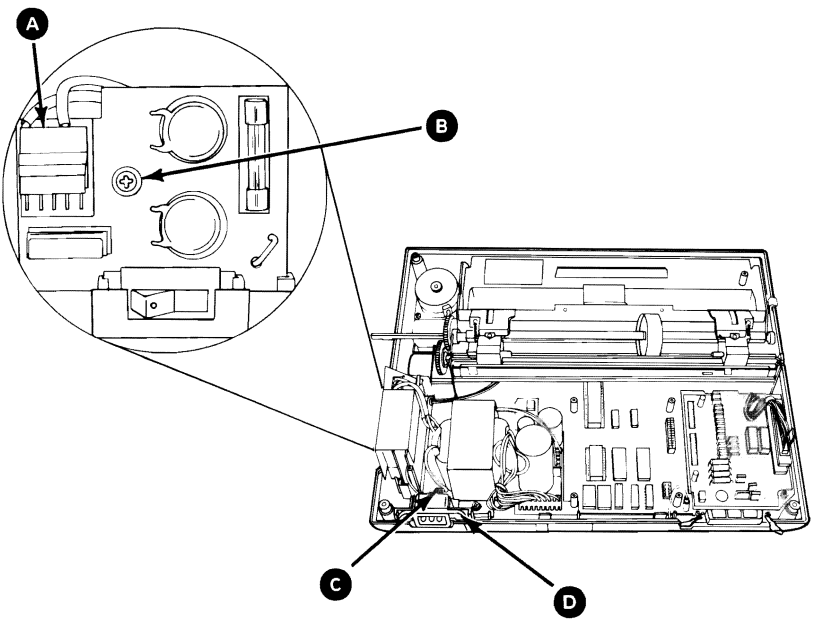
7. Remove transformer primary connector (A) from the fuse-filter card.

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

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

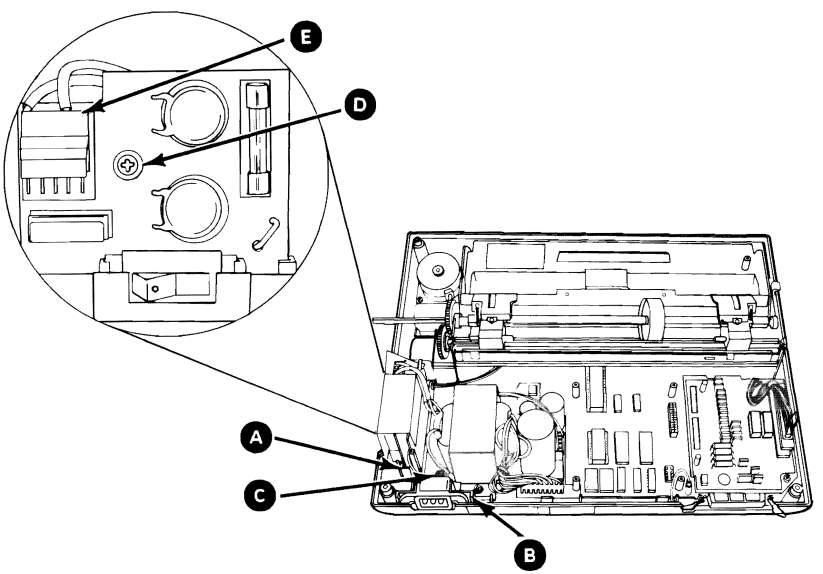
10. Lift AC socket (D) from the slot in the base cover.

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



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

1. Insert the fuse-filter card into slot (A) in the base cover.
2. Insert the AC socket into slot (B) in the base cover.
3. Install screw (C) into the ground wire of the AC socket.
4. Install screw (D) in the center of the fuse-filter card.
5. Connect transformer primary (E) to the fuse-filter card.
6. Install the safety shield onto 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/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 the forms.

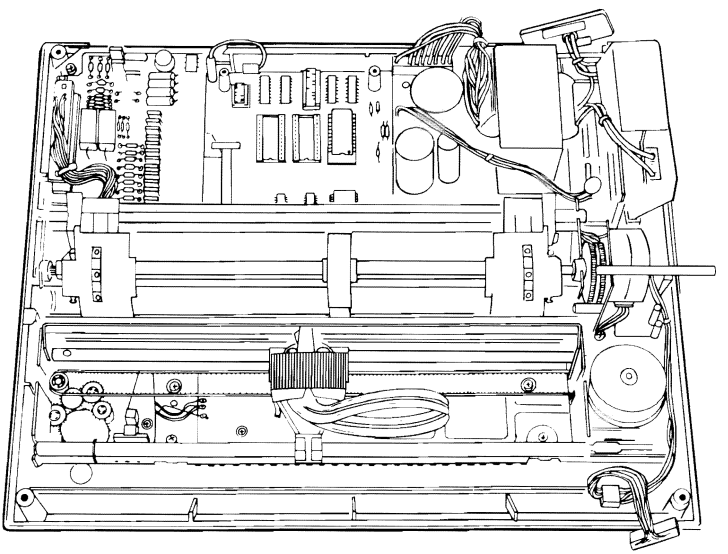
3. Remove the forms rack **(5640)**.

4. Remove the access cover **(5630)**.

5. Remove the top cover **(5631)**.

> **DANGER**
> **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.**

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



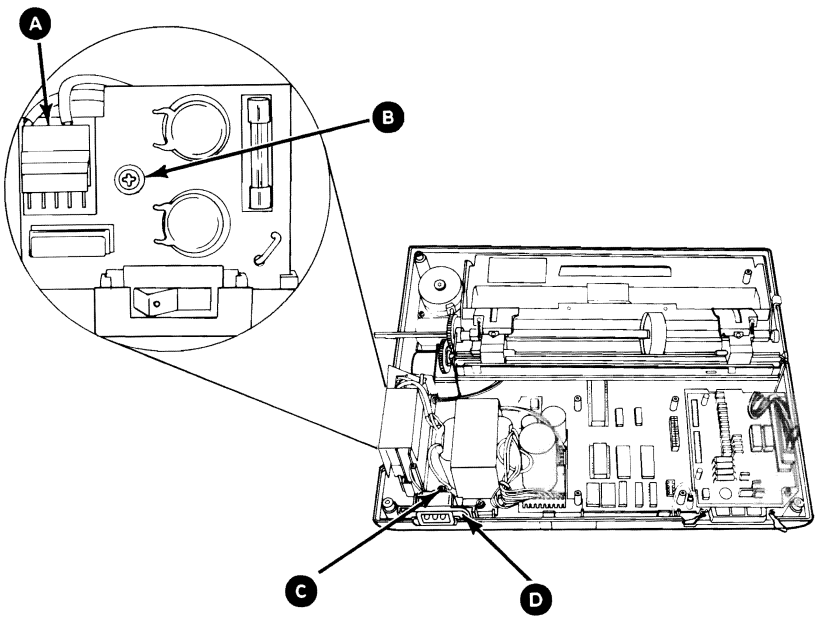
7. Remove the transformer primary connector (A) from the fuse-filter card.

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.

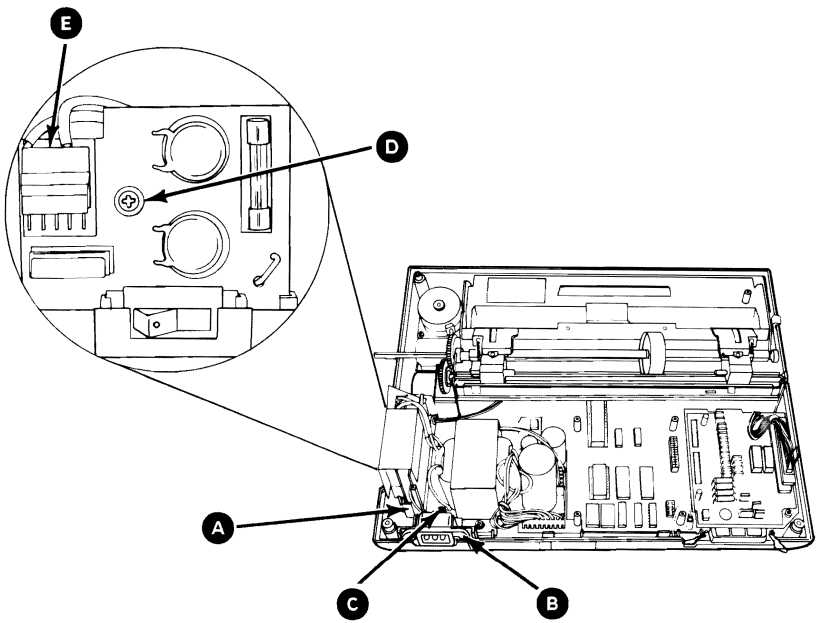
10. Lift the strain relief (D) from the slot in the base cover.

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



Fuse-Filter Card/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 onto the fuse-filter card **(5696)**.

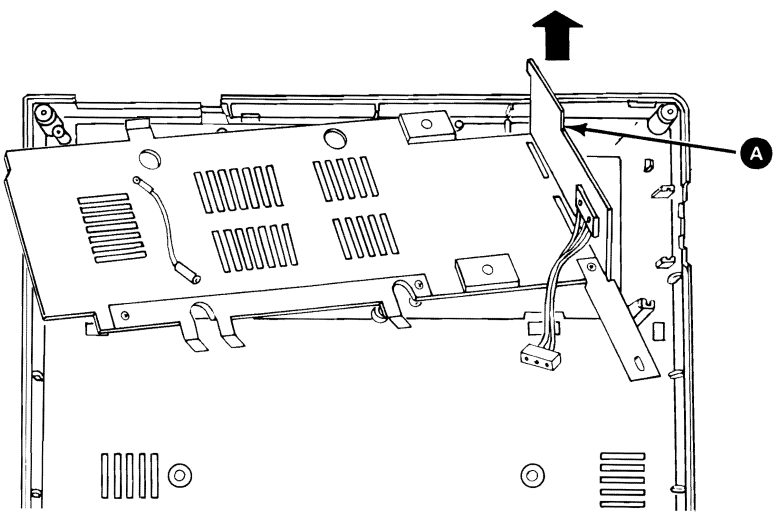
7. Install the top cover **(5632)**.

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

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

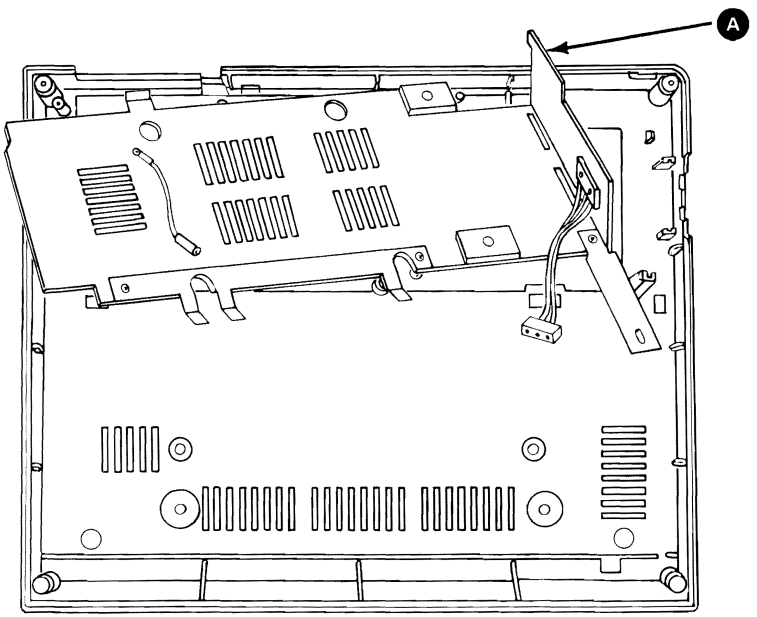
Heat Sink/Power Transistor Assembly Removal 5660

1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove the forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5632)**.
6. Remove the power transformer **(5675)** or **(5678)**.
7. Remove the fuse-filter card/power cord **(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 Ⓐ from the base cover.



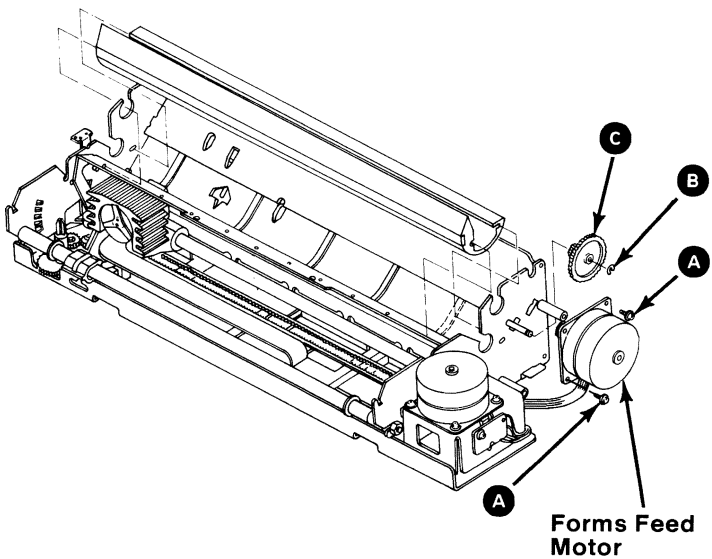
Heat Sink/Power Transistor Assembly Replacement 5661

1. Position the heat sink/power transistor assembly Ⓐ onto 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/power cord **(5656)**.
6. Install the power transformer **(5676)** or **(5679)**.
7. Install the top cover **(5632)**.
8. Install the access cover **(5630)**.
9. Install the forms rack **(5640)**.



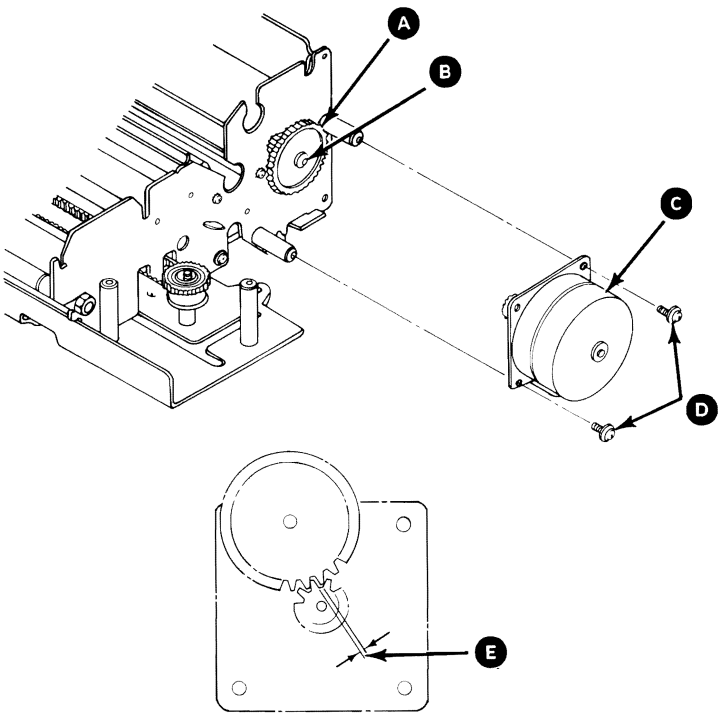
Intermediate Gear Removal 5665

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.



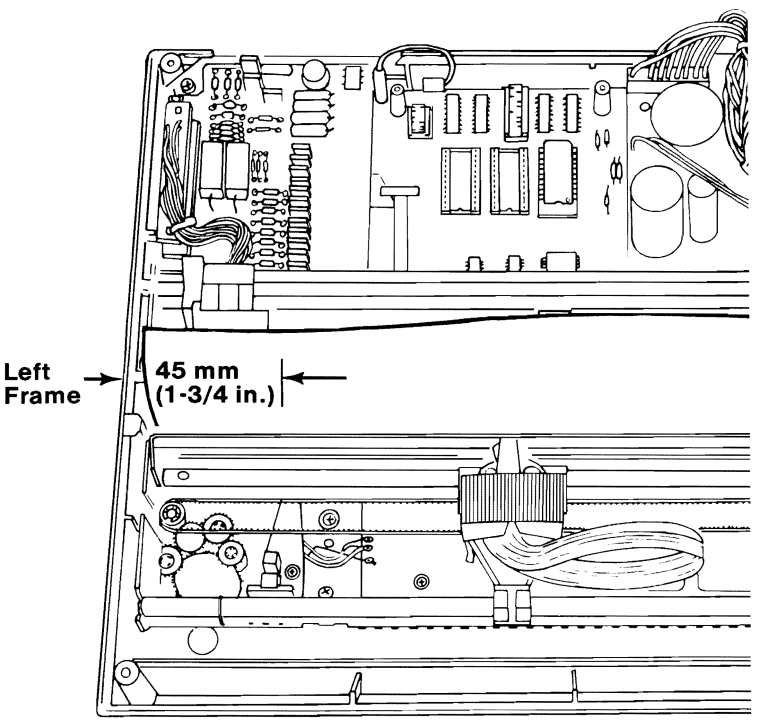
Intermediate Gear Replacement 5666

1. Slide the intermediate gear (A) onto the shaft.
2. Install the retaining clip (B).
3. Install the forms feed motor (C) onto the mounts.
4. Install the two screws (D) but do not tighten.
5. Adjust the motor to mesh so the gears have 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)**.

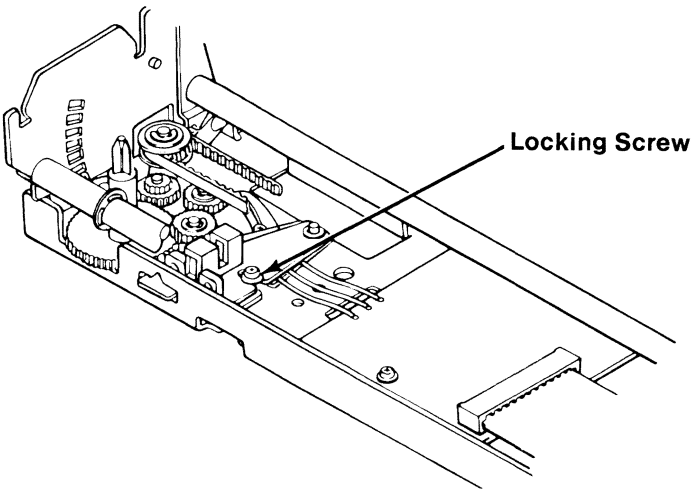


Left Margin Sensor Adjustment 5670

1. Set the printer Power switch to Off; unplug the the printer 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 top cover **(5631)**.
6. Remove the ribbon cartridge.
7. Insert a sheet of paper into the printer. Position the paper to the left frame.
8. Measure 45 mm (1-3/4 in.) from the left frame and mark the position on the paper.

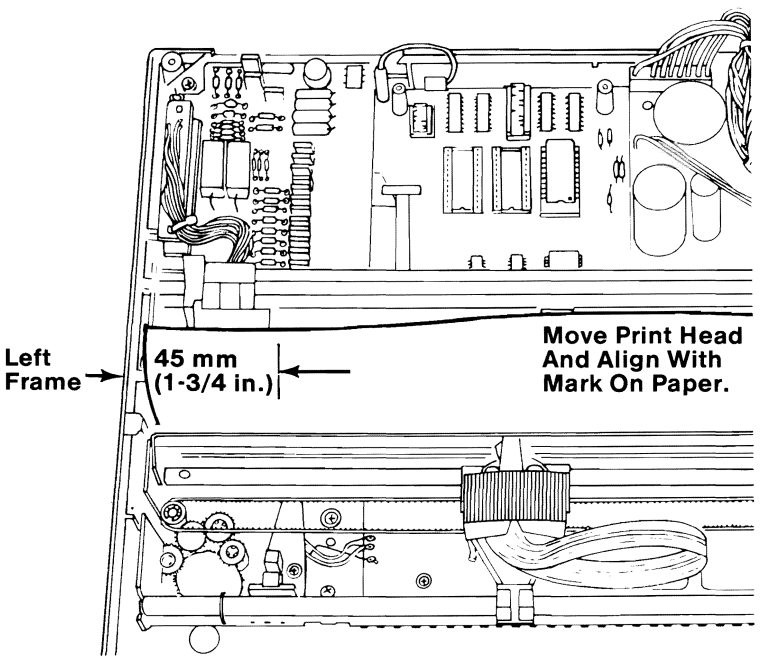


9. Loosen the left margin sensor locking screw.



10. Plug the printer Power cord into the outlet. Set the printer Power switch to On.

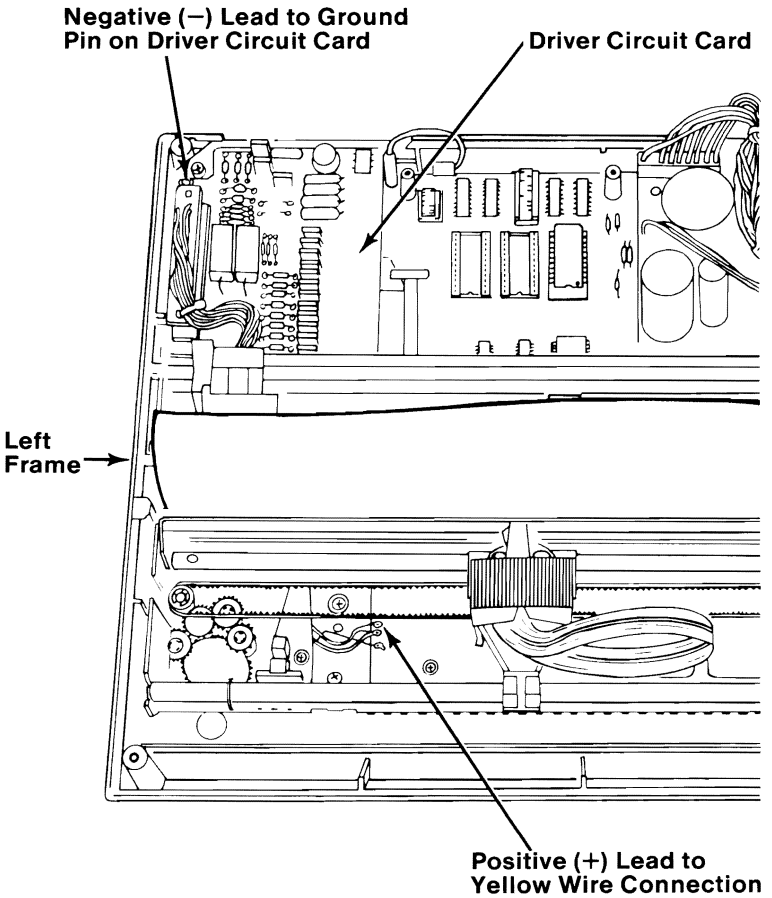
11. Move the print head manually and align it with the 45 mm (1-3/4 in.) mark on the paper.



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.

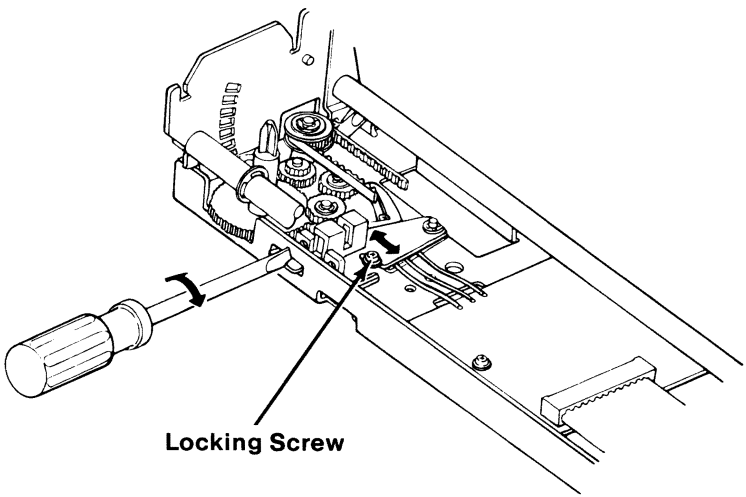


15. Move the left margin sensor to the left until the voltage reading on the meter is a down level (approximately 0 Vdc).

16. Move the left margin sensor to the right until the voltage on the meter is an up level (approximately 5 Vdc).

    Note: If the voltage reading on the meter stays at a down level, move the head one position to the left and repeat steps 15 and 16.

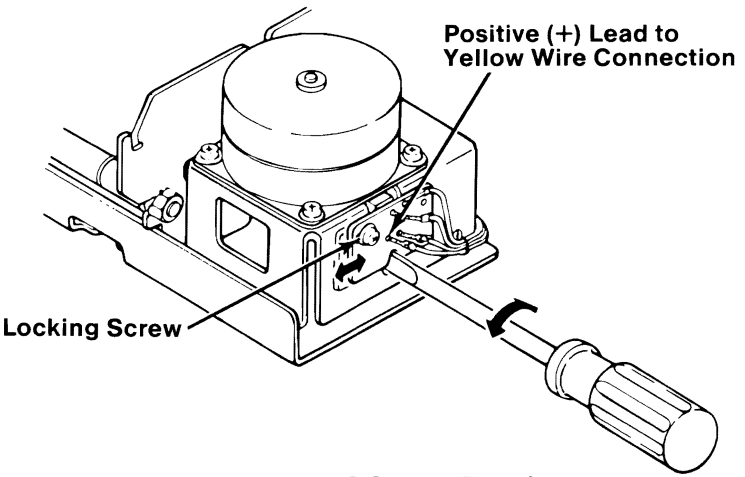
17. Tighten the left margin locking screw.



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

19. Loosen the printer timing sensor board locking screw.

20. Move the printer timing sensor board either way until the voltage reading is an up level (approximately 5 Vdc).



Adjustment of PTS Sensor Board

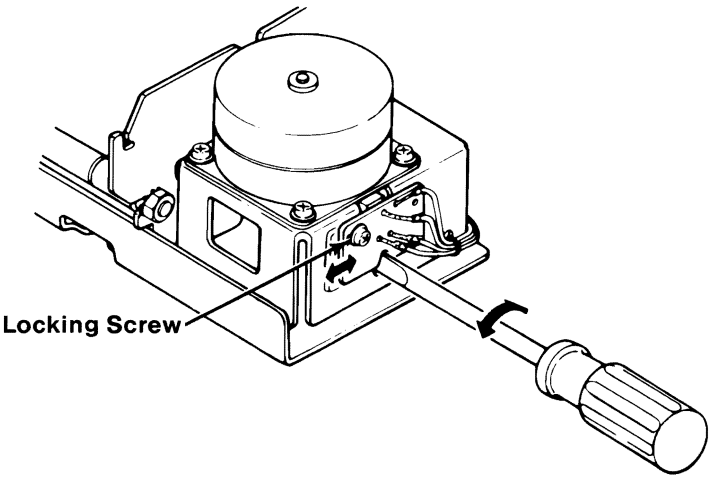
21. Perform the following steps:

    a. Move the print head slightly to the left. The voltage reading 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 reading should 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 either direction when the meter drops to the down level, without causing the print head to jump to the next detented position.

22. Tighten the printer timing sensor locking screw and recheck step 21. Align if necessary.



23. Run the "Printer Off-line Diagnostic Test" and observe the speed in both directions.

24. If the buzzer sounds, the printer timing sensor board is set incorrectly. Repeat the procedure starting at step 18.

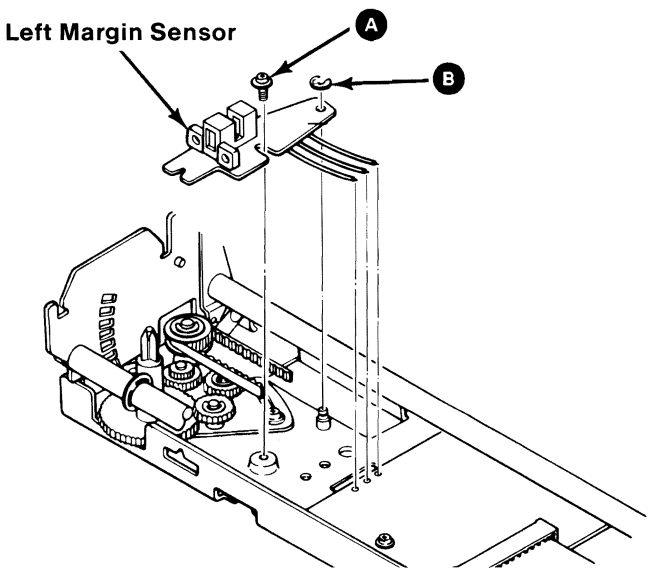
25. If the speed is different between forward and reverse printing, perform the following steps.

    a. Place the positive (+) lead of the voltage meter on the yellow wire solder connection on the printer timing sensor board.
    b. Loosen the printer timing sensor board locking screw.
    c. Move the printer timing sensor board until another up level location is observed and repeat the procedure from step 21.

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

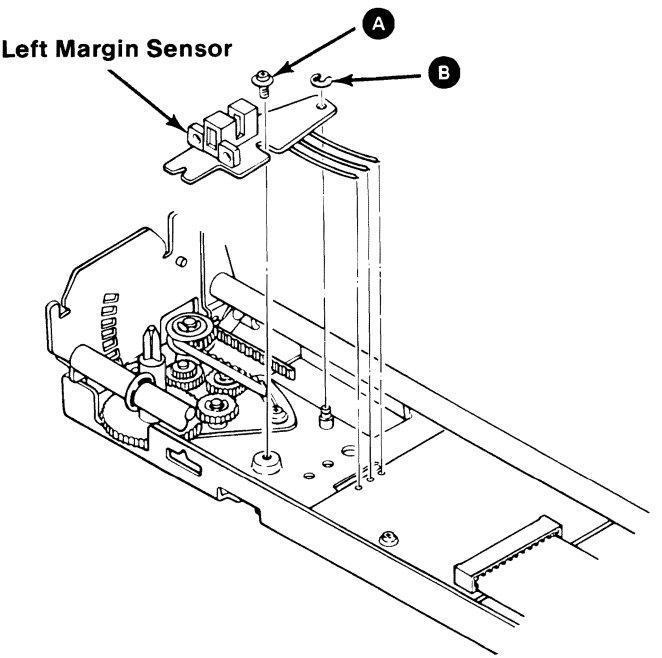
Left Margin Sensor Removal 5671

1. Set the printer Power switch to Off; unplug the printer Power cord from the outlet and disconnect the Printer Cable.
2. Remove 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. Move the carriage to the right frame.
8. Remove the retaining screw (A) and the retaining clip (B).
9. Unsolder the three wires from the left margin sensor.
10. Lift the left margin sensor from the printer.



Left Margin Sensor Replacement 5672

1. Solder the three wires from the terminal board to the left margin sensor.
2. Place the left margin sensor pivot hole over the post.
3. Install the retaining screw (A) and the 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)**.

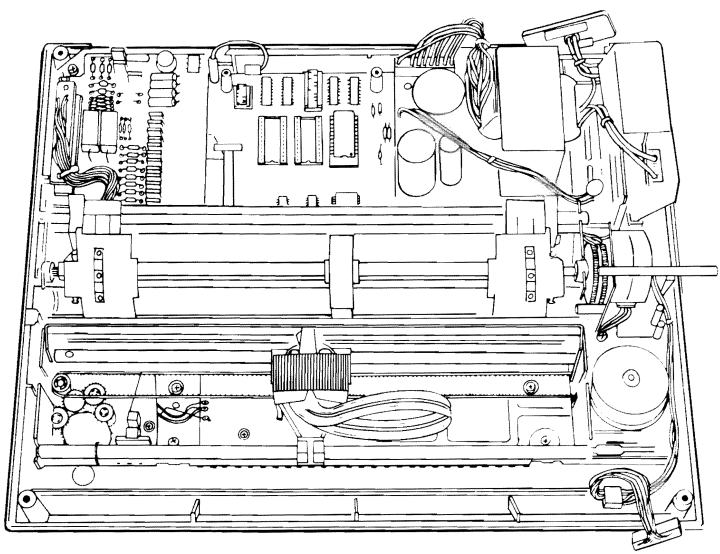


Power Transformer Removal 220/240 Volt 5675

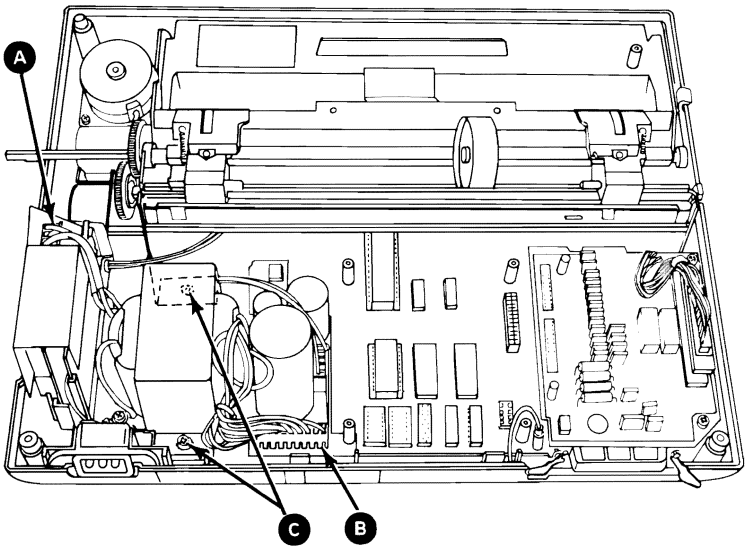
1. Set the printer Power switch to Off. Unplug the printer Power cord from the outlet and disconnect the printer cable.
2. Remove all forms.
3. Remove the forms rack **(5640)**.
4. Remove the access cover **(5630)**.
5. Remove the top cover **(5631)**.

> **DANGER**
> **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.**

6. Remove the safety shield **(5695)**.

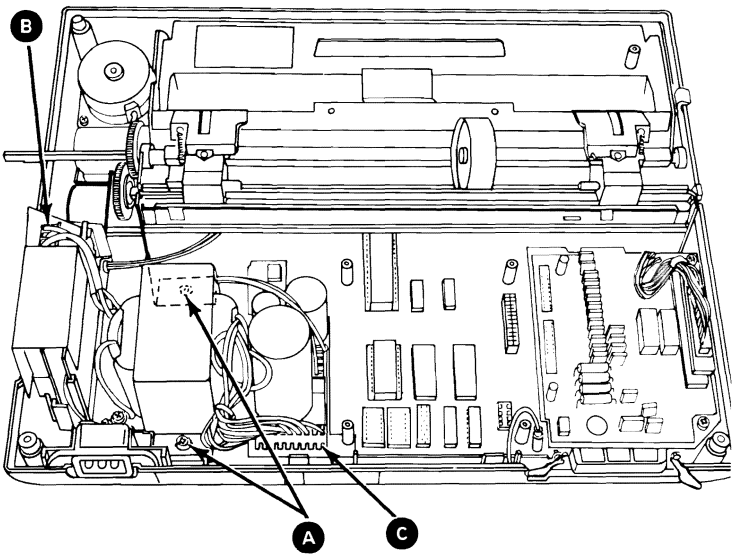


7. Unplug connector (A) from the fuse-filter card.
8. Unplug connector (B) from the control circuit card.
9. Remove two screws (C) from the base of the transformer.
10. Lift the transformer from the base.



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 positioning of the two connectors).
2. Install two base mounting screws (A).
3. Plug connector (B) into the fuse-filter card.
4. Plug connector (C) into the control circuit card.



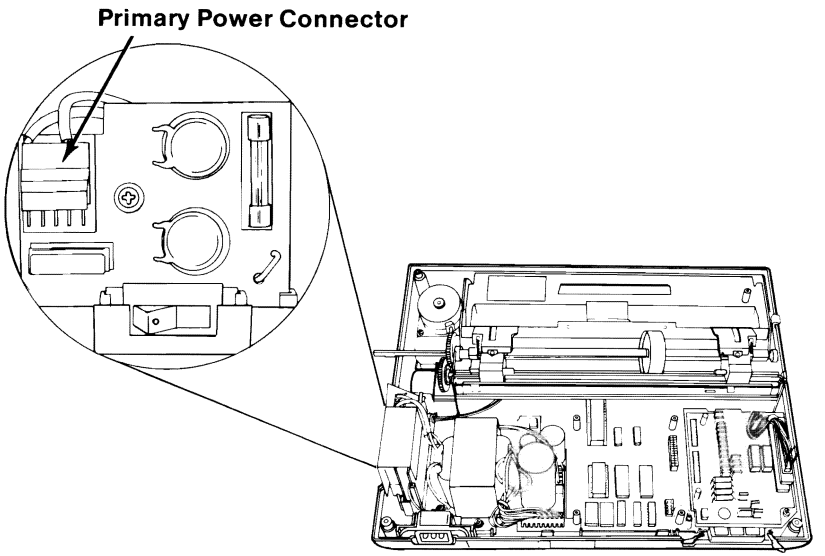
5. Install the safety shield **(5696)**.
6. Install the top cover **(5632)**.
7. Install the access cover **(5630)**.
8. Install the forms rack **(5640)**.

Power Transformer 220/240 Volt Primary Power Connector Wiring Check 5677

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

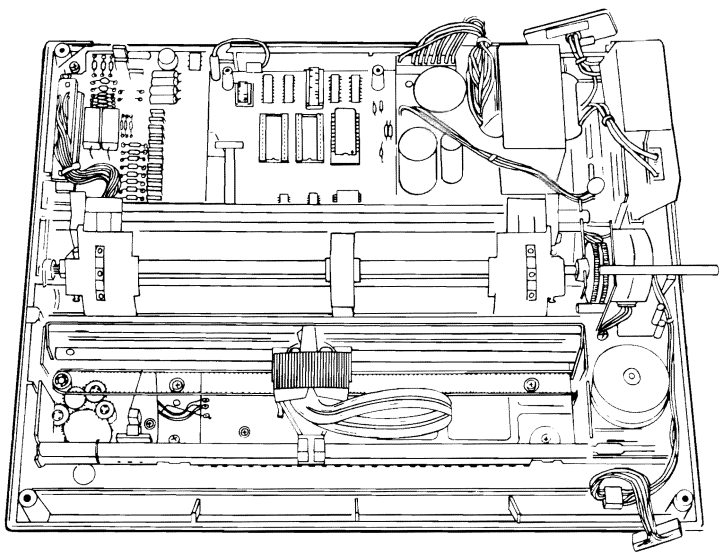
A 220 Volt transformer must have a White wire in Primary Power Connector pin 1 and a Brown wire in pin 4. The Orange wire is stored in pin 6.

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 connector pin 6.



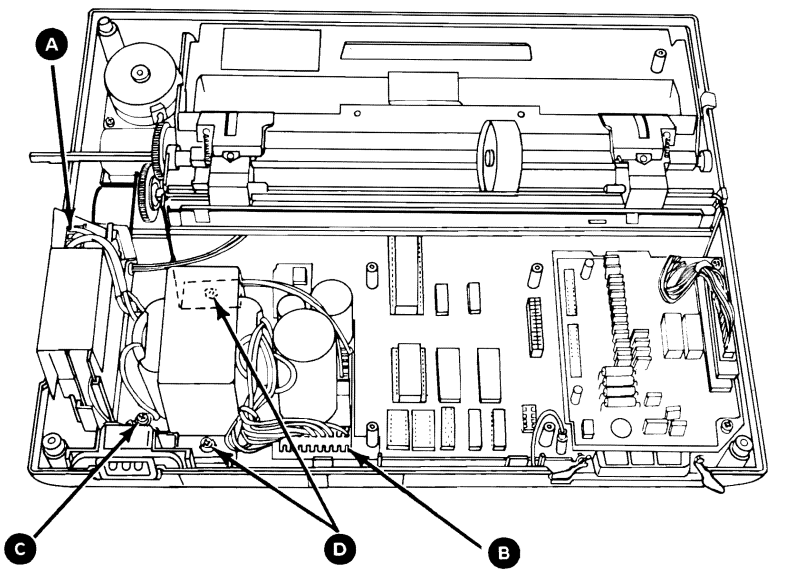
Power Transformer Removal 120 Volt 5678

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)**.



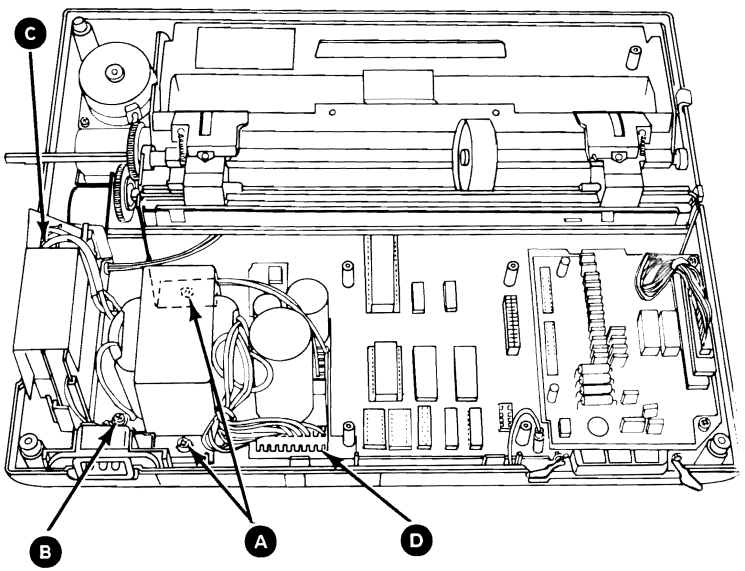
DANGER
STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.

6. Unplug connector (A) from the fuse-filter card.
7. Unplug 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 5679

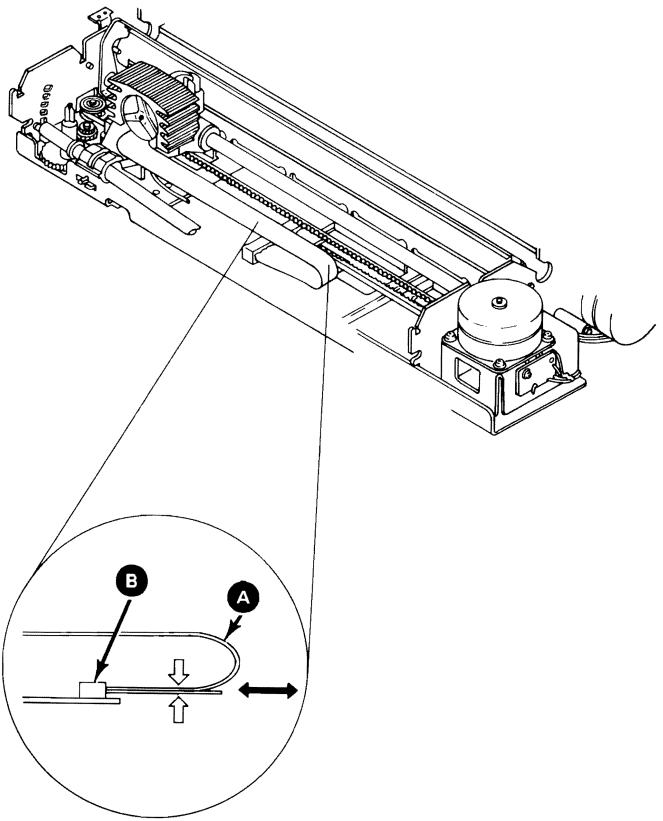
1. Place the transformer on the base in the area next to the fuse-filter card (note positioning of the two connectors).
2. Install the two base mounting screws (A).
3. Install the screw into the ground wire (B).
4. Plug connector (C) into the fuse-filter card.
5. Plug connector (D) into the control circuit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



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

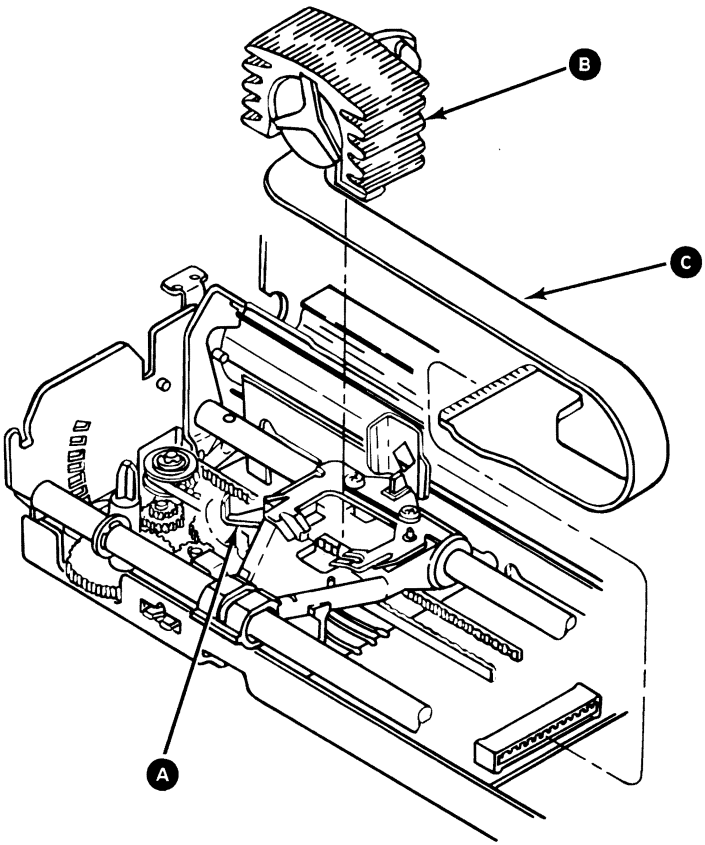
Print Head Removal 5680

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 Ⓐ from connector Ⓑ.



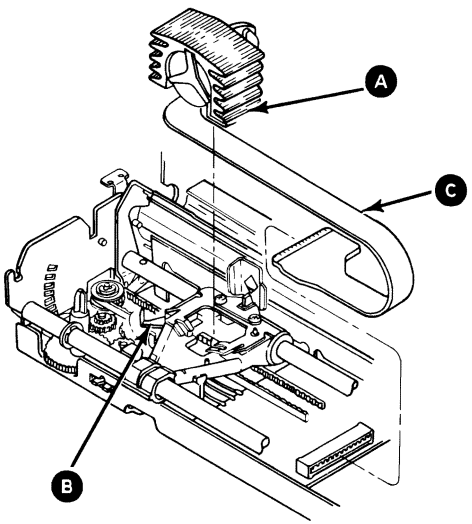
8. Pivot the print head lock lever (A) clockwise.

9. Lift the print head (B) and cable (C) from the carriage.



Print Head Replacement 5681

1. Insert the feet (A) on the print head into the opening on the carriage.
2. Pivot the lock lever (B) counterclockwise while pressing down on the print head.
3. Connect the print head cable (C) 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)**.



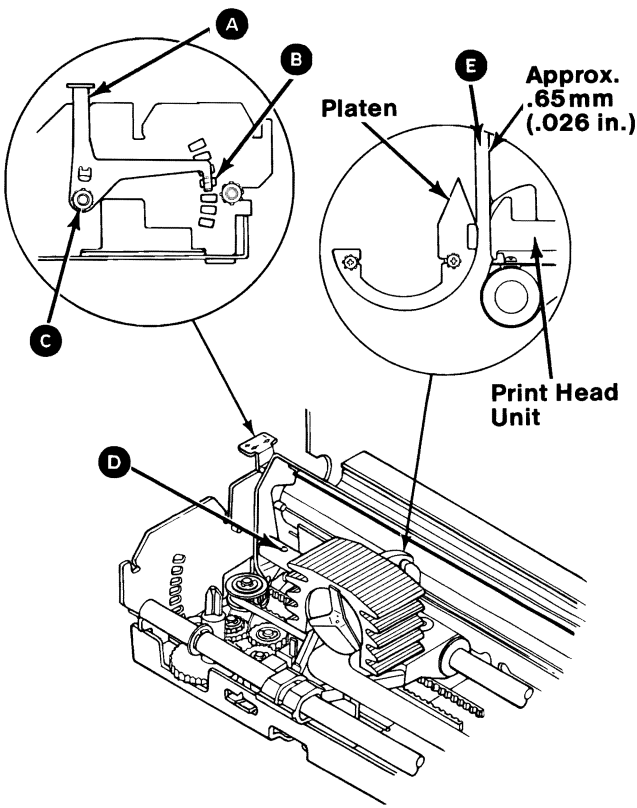
Note: Broken wires may be the result of other problems. If a print head has been replaced because of a broken wire, perform the steps on the next page to prevent damaging the newly installed print head.

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. Set the Power switch to On. Check for +24 Vdc at pins CN6-1 through 9 on driver card (use ground pin for common lead). If any pin has +24 Vdc, replace the control cards. If all pins read 0 Vdc, set the power switch to Off and connect CN6. The print head circuitry is functional.

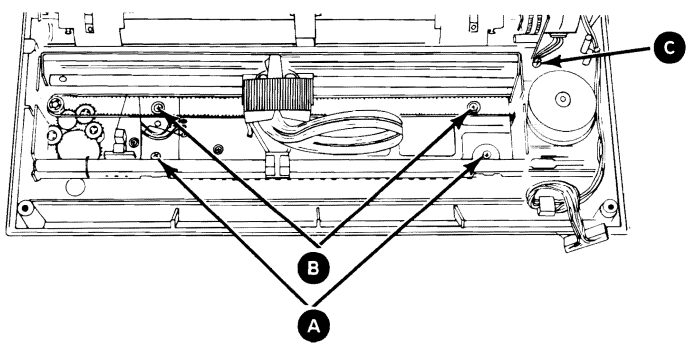
Print Head Gap Adjustment 5682

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 obtain a gap of .65 mm (0.26 in.) between the print head and the platen (E).
5. Tighten the nut (C).
6. Install the print mechanism assembly **(5686)**.



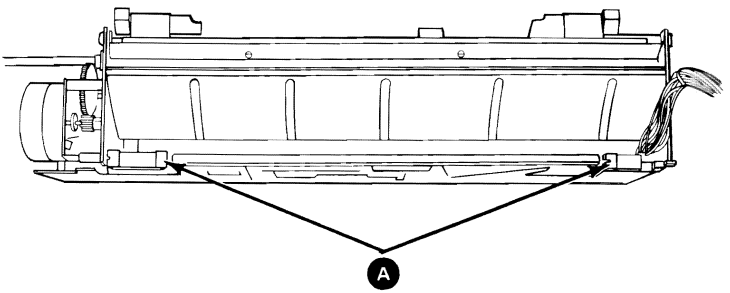
Print Mechanism Assembly Removal 5685

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 the shipping screws **B** if 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.

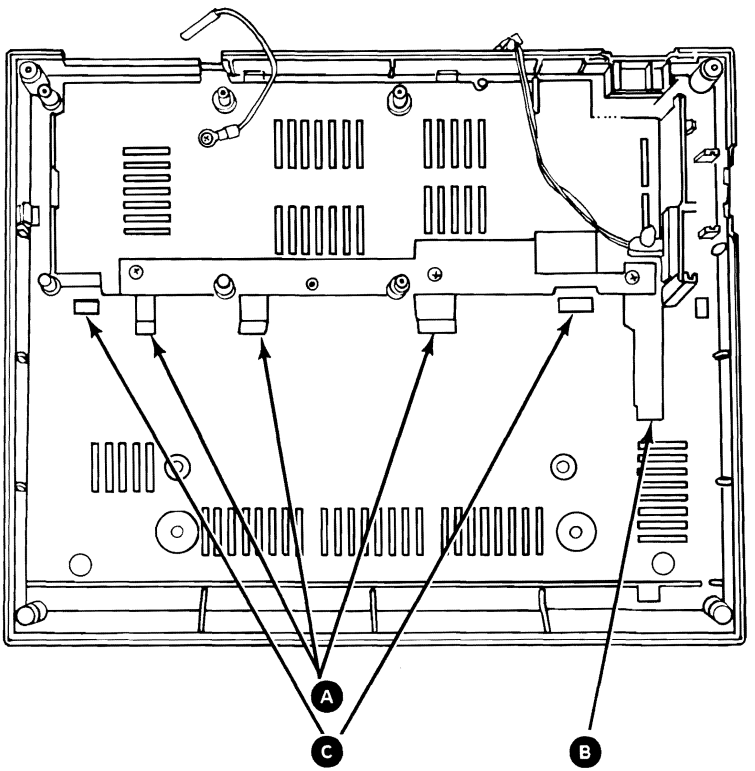


(Rear View)

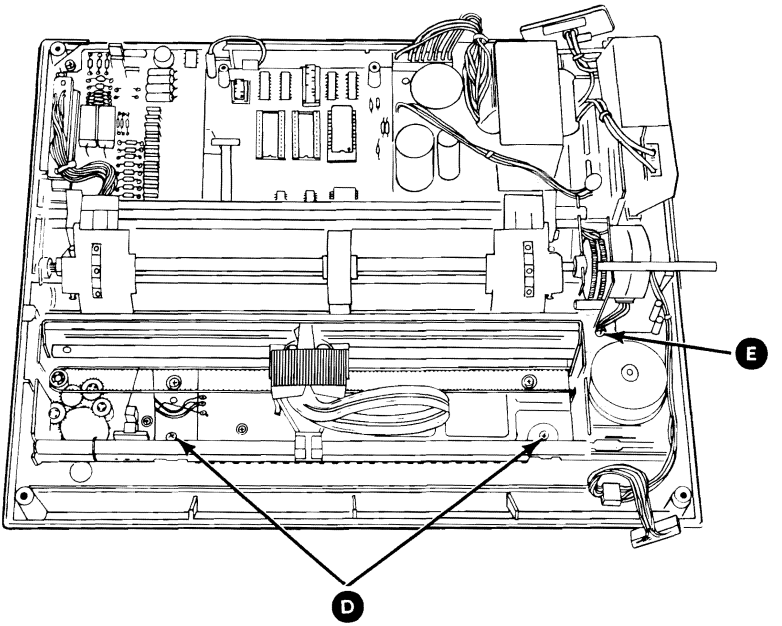
2. Place the print mechanism assembly on the base cover.

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).



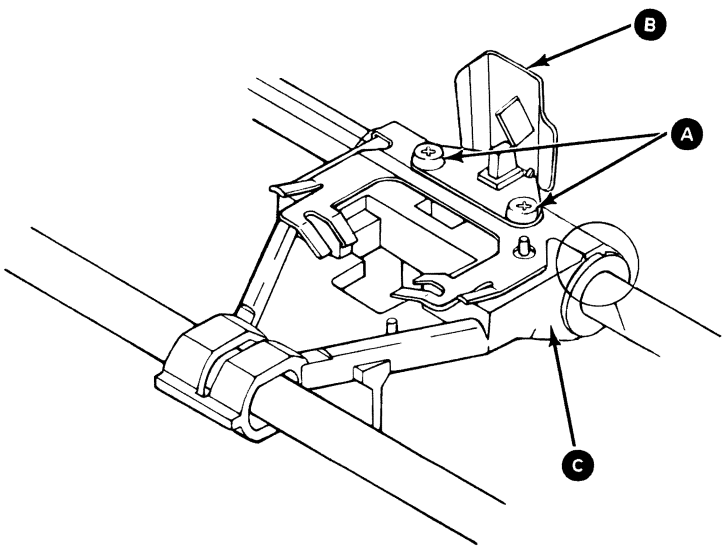
5. Install the two screws (D).
6. Install the screw (E) in the ground strap.



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)**.

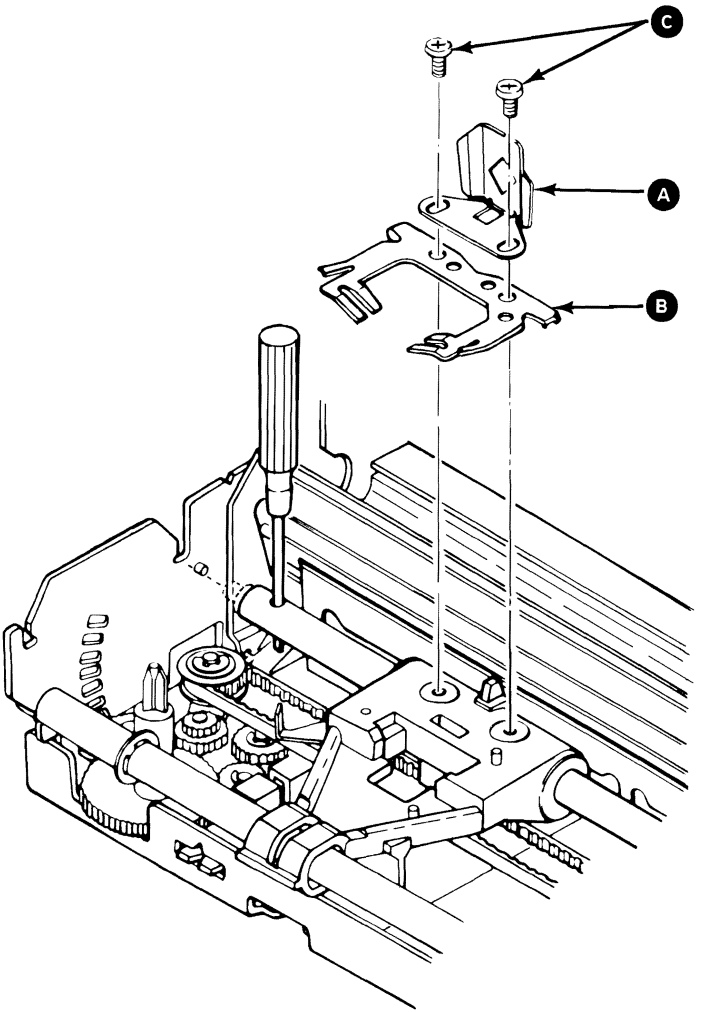
Ribbon Shield Removal 5690

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).

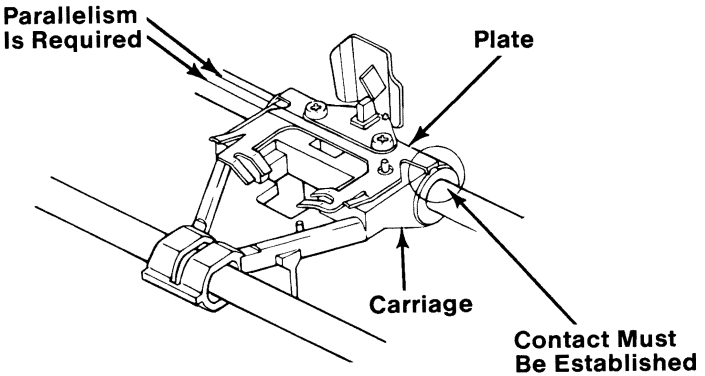


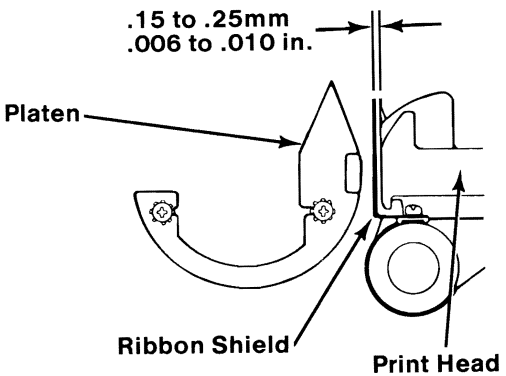
Ribbon Shield Replacement 5691

1. Position the shield (A) and the plate (B) on the print head carriage.
2. Insert the screws (C). (Do not tighten.)



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





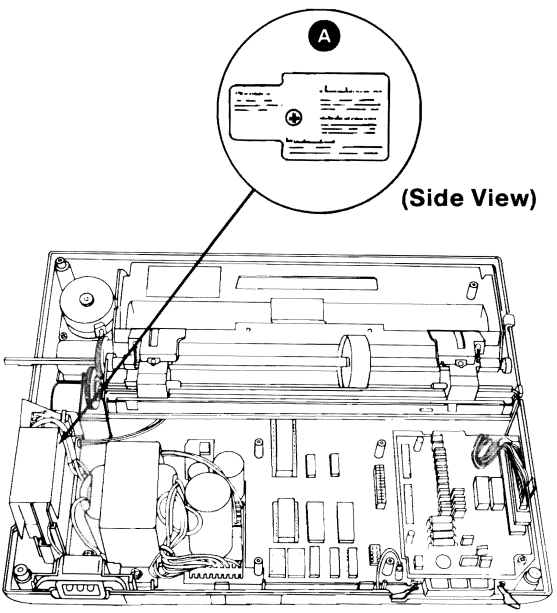
4. Install the print head **(5681)**.
5. Install the top cover **(5632)**.
6. Install the ribbon cartridge.
7. Install the access cover **(5630)**.
8. Install the forms rack **(5640)**.

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)**.

> **DANGER**
> **STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.**

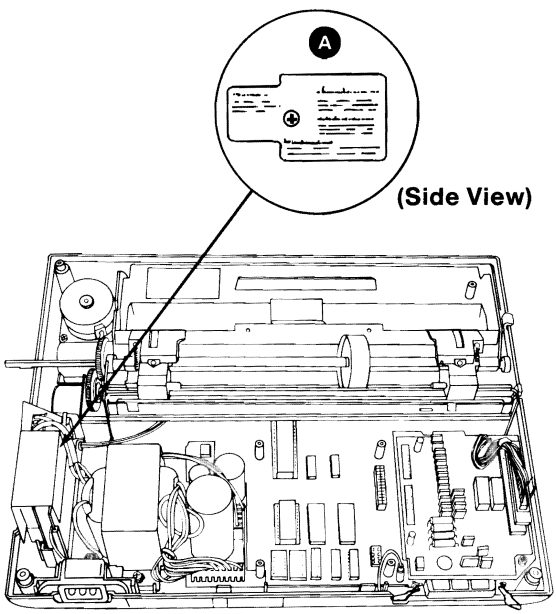
6. Loosen the screw (A).
7. Lift the safety shield from the fuse-filter card.



Safety Shield Replacement 5696

DANGER
STATIC VOLTAGE MAY BE PRESENT ON THE FUSE-FILTER CARD. USE CAUTION IN THIS AREA.

1. Position the safety shield on the fuse-filter card.
2. Tighten the screw (A).
3. Install the top cover **(5632)**.
4. Install the access cover **(5630)**.
5. Install the forms rack **(5640)**.



SECTION 6. SYSTEM SETUP, JUMPERS, AND SWITCH SETTINGS

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Notes:

System Setup

The Setup program is on the Advanced Diagnostics diskette. You need to know what options are installed in your system unit to run the Setup program.

1. Remove the system unit's cover (see Section 5).

2. Make a list of the option adapters installed in your system.

3. Look at the labels on the front of the fixed disk drives and make a note of the type of drives installed.

4. Look at the front bezel of the diskette drive and make a note of the type of drive installed. (The bezel of a double-sided diskette drive has an asterisk; the bezel of a high-capacity diskette drive is not marked.)

5. Turn to "Jumpers" and ensure the jumpers in your system are installed correctly.

6. Turn to "Switch Settings" and ensure all switches are set correctly.

   Note: If you receive an error code, troubleshoot any error indications other than 16X first. If the only error code you receive is 16X, and you cannot correct the Setup program using the instructions on the following page, go to page Start 3-10.

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1. Insert the Advanced Diagnostics diskette into drive A.

2. Set the system unit's Power switch to On.

   The Setup program will prompt you for the following information:

Time	Allows you to set or change the time.
Date	Allows you to set or change the date.
Diskette Drives	Select the number and type (high capacity or double sided) installed.
Fixed Disk Drives	Select the number and type installed.
Memory	Select the amount of base and expansion memory installed.
Display	Set the primary display if 2 display adapters are installed.

Note: If Menu 2 - Select an Option appears after the POST, select option **4 (SETUP)** and verify that the options are correctly set.

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Incompatible Adapters

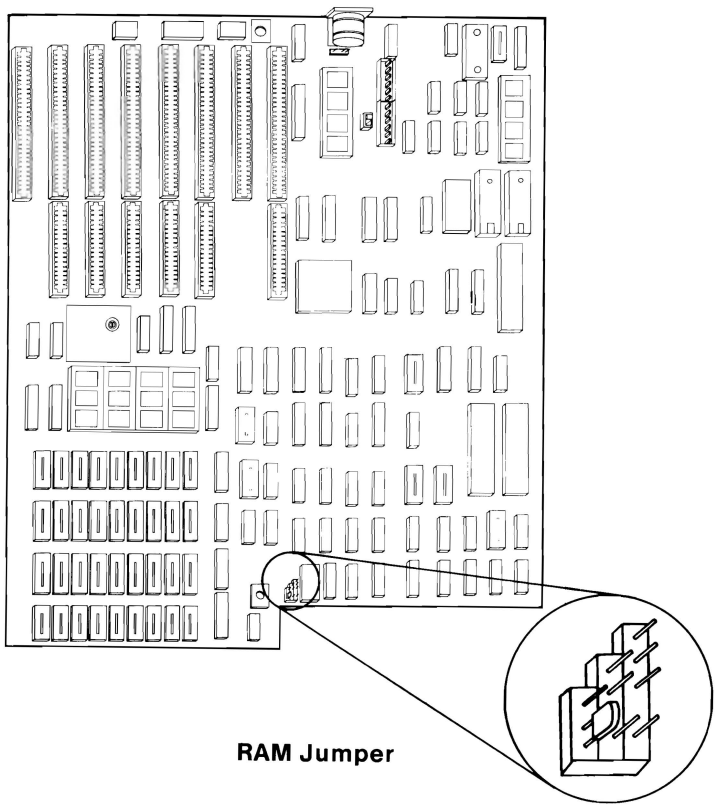
Certain option adapters conflict with each other when used in the same system. The following adapters should not be installed together in your system unit:

- Synchronous Data Link Control (SDLC)
- Alternate Binary Synchronous Communications (Alt. BSC).

Notes:

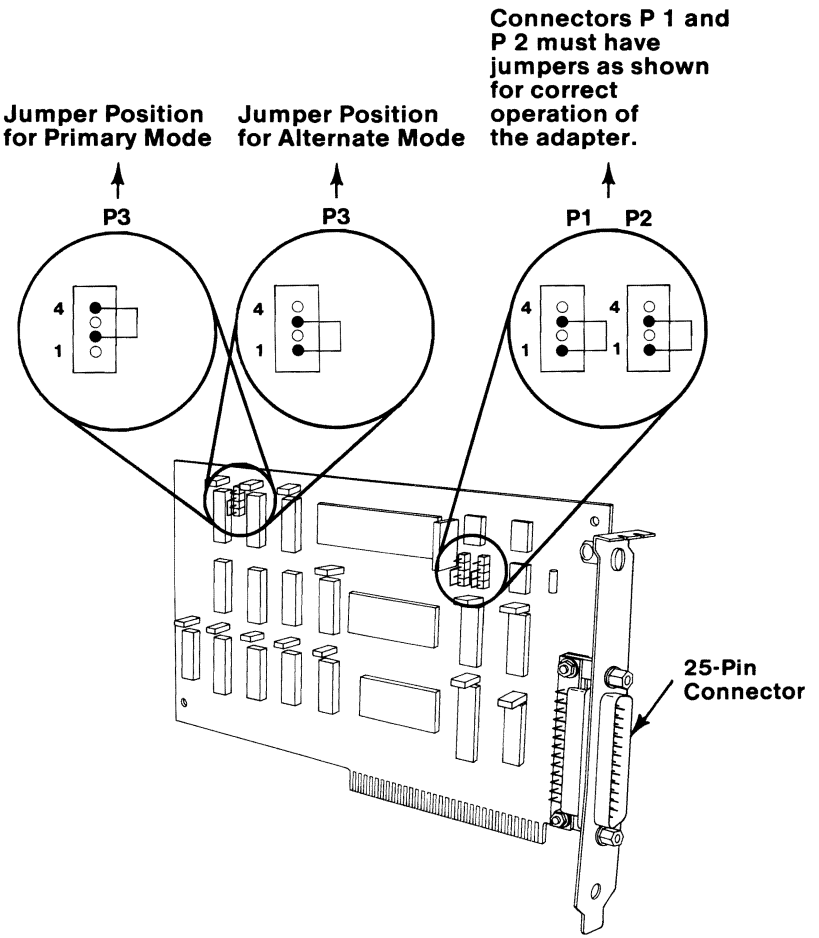
Jumpers

System Board

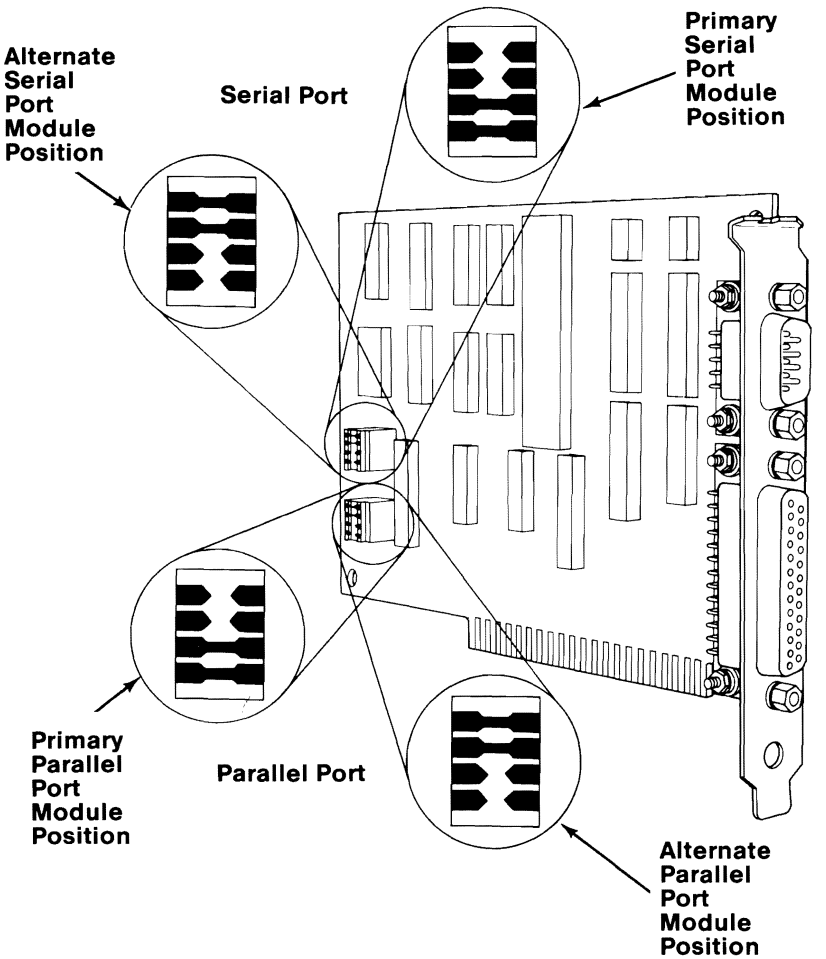


RAM Jumper

Binary Synchronous Communications Adapter

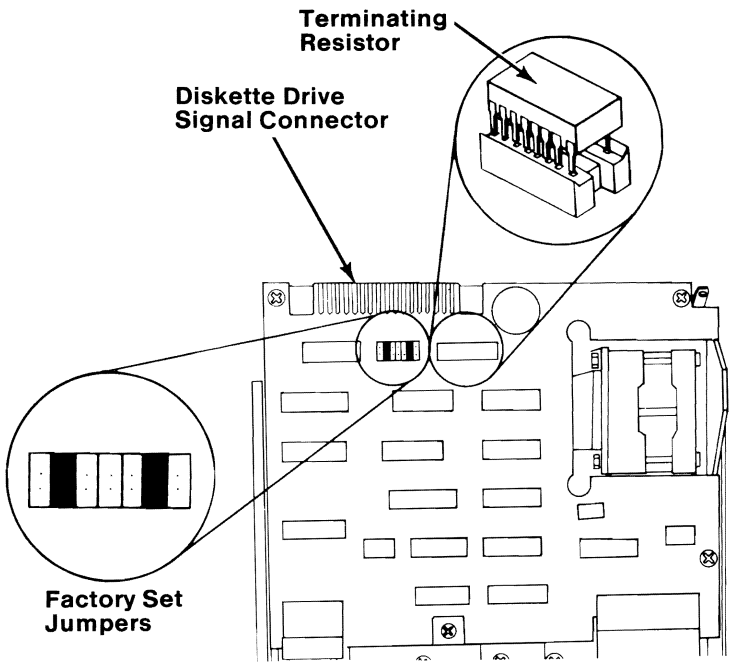


Serial/Parallel Adapter



Diskette Drive

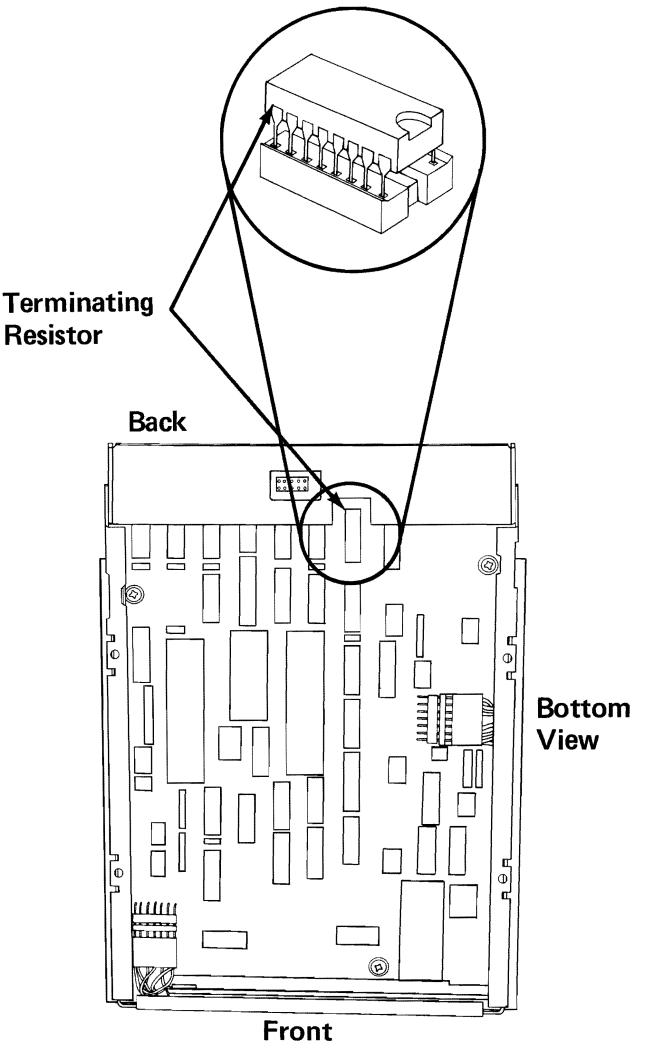
- The terminating resistor must be installed on drive A (top unit).
- In a system unit with two diskette drives, remove the terminating resistor from drive B (bottom unit) for proper operation.
- The diskette drive end of the signal cable is attached to diskette drive A.



Top View

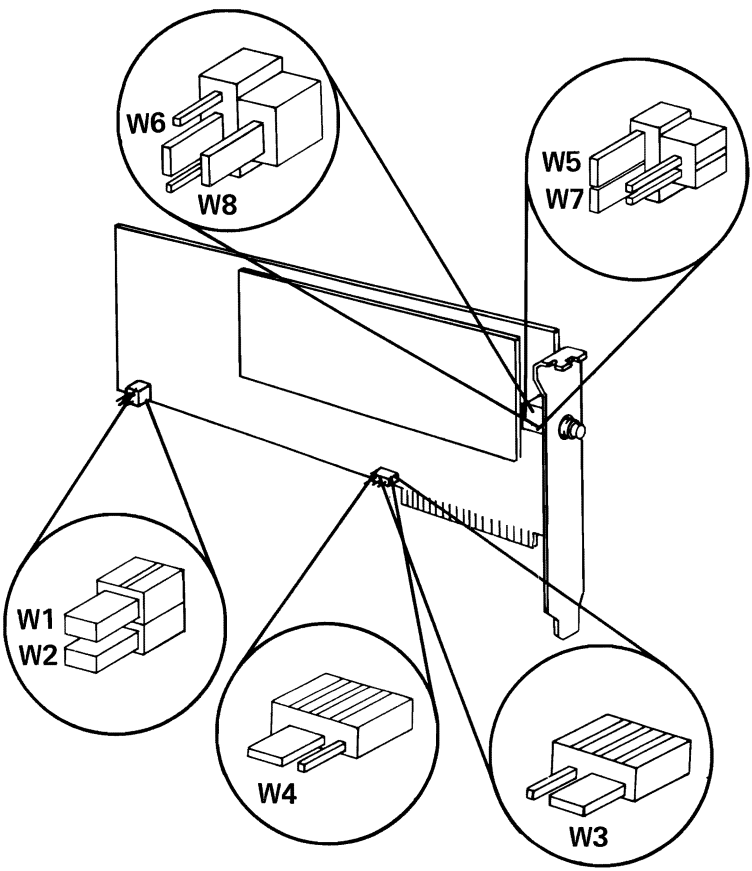
Fixed Disk Drive

- The terminating resistor must be installed on fixed disk drive C (left unit).
- In a system unit with two fixed disk drives, remove the terminating resistor from fixed disk drive D (right unit) for proper operation.

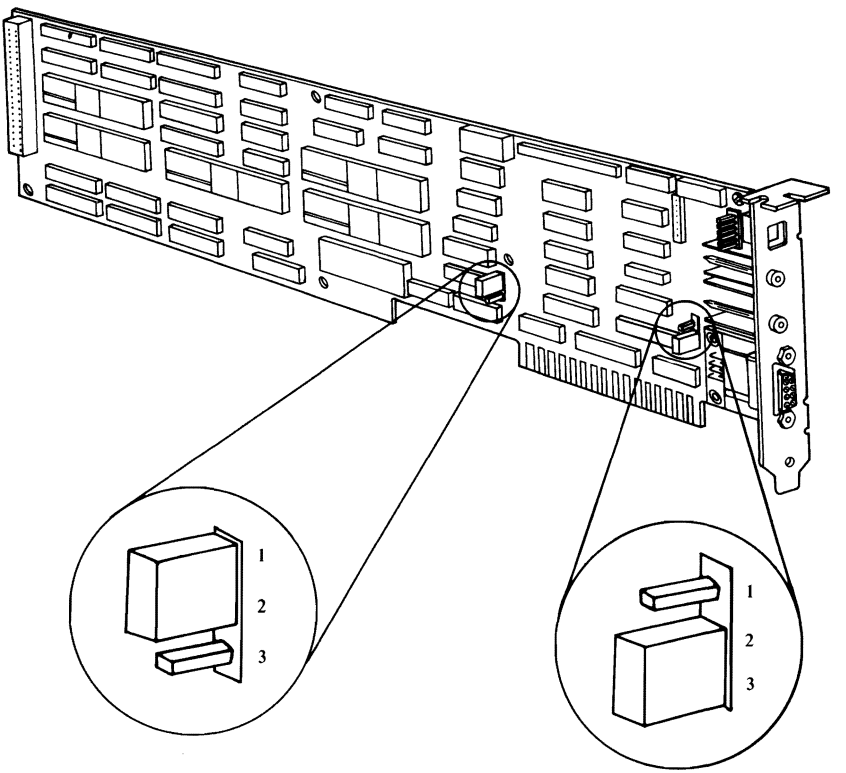


PC Network Adapter

W1	Automatic IPL
W2	Reserved
W3	Sets adapter to use Interrupt Level 2
W4	Sets adapter to use Interrupt Level 3
W5 & W7	Sets adapter as alternate adapter
W6	Sets adapter as primary adapter
W8	Enables ROM on adapter



Enhanced Graphics Adapter



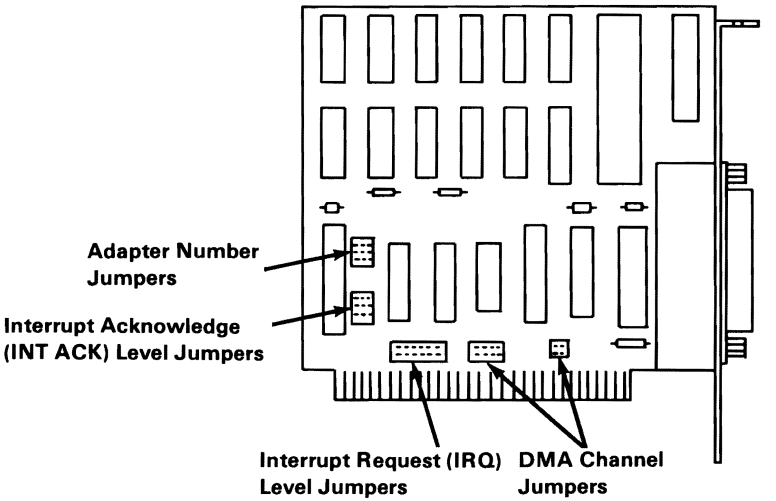
Display	P1	P3
IBM Color Display or IBM Monochrome Display	2 & 3	1 & 2
IBM Enhanced Color Display	1 & 2	1 & 2

Warning: Damage to the graphics adapter, the display, or both may result if these jumpers are not in the correct position.

Notes:

General Purpose Interface Bus Adapter

The GPIB adapter (shown below) has four groups of jumper pins.



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Adapter Number

All GPIB adapters that are installed in the same system have a different adapter number selected.

Adapter Number	Jumper Positions
0	
1	
2	
3	
4	
5	
6	
7	

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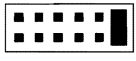
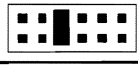
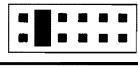
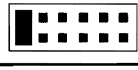
Interrupt Request (IRQ) Level

The GPIB adapter can share its IRQ level with other adapters that can use shared interrupts.

Interrupt Request Level	Jumper Positions
7	
6	
5	
4	
3	
2	

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Interrupt Acknowledge (INT ACK) Level

The interrupt acknowledge (INT ACK) and interrupt request (IRQ) levels must be the same.

INT ACK Level	Jumper Positions
7	
6	
5	
4	
3	
2	

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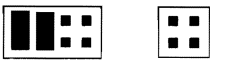
Direct-Memory Access (DMA) Channel

DMA Channel	Jumper Positions
1	
2	
3	

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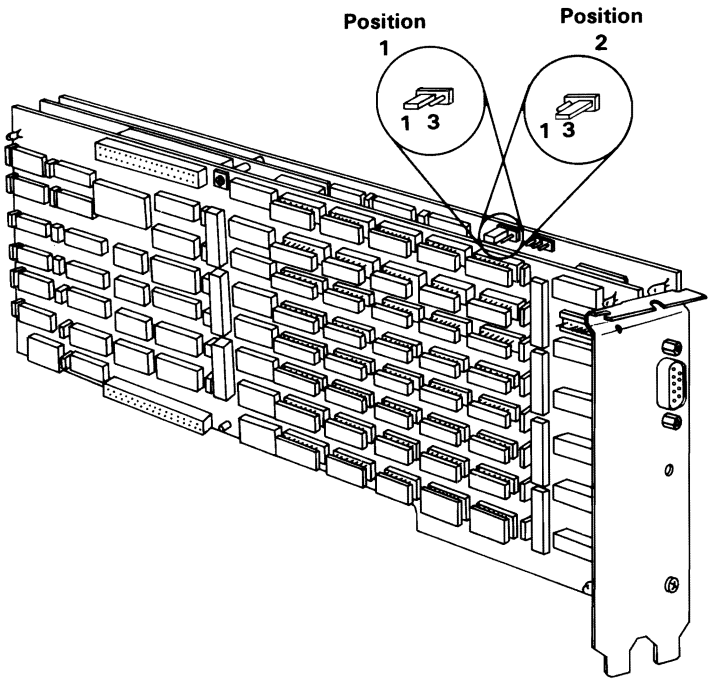
Professional Graphics Controller

The diagram below shows the location of the Emulator Enable/Disable Jumper on the Professional Graphics Controller.

When installed in position 1, the emulator jumper allows the Professional Graphics Controller to also function like an IBM Color/Graphics Monitor Adapter.

If there is an IBM Color/Graphics Adapter installed in the system, the emulator jumper must be in position 2.



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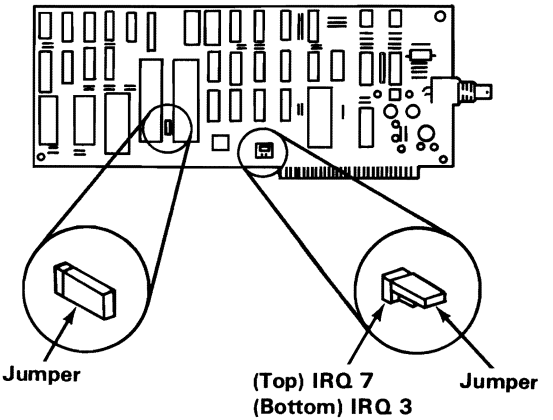
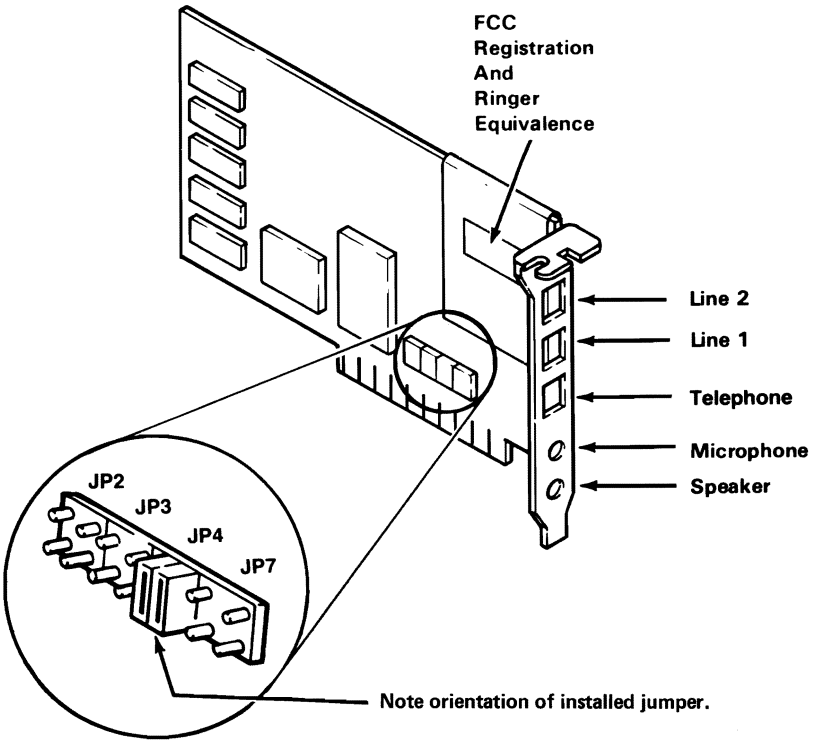
Cluster Adapter



Voice Communications Adapter Jumper Settings

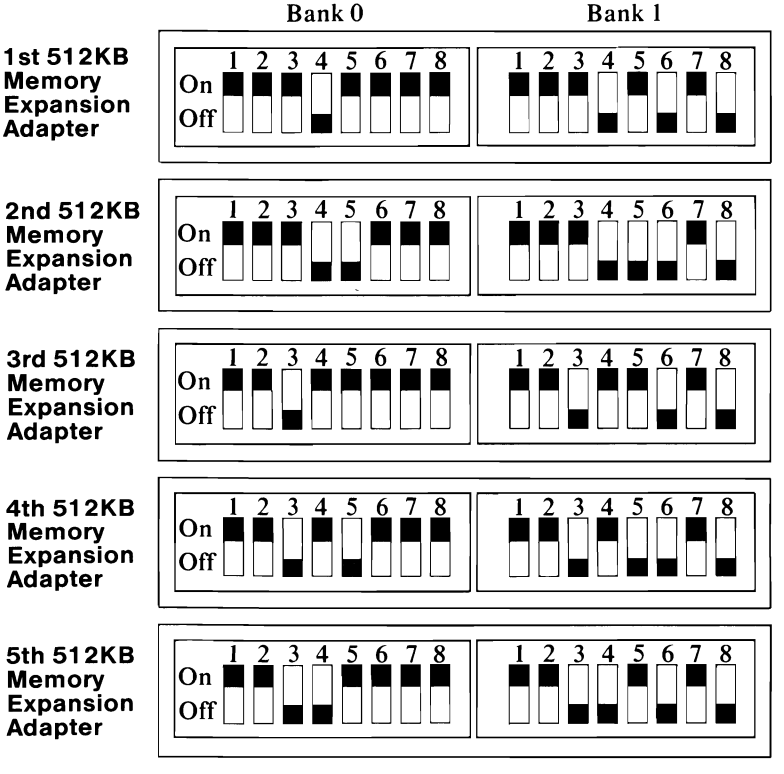


Jumper block is usually set at JP4. It must be installed at an interrupt level that does not conflict with other options.

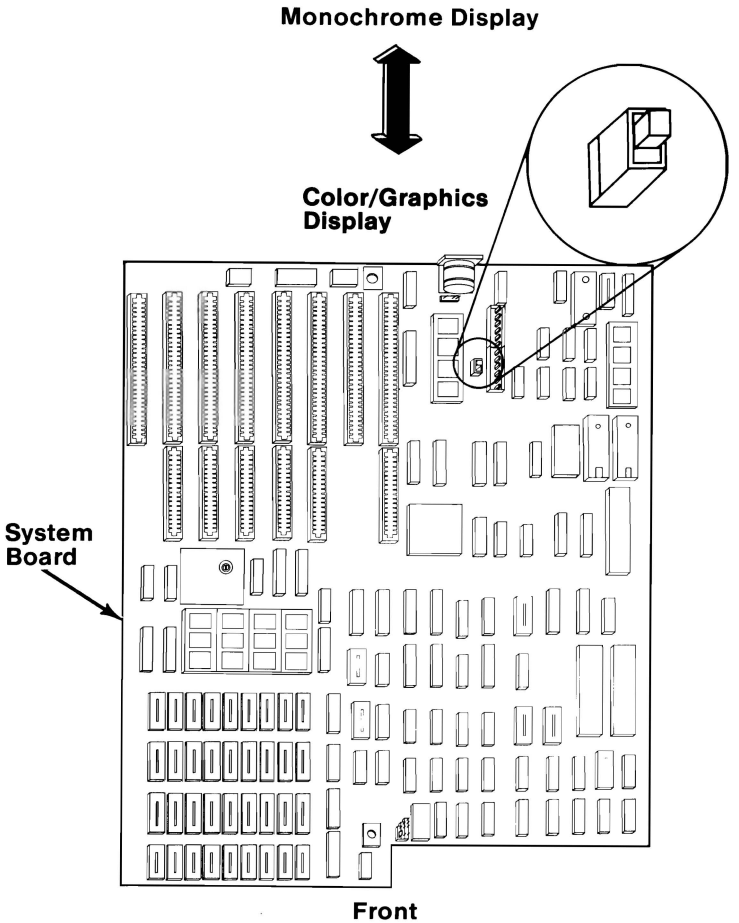
Switch Settings

512Kb Memory Expansion Adapter

The settings of the switches reflect the number of 512Kb Memory Expansion Adapters installed (128Kb adapters have no switch settings). Use the information on this page and set the memory switches in your system.



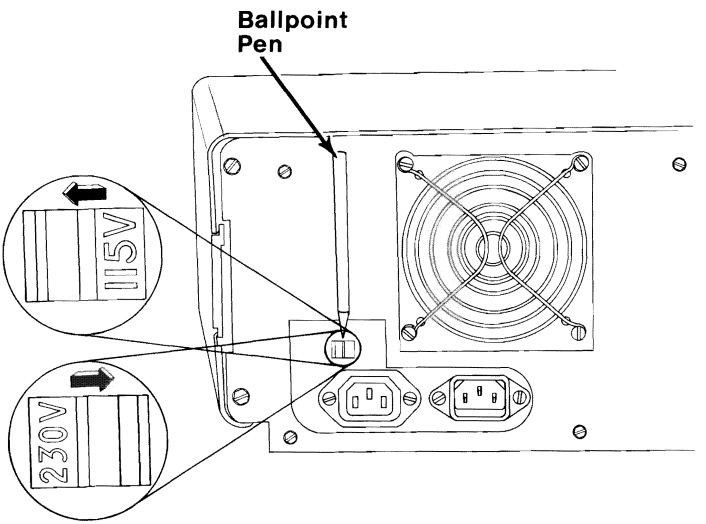
System Board Video Switch



Input Voltage Requirements

The 115/230 Vac selector switch at the rear of the system unit's power supply must be set for the voltage present at the outlet.

Switch Position	Voltage Range
115 Vac	100 to 125 Vac
230 Vac	200 to 240 Vac



Notes:

Enhanced Graphics Adapter Switch Settings

TABLE 1

Use these Switch Settings if the **Enhanced Graphics Adapter** is the **ONLY** display adapter you have installed in your system.

SW1	SW2	SW3	SW4	Type of Display Attached and Initial Mode Selection*
Off	Off	On	Off	Monochrome
On	Off	Off	On	Color (40x25)
Off	Off	Off	On	Color (80x25)
On	On	On	Off	Enhanced Color (in Normal Color Mode)
Off	On	On	Off	Enhanced Color (in Enhanced Color Mode)

***Note:** Mode Selection can be changed by programming

TABLE 2

Use these Switch Settings if the Enhanced Graphics Adapter and the IBM Monochrome Display And Printer Adapter are **BOTH** installed in your system, and the **Enhanced Graphics Adapter** is the **Primary** Display Adapter.

Switch Settings				**Type of Display Attached and Initial Mode Selection**	
SW1	**SW2**	**SW3**	**SW4**	**Enhanced Graphics Adapter**	**Monochrome And Printer Adapter**
On	Off	Off	On	Color (40x25)	Monochrome or None
Off	Off	Off	On	Color (80x25)	Monochrome or None
On	On	On	Off	Enhanced Color (in Normal Color Mode)	Monochrome or None
Off	On	On	Off	Enhanced Color (in Enhanced Color Mode)	Monochrome or None

TABLE 3

Use these Switch Settings if the Enhanced Graphics Adapter and the IBM Monochrome Display And Printer Adapter are **BOTH** installed in your system, and the **Monochrome Display And Printer Adapter** is the **Primary** Display Adapter.

Switch Settings				**Type of Display Attached and Initial Mode Selection**	
SW1	**SW2**	**SW3**	**SW4**	**Enhanced Graphics Adapter**	**Monochrome And Printer Adapter**
Off	On	On	On	None	Monochrome
On	On	On	On	Color (40x25)	Monochrome
Off	On	On	On	Color (80x25)	Monochrome
On	Off	On	On	Enhanced Color (in Normal Color Mode)	Monochrome
Off	Off	On	On	Enhanced Color (in Enhanced Color Mode)	Monochrome

TABLE 4

Use these Switch Settings if the Enhanced Graphics Adapter and the IBM Color Graphics/Adapter are **BOTH** installed in your system, and the **Enhanced Graphics Adapter** is the **Primary** Display Adapter.

Switch Settings				Type of Display Attached to:	
SW1	**SW2**	**SW3**	**SW4**	**Enhanced Graphics Adapter**	**Color/Graphics Adapter**
Off	Off	On	Off	Monochrome	None
On	Off	On	Off	Monochrome	Color (40x25)
Off	Off	On	Off	Monochrome	Color (80x25)

TABLE 5

Use these Switch Settings if the Enhanced Graphics Adapter and the IBM Color/Graphics Adapter are **BOTH** installed in your system, and the **Color/Graphics Adapter** is the **Primary** Display Adapter.

> **Note:** A monochrome display is the only display that may be attached to the Enhanced Graphics Adapter.

Switch Settings				**Type of Display Attached to:**	
SW1	**SW2**	**SW3**	**SW4**	**Enhanced Graphics Adapter**	**Color/Graphics Adapter**
On	On	Off	On	Monochrome or None	Color (40x25)
Off	On	Off	On	Monochrome or None	Color (80x25)

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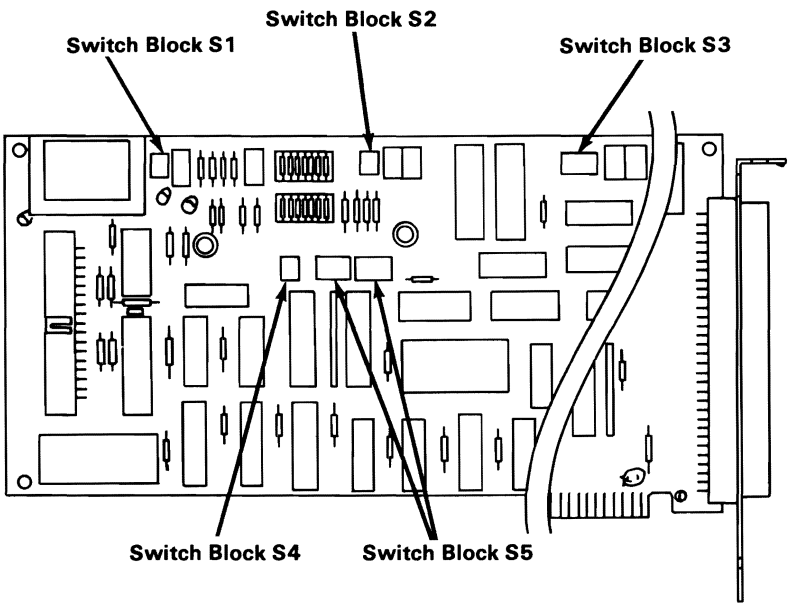
Data Acquisition and Control Adapter

On the Data Acquisition adapter shown below, there are five groups of switches.



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Analog Output Range (D/A) Channel 0

Switch Block S1

Output Range	Switch Settings
-5 to +5 Volts	
-10 to +10 Volts	
0 to +10 Volts	

Note: Only the switch settings shown may be used for this switch block.

Analog Output Range (D/A) Channel 1

Switch Block S2

Output Range	Switch Settings
-5 to +5 Volts	
-10 to +10 Volts	
0 to +10 Volts	

Note: Only the switch settings shown may be used for this switch block.

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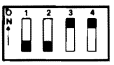
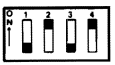
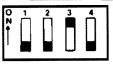
Analog Input Range (A/D)

Switch Block S3

Input Range	Switch Settings
-5 to +5 Volts	
-10 to +10 Volts	
0 to +10 Volts	

Note: Only the switch settings shown may be used for this switch block.

Adapter Number

All IBM Data Acquisition Adapters that are installed in the same system must have their own adapter number selected.

Switch Block S4

Adapter Number	Switch Positions
0	
1	
2	
3	

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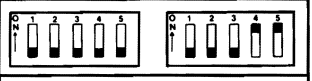
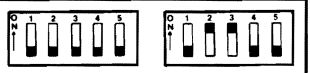
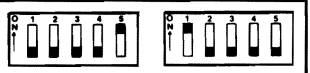
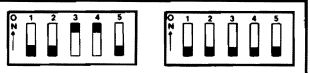
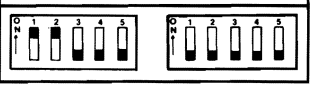
Interrupt Request Level (IRQ)

The Data Acquisition Adapter can share its IRQ level with other adapters that can use shared interrupts.

Switch Block S5

IRQ Level	Switch Settings
7	
6	
5	
4	
3	

Note: Only the switch settings shown may be used for this switch block.

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Notes:

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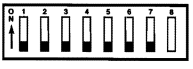
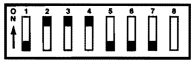
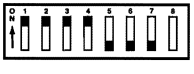
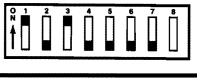
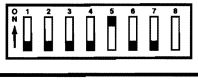
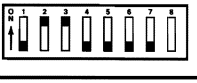
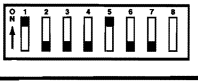
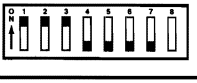
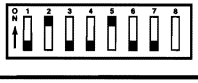
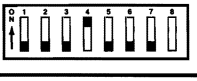
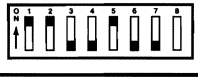
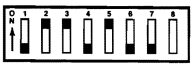
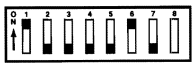
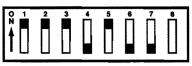
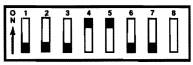
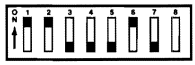
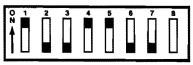
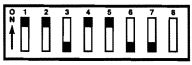
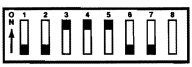
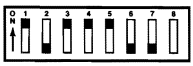
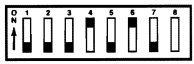
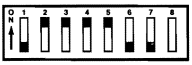
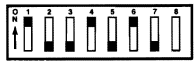
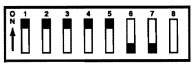
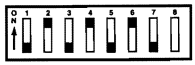
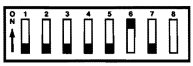
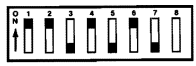
Cluster Adapter Switch Settings

The following figure shows the settings for switches 1 through 6 of Switch Block 1 for station addresses 0 to 21.

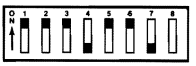
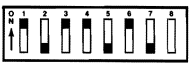
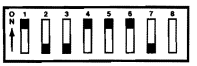
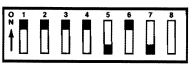
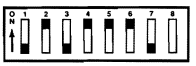
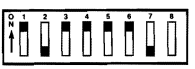
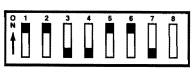
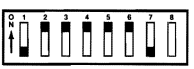
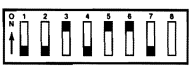
Position 7 of Switch Block 1 is always set to Off.

Station Address	Switch Block 1	Station Address	Switch Block 1
0		11	
1		12	
2		13	
3		14	
4		15	
5		16	
6		17	
7		18	
8		19	
9		20	
10		21	

The following figure shows the settings for switches 1 through 6 of Switch Block 1 for station addresses 22 to 43.

Station Address	Switch Block 1	Station Address	Switch Block 1
22		33	
23		34	
24		35	
25		36	
26		37	
27		38	
28		39	
29		40	
30		41	
31		42	
32		43	

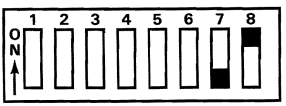
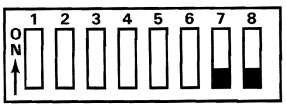
The following figure shows the settings for switches 1 through 6 of Switch Block 1 for station addresses 44 to 63.

Station Address	Switch Block 1	Station Address	Switch Block 1
44		55	
45		56	
46		57	
47		58	
48		59	
49		60	
50		61	
51		62	
52		63	
53			
54			

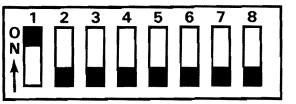
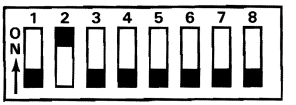
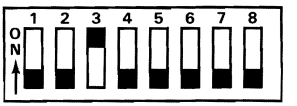
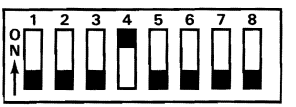
The following shows the switch setting for switch 8 of Switch Block 1.

With switch 8 of Switch Block 1 set to On, the Personal Computer will request an IPL from another station on the Cluster. This request delays the POST test completion by 30 seconds.

The recommended switch setting is IPL Off.

Remote IPL ON: Switch Block 1, Switch 8	
Remote IPL OFF: Switch Block 1, Switch 8	

The following figure shows the settings for switches 1 through 4 of Switch Block 2 for adapter numbers 1 through 4.

Select Adapter 1: **Switch Block 2, Switch 1**	
Select Adapter 2: **Switch Block 2, Switch 2**	
Select Adapter 3: **Switch Block 2, Switch 3**	
Select Adapter 4: **Switch Block 2, Switch 4**	

Switches 5 through 8 of Switch Block 2 are always set to Off.

Note: If one Cluster Adapter is installed, it must be set as adapter number one. Each additional adapter must have a different Cluster Adapter number.

Notes:

SECTION 7. PARTS CATALOG

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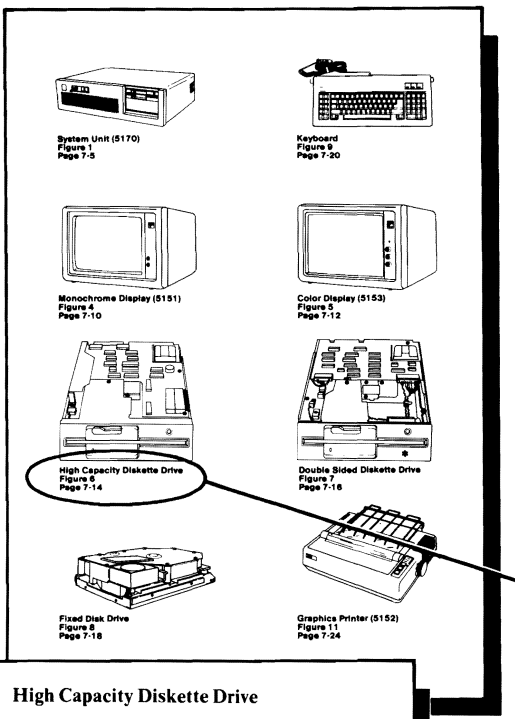
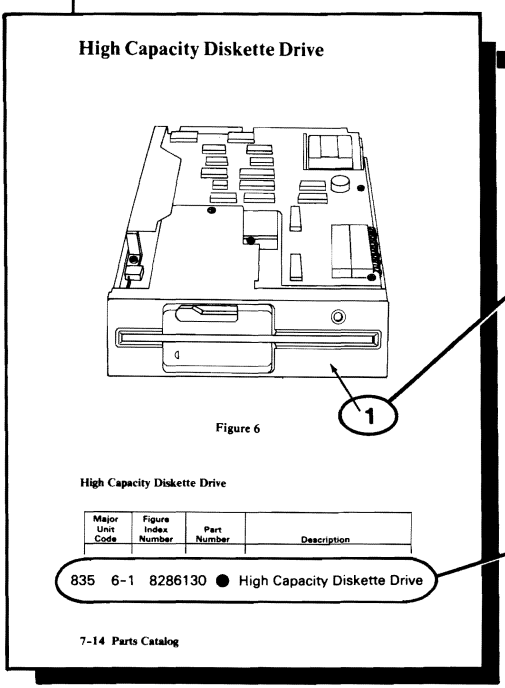
How To Use This Parts Catalog



1

Turn to the visual index then locate, by illustration, the assembly containing the part.



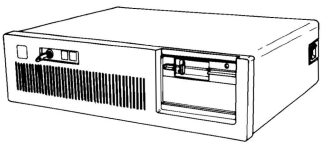
2

Turn to the page for that assembly. Then locate the part visually.

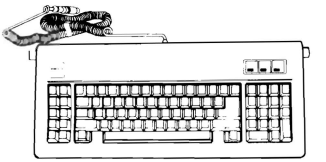
3

Using the index number shown with the part, refer to the accompanying listing to obtain major unit code, part number and description.

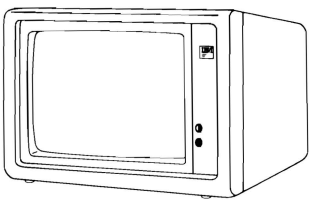
Visual Index



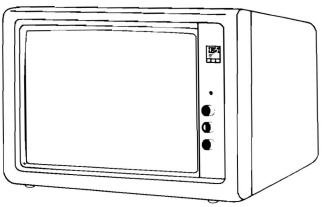
System Unit (5170)
Figure 1
Page 7-5



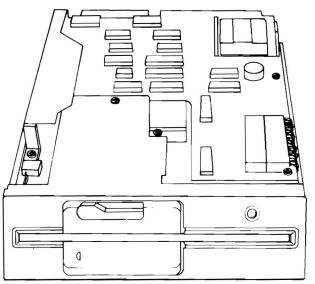
Keyboard
Figure 9
Page 7-20



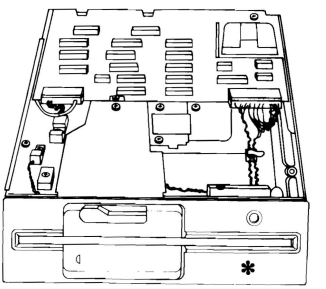
Monochrome Display (5151)
Figure 4
Page 7-10



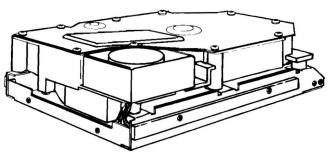
Color Display (5153)
Figure 5
Page 7-12



High Capacity Diskette Drive
Figure 6
Page 7-14



Double Sided Diskette Drive
Figure 7
Page 7-16



Fixed Disk Drive
Figure 8
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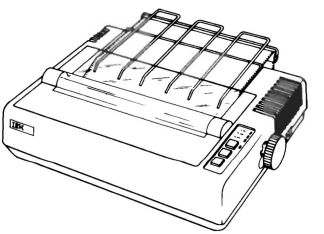
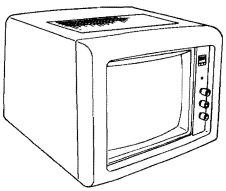
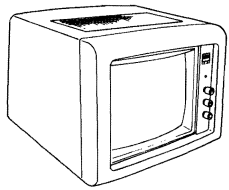


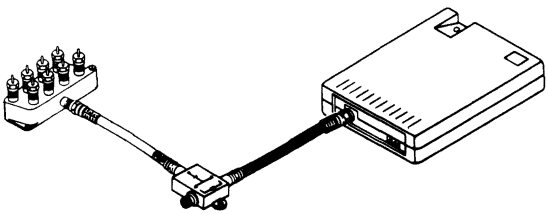
Graphics Printer (5152)
Figure 11
Page 7-24



Enhanced Color Display
Figure 5.1
Page 7-14



Professional Graphics Display
Figure 5.2
Page 7-14.2



PC Network
Figure 11
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Notes:

August 15,1984
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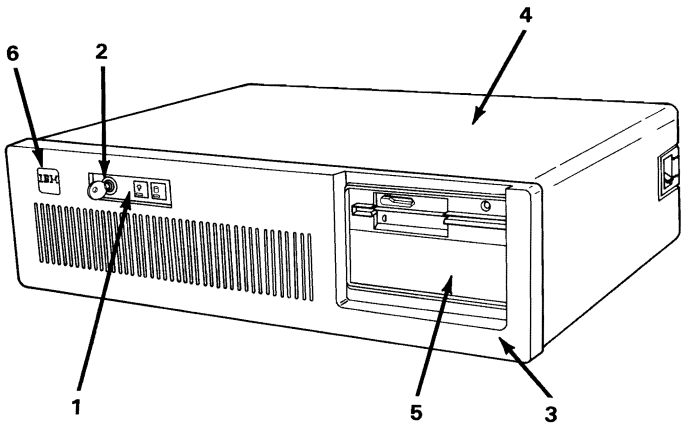
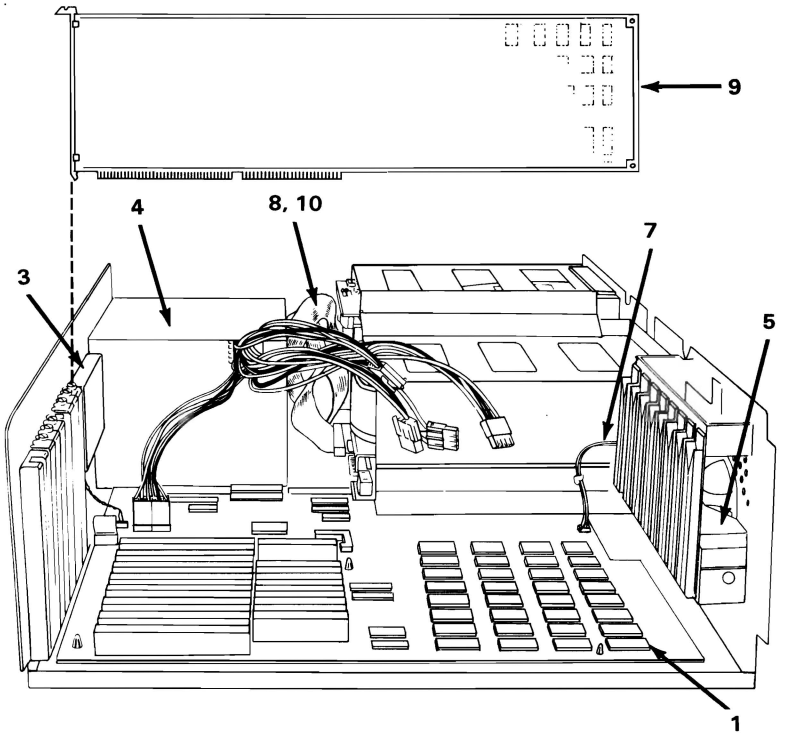
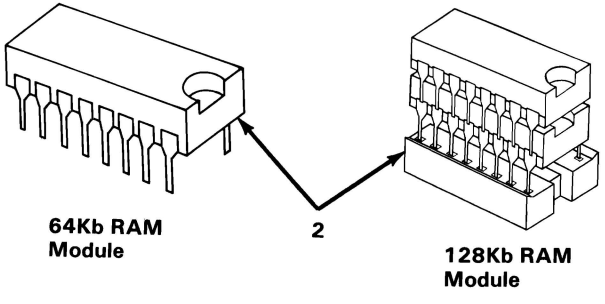
System Unit (5170)

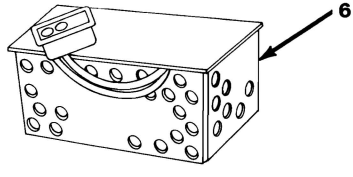


Major Unit Code	Index No.	Part Number	Description
000	1	8286133	Control Panel Assembly
000	2	8286117	Key Lock Assembly
000	3	8286134	Front Bezel
000	4	8286119	Cover
000	5	8286114	Blank Bezel
000		8286169	Back Panel
000	6	8286137	Label/Logo Kit - Consisting of - Nameplate Logo (Front) Logo Spring Identification Label

System Unit (5170)







Major Unit Code	Index No.	Part Number	Description
311	1	6480170	System Board-Type 1, 256Kb-512Kb (Populated to 256Kb)
311	1	6480072	System Board-Type 2, 512Kb
321	2	8286168	64Kb RAM Module AT (Qty.1)
321	2	8286139	128Kb RAM Module (Qty.1)
321	2	6480008	256Kb RAM Module (Qty.1)
600	3	8286121	Battery
600	4	8286122	Power Supply
000	5	8529143	Speaker Assembly
600	6	8286123	Power Supply Load Resistor
000	7	8286118	Control Panel Cable
866	8	8286129	Fixed Disk Drive Data Cable
327	9	8286125	Fixed Disk and Diskette Drive Adapter
866	10	8286124	Fixed Disk and Diskette Drive Signal Cable
			Misc. Parts Kit
		8286132	- Consisting of -
			Access Plate
			Blank Bracket
			Bracket Keeper
			Board Clip
			Drive Ground Strap
			Retainer Clip
001		8286135	Plastic Wares Kit AT
			- Consisting of -
			System Board Clip
			System Unit Foot Pad
			Keyboard Foot Pad
			Keyboard Lens Insert
			Keyboard Foot Spring
			Radio Frequency Interference Gasket
			Adapter Support Bracket
			Bezel Keeper
		8286136	Screw Hardware Kit
			- Consisting of -
			Screw (Self-Tap)
			Screw (System Unit)
			Star Washer, Lock Washer
			Screw (2-56), Screw (Panel)
			Screw (Cover), Screw (Hex)
			Hex Nut (2-56)
			Screw (6-32)
			Nut (4-40), Screw (4-40)
			Screw (Head Bind)

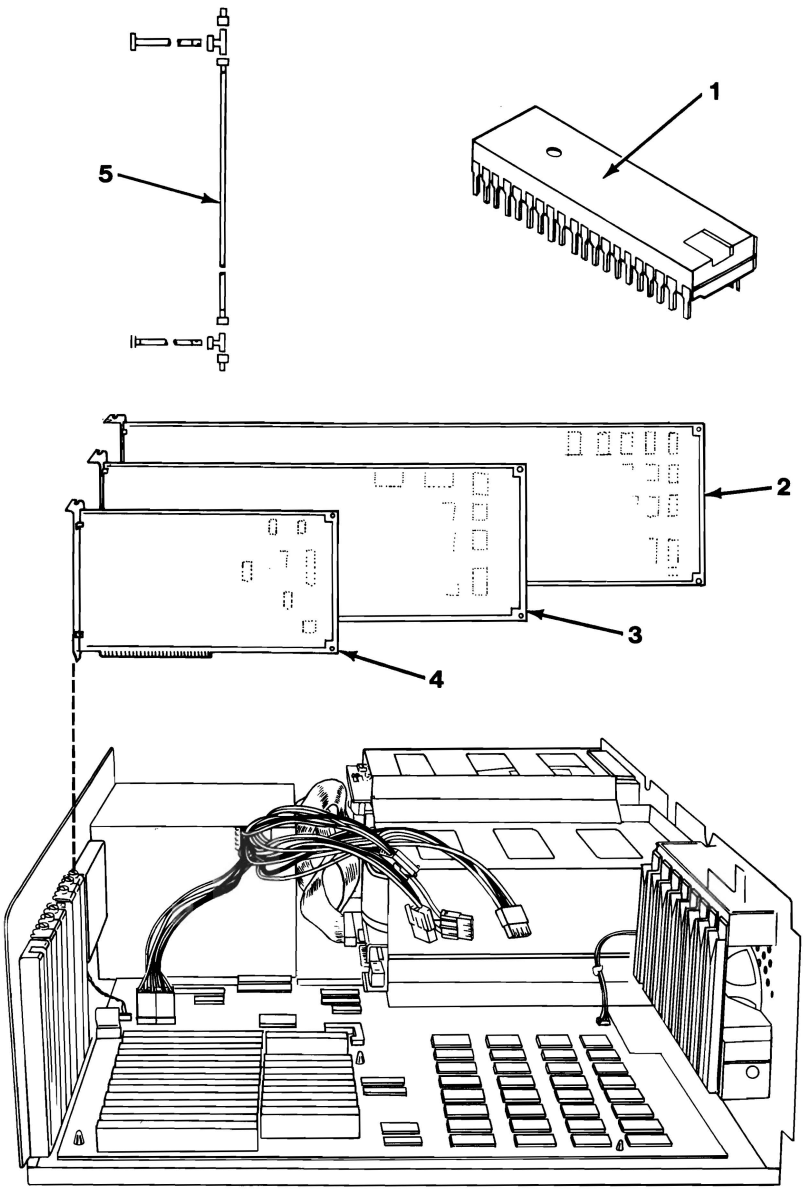
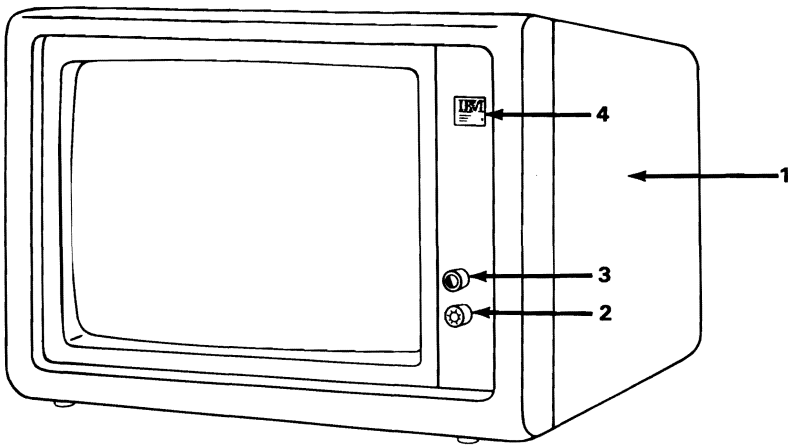


Figure 3

Major Unit Code	Index No.	Part Number	Description
			- Optional Parts -
326	3-1	8286127	80287 Math Coprocessor
306	3-2	8286115	512Kb Memory Expansion Adapter
304	3-2	8286116	128Kb Memory Expansion Adapter
350	3-2	8286138	Prototype Adapter
106	3-2	8286098	Binary Synchronous Communications (BSC) Adapter
102	3-2	8286099	Synchronous Data Link Control (SDLC) Communications Adapter
307	3-2	8529148	Monochrome Display and Printer Adapter
309	3-2	8529146	Color/Graphics Monitor Adapter
110	3-2	6323472	Cluster Adapter
	3-5	6323575	Cluster Cable Kit
115	3-2	8286171	PC Network Adapter
115		8286172	PC Network Adapter Cable
344	3-2	8654215	Enhanced Graphics Adapter
345		6323468	Graphics Memory Expansion Card (Does not include memory modules)
346		8654219	Graphics Memory Module (Qty. 1)
333	3-2	6181765	Professional Graphics Controller
332		6181772	Professional Graphics Memory Module (Qty.1)
		6133787*	Controller Processor Card
		6133788*	Controller Emulator Card
		6133789*	Controller Memory Card
		6133790*	8088 Processor
		6133791*	32Kb ROM
		6133792*	32Kb ROM
		6323410*	Digital-Analog Converter
		6323412*	Misc. Hardware kit
330	3-2	6181770	GPIB Adapter
331	3-2	6181768	Data Acquisition Adapter
568	3-2	2684438	Voice Communications Adapter
322	3-3	8286147	Serial/Parallel Adapter
		8286170	Serial Adapter Cable
322		8286194	Serial Adapter Connector
315	3-4	8529151	Game Control Adapter

* Restricted Availability

Monochrome Display (5151)



Major Unit Code	Figure Index Number	Number	Part Description
200	4-1	8529171	Display Assembly 120 Volt
200	4-1	8529209	Display Assembly 220/240 Volt
200	4-2	8529177	Brightness Knob
200	4-3	8529178	Contrast Knob
200	4-4	8529179*	Logo/Label Kit 120 Volt
		8654205*	Logo/Label Kit 220/240 Volt - Consisting of - Front Name Plate FCC Label Label-Caution Rear Name Plate
		8529229*	Front Panel
		8529230*	Back Cover
		8529231*	Upper Cover Plug
		8529232*	Foot
		8529176*	Power Cord Holder
		8529173*	Signal Cable
		8529235*	Transformer 120 Volt
		8654206*	Transformer 220/240 Volt
		8529237*	Control Support
		8529236*	Transformer Support
		8529175*	Fuse 0.75 Amp for 120 Volt
		8654204*	Fuse 0.5 Amp for 220/240 Volt
		8529233*	Analog Card
		8529234*	PC Card
		8529174*	Power Cord 120 Volt
		8654203*	Power Cord 220/240 Volt
		8529180*	Display Misc. Hardware Kit - Consisting of - Display CRT Mounting Screw Display Transformer Screw Display CRT Mounting Support Display CRT Bracket to Front Panel Display Transformer Support Front Panel Display Rubber Bushing Screw Display Rubber Bushing Nut Display Cable Restraint Screw Display Star Washer
			*Restricted availability

Color Display (5153)

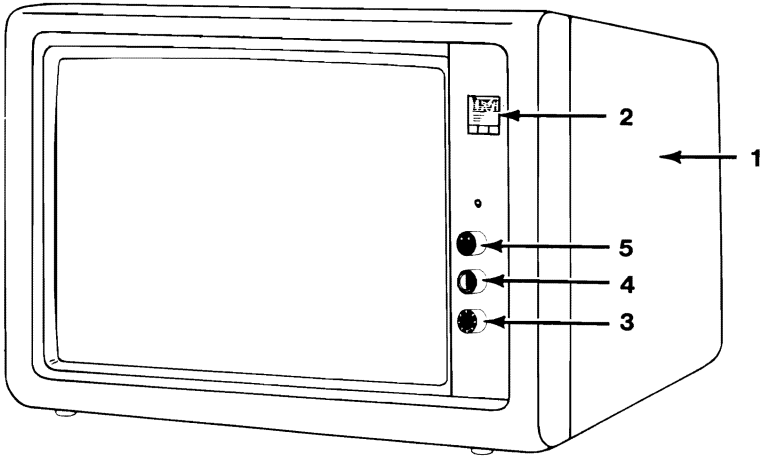
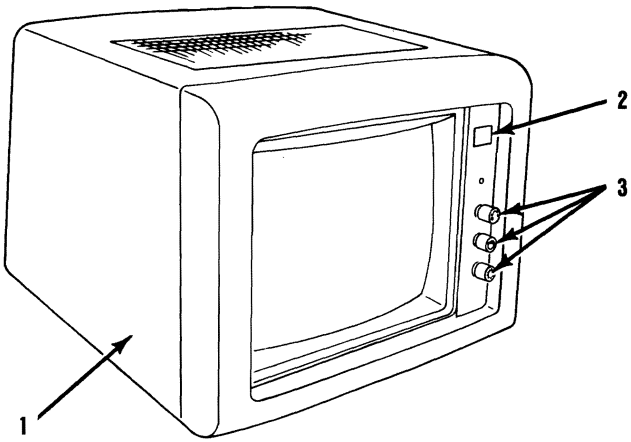


Figure 5

Major Unit Code	Figure Index Number	Part Number	Description
202	4-1	8529227	Display Assembly
202	4-1	8654214	Display Assembly model-002
202	4-2	8529339	Logo/Label Kit
202	4-3	8529287	Brightness Knob
202	4-4	8529288	Contrast Knob
202	4-5	8529289	Power On/Off Knob
202	4-6		Power Cord**
		8529285*	Front Cover with Top, Bottom, and Power Supply Brackets
		8529286*	Rear Cover
		8529323*	P.C. Board/Flyback Transformer Focus Pack/Horizontal Drive Transistor/Chassis
		8654222*	P.C. Board/Flyback Transformer control assembly model-002
		6135903*	Degaussing Coil
		8529338*	Control Assembly
		8654224*	Control Assembly model-002
		8654276*	Power On Indicator
		8529291*	Power Supply Assembly
		8654221*	Power Supply Assembly model-002
		8529290*	CRT and Yoke
		8529324*	CRT Board and Shield Cable
		8529334*	Signal Cable
		8529336*	Power Receptacle/Line Filter Assembly
		8654223*	Power Receptacle/Line Filter Assembly model-002
		8529335*	Vertical Size Pot Shaft Extension
		8529337*	Vertical Hold Pot Shaft Extension
		8529327*	Miscellaneous Hardware Kit - Consisting of - Driver Board Shield Driver Board Shield Retainers Signal Cord Strain Relief Power Supply Screws CRT Mounting Screws Control Assembly Screws P.C. Board Chassis Mounting Screws Rear Cover Screws and Washers Cover Screw Plugs Degaussing Coil Wire Ties
		6937192*	Packing Material Kit
			*Restricted availability
			**See Power Cord Parts list for the proper power cord certified for your country.

Enhanced Color Display (5154)



Enhanced Color Display (5154)

Major Unit Code	Figure Index Number	Part Number	Description
205	5.1-1	6321035	Display Assembly Model 001
		6321049	Display Assembly Model 002
		6321036	Display Assembly Model 003
	5.1-2	6321061	Logo and Label Kit -Consisting of- Back Logo Bottom Cover Warning Labels (Five Languages)
	5.1-3	6321056	Knob and Cover Cap Kit -Consisting of- On/Off Knob (1) Contrast Knob (1) Brightness Knob (1) Cover Cap (2) Rear Knob (2)
		6323319	Rubber Feet Kit -Consisting of- Rubber Feet (4) Washers (4) Screws (4)
		6321050*	Front Cover
		6321051*	Rear Cover
		6321052*	Main P.C. Board Assembly / Chassis / CRT Drive Card
		6321053*	Power Supply with Cover
		6321054*	Video Amp. Assembly / RGB Cable and Connector
		6321055*	Front Control Assembly
		6321057*	Power On Indicator
		6321058*	Rear Control Panel Assembly / Strain Relief
		6321059*	Signal Cable
		6135903*	Degaussing Coil
		6321064*	Miscellaneous Hardware Kit -Consisting of- CRT Rubber Mounting Washers (4) Plastic Drive Board Shield (1) Plastic Shield Retainers (2)
			CRT and Deflection Yoke Assembly with Wires / Ground Band / CRT Warning Label
		6321060*	Model 001 / Model 002
		6321063*	Model 003
			* Restricted Availability ** See Power Cord Parts List for proper power cord for your country.

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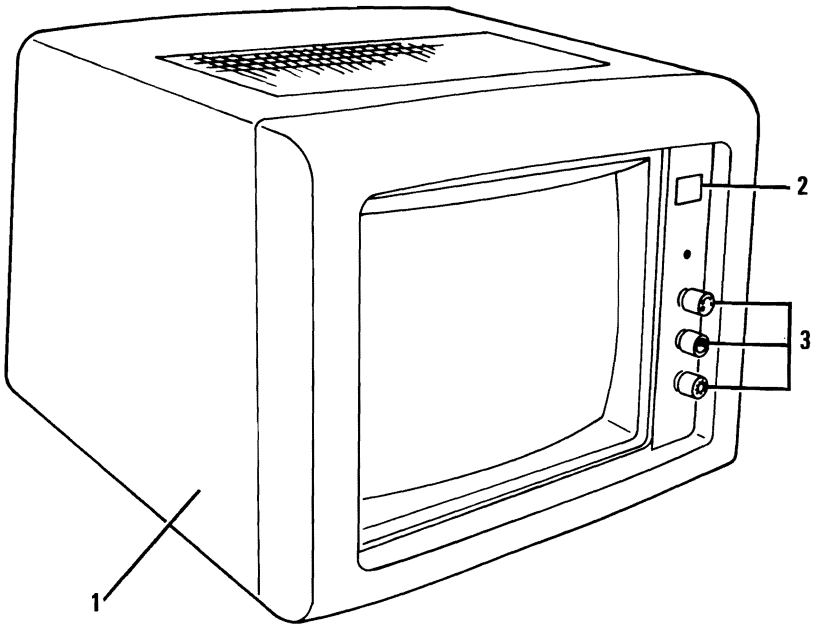
Professional Graphics Display (5175)



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Major Unit Code	Index No.	Part Number	Description
204	1	6181764	Display assembly (Domestic U.S.)
	1	6181766*	Display assembly (Southern Hemisphere)
	1	6171767*	Display assembly (Northern Hemisphere)
	1	6133988*	Display assembly (South America)
204		8529158**	Power cord (U.S.)
		6321050*	Front cover
		6321051*	Rear cover
		6133989*	Main PCB assembly/chassis/crt drive card
		6133990*	Power supply/with cover
		6133991*	Video AMP assembly/RGB Cable & Connector
		6133992*	Front control assembly
	3	6133993	Cover caps (2) & knob set (3 front)
		6321057*	Power on indicator
		6133994*	Signal cable
		6133995*	CRT & deflection yoke assembly with wires/tubes, warning labels (GND band) (northern hemisphere)
		6133996*	CRT & deflection yoke assembly with wires/tubes, warning labels (GND band) (southern hemisphere)
	2	6133997	Logo & label kit -Consisting of- Front IBM name plate Back IBM name plate Warning bottom cover labels
		6323319	Rubber feet kit
		6321064*	Miscellaneous hardware kit -Consisting of- CRT mounting rubber washers Plastic board shield Shield retainers, plastic type
		6133998*	Rating label model 002
		6133999*	Rating label model 003
		6134000*	Rating label model 004

* Restricted availability.
** See Power Cord parts list for proper power cord for your country.

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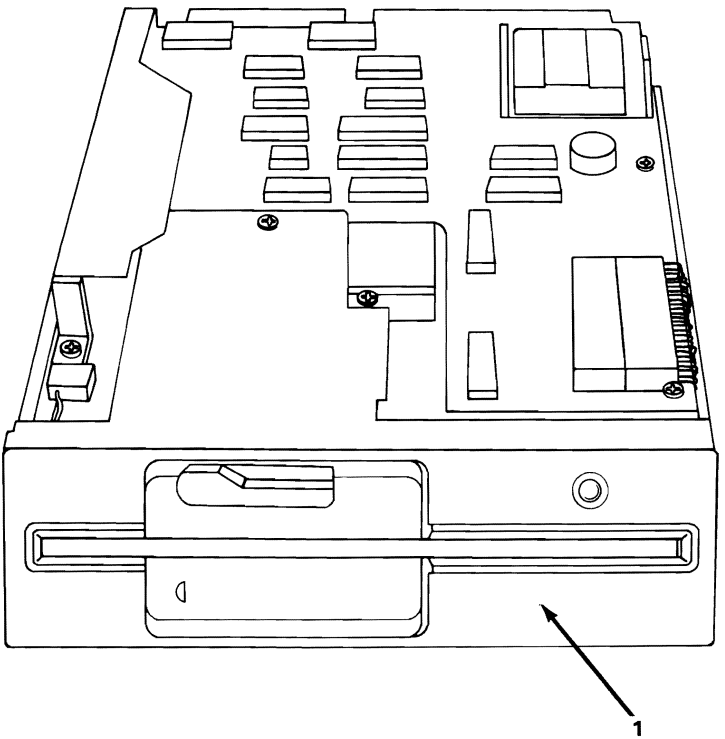
High Capacity Diskette Drive



August 15,1984
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High Capacity Diskette Drive

Major Unit Code	Figure Index Number	Part Number	Description
835	6-1	8286130	High Capacity Diskette Drive
866	8-2	8286124	Fixed Disk and Diskette Drive Signal Cable

Double Sided Diskette Drive

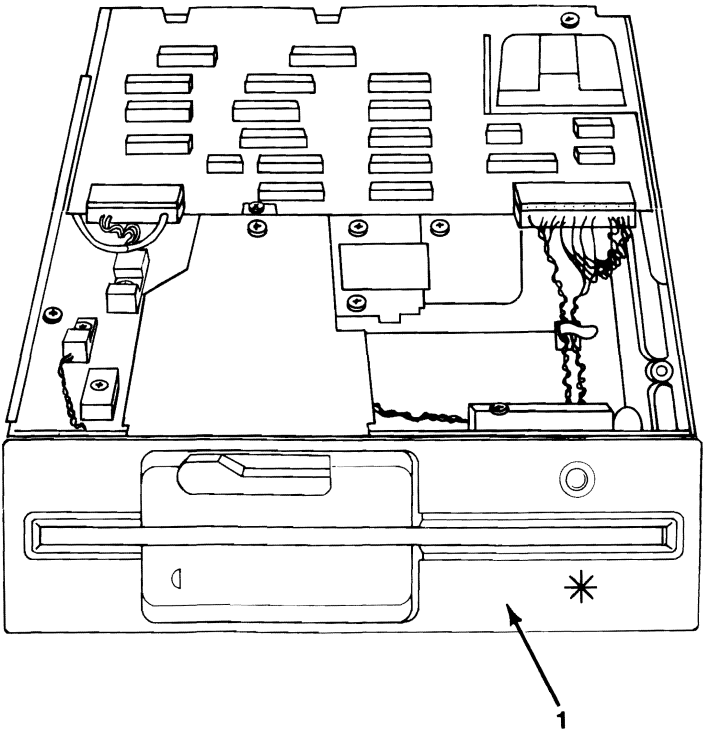

Figure 7

Double Sided Diskette Drive

Major Unit Code	Figure Index Number	Part Number	Description
875	7-1	8286131	Double Sided Diskette Drive
866	8-2	8286124	Fixed Disk and Diskette Drive Signal Cable

Fixed Disk Drive

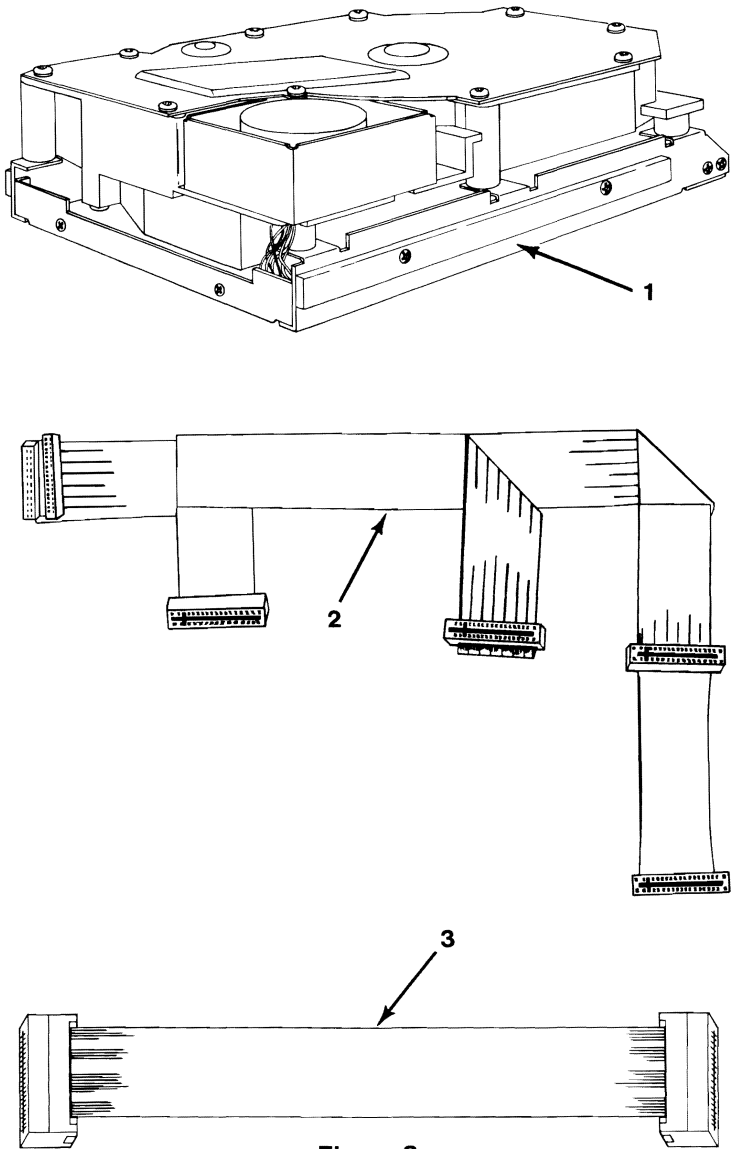

Figure 8

Fixed Disk Drive

Major Unit Code	Index No.	Part Number	Description
866	1	8286128	Fixed Disk Drive 20MB
867	1	8286216	Fixed Disk Drive 30MB
866	2	8286124	Fixed Disk and Diskette Drive Signal Cable
866	3	8286129	Fixed Disk Drive Data Cable
866		6489949	Fixed Disk Keeper Bar

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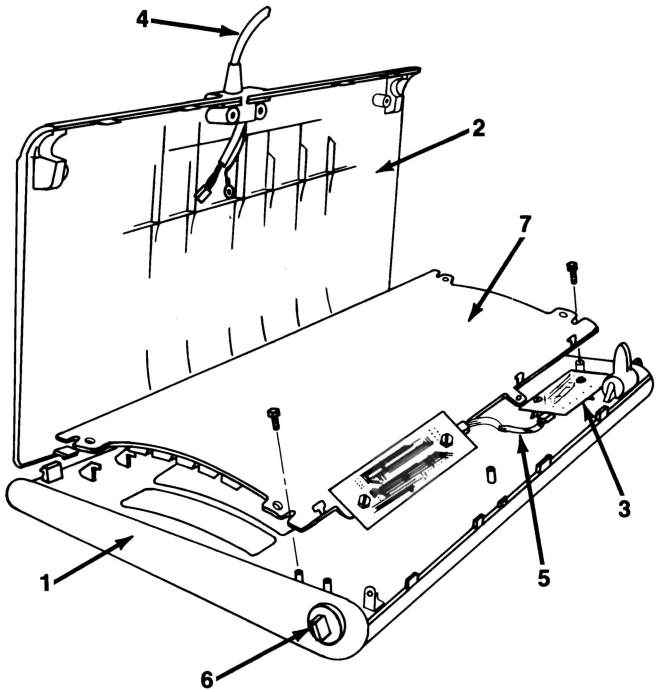
Keyboard



Major Unit Code	Index No.	Part Number	Description
040		8286165	Keyboard Complete USA (Includes Figure Index Numbers 9-1 through 9-7)
040	1	8286142	Top Cover
040	2	8286143	Base
040	3	8286144	LED Card
040	4	8286146	External Cable
040	5	8286145	Internal Cable
040	6	8286141	Adjustable Foot (Adjustable Foot Spring included in Misc. Parts Kit for System Unit)
040	7	8286140	Keyboard Subassembly USA
040	7	8286160	Keyboard Subassembly France
040	7	8286161	Keyboard Subassembly Italy
040	7	8286162	Keyboard Subassembly Germany
040	7	8286163	Keyboard Subassembly Spain
040	7	8286164	Keyboard Subassembly United Kingdom

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Keybutton Part Numbers

(Major Unit Code 040)

Key Location	Part Number	Description		Key Location	Part Number	Description
1	1642306	~/`		46	2658860	Z
2	1761460	!/1		47	2658861	X
3	1642308	@/2		48	2658862	C
4	1642309	#/3		49	2658863	V
5	1642342	$/4		50	2658864	B
6	1642343	%/5		51	2658865	N
7	4496183	^/6		52	2658866	M
8	2658824	&/7		53	1864026	</,
9	2658825	*/8		54	1864027	>/.
10	2658826	(/9		55	2658869	?/ /
11	2658827	)/0		57	6111189	⇧
12	1761515	_/-		58	1762744	Alt
13	2658829	+/=		61	N/A	Space Bar
14	5997221	¦/\		64	8310423	Caps Lock
15	5997176	←		65	4584721	F2
16	8310421	|←/→|		66	4584723	F4
17	2658832	Q		67	4584725	F6
18	2658833	W		68	4584727	F8
19	2658834	E		69	4584729	F10
20	2658835	R		70	4584720	F1
21	2658836	T		71	4584722	F3
22	2658837	Y		72	4584724	F5
23	2658838	U		73	4584726	F7
24	2658839	I		74	4584728	F9
25	2658840	O		90	4584714	Esc
26	2658841	P		91	4584732	7/Home
27	4585286	{/[		92	6111212	4/←
28	8310418	}/]		93	4584737	1/End
30	8310420	Ctrl		95	8310426	Num Lock
31	2658846	A		96	6111213	8/↑
32	2658847	S		97	2658892	5
33	2658848	D		98	6111215	2/↓
34	2658849	F		99	8310424	0/Ins
35	2658850	G		100	8310427	Scroll Lock
36	2658851	H		101	4584734	9/PgUp
37	2658852	J		102	6111214	6/→
38	2658853	K		103	4584739	3/PgDn
39	2658854	L		104	8310425	Del
40	2658855	:/;		105	8543584	Sys
41	4584779	"/ /		106	4584718	PrtSc
43	1435031	↵		107	8310448	-
44	6111188	⇧		108	8310429	+

Part numbers for complete keybutton sets are on the next page.

Keyboard (Keybutton Kits)

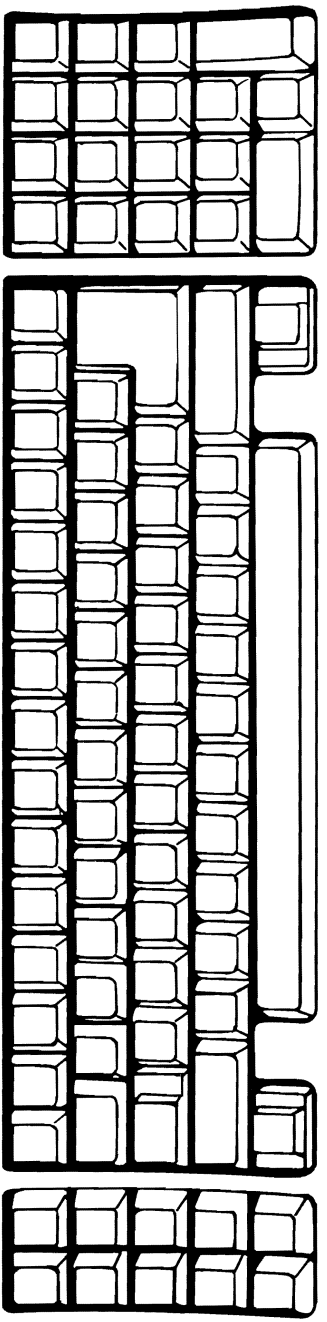


Figure 10

Keybutton Kits

Major Unit Code	Figure Index Number	Part Number	Description
040	10-1	8286153	Keybutton Kit USA
040	10-1	8286154	Keybutton Kit France
040	10-1	8286155	Keybutton Kit Italy
040	10-1	8286156	Keybutton Kit Germany
040	10-1	8286157	Keybutton Kit Spain
040	10-1	8286158	Keybutton Kit United Kingdom
			Note: Keybutton Kit contains a complete set of keybuttons (spacebar not included).

Graphics Printer (5152)

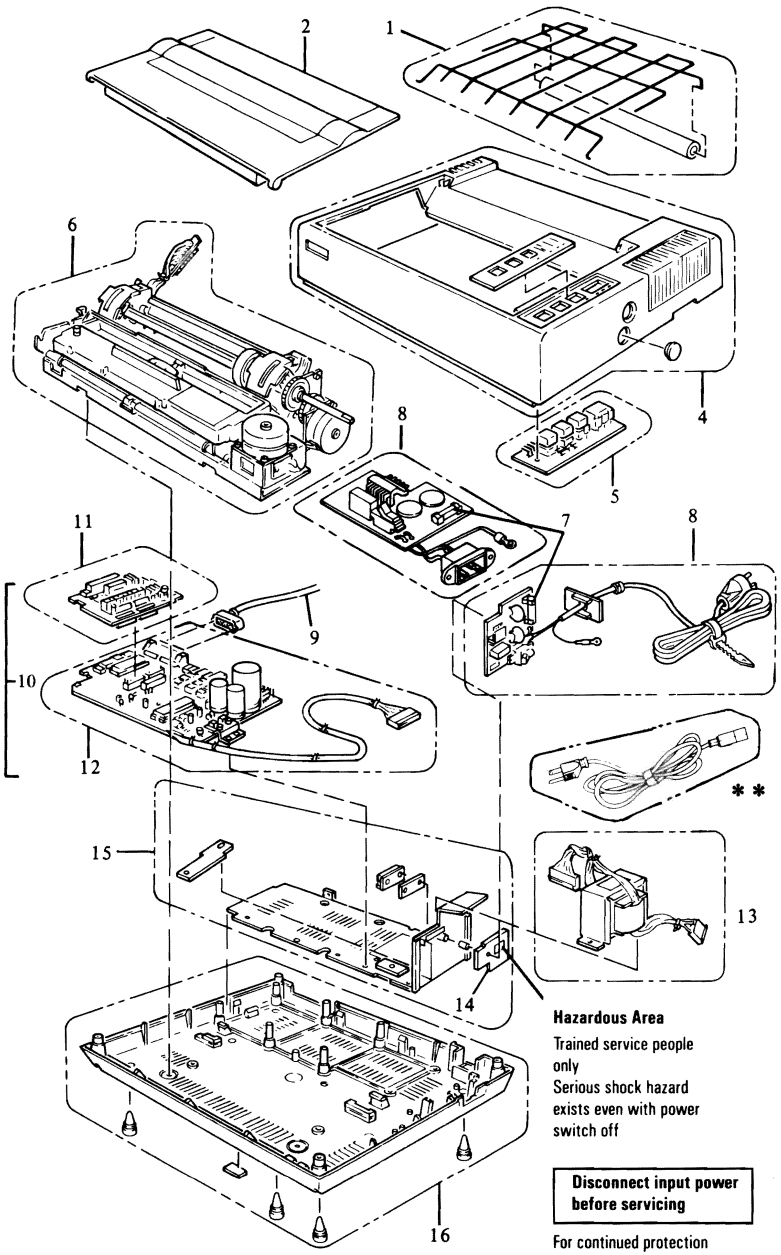


Figure 11

Major Unit Code	Figure Index Number	Part Number	Description
554	11-1	8529191	Forms Rack
000	11-2	8529185	Access Cover
000	11-3	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	11-4	8529182	Top Cover
000	11-5	8529184	Control Panel
551	11-6	8529198	Print Mechanism Assembly
600	11-7	8529220	Fuse-2A for 120 Volt
600	11-7	8529278	Fuse-315mA for 220/240 Volt
600	11-8	8529187	Fuse-Filter Card/ Power Cord Assembly for 120 Volt
600	11-8	8529279	Fuse-Filter Card/ AC Socket for 220/240 Volt
551	11-9	8529214	Printer Cable
318	11-10	8529268	Control Cards -Consisting of-
318	11-11	8529221*	Driver Card
318	11-12	8529276*	Logic Card
600	11-13	8529196	Power Transformer 120 Volt
600	11-13	8654236	Power Transformer 220 Volt
600	11-13	8529277	Power Transformer 240 Volt
600	11-14	8529215	Safety Shield
600	11-15	8529217	Heat Sink/Power Transistor
000	11-16	8529181	Base Assembly

*Restricted availability

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

Graphics Printer (5152)

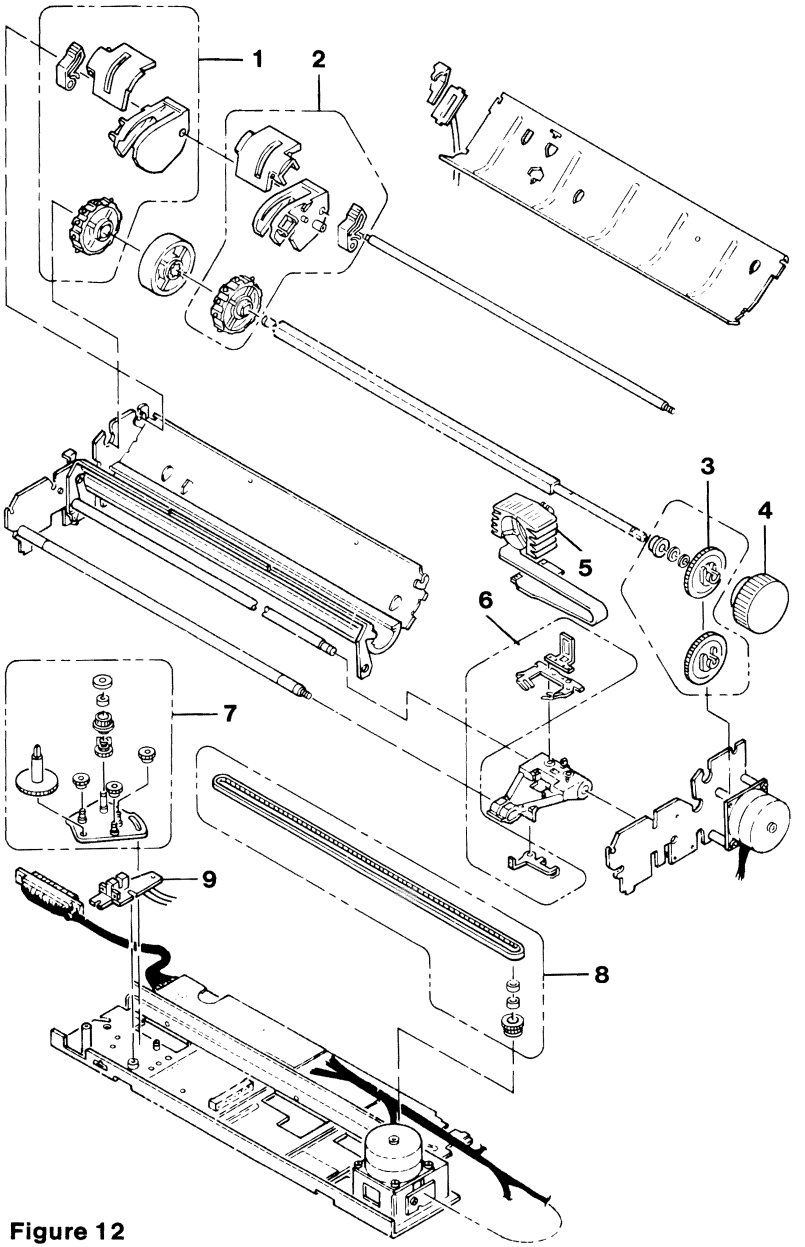


Figure 12

Major Unit Code	Figure Index Number	Part Number	Description
550	12-1	8529188	Forms Tractor Assembly, Left
550	12-2	8529216	Forms Tractor Assembly, Right
550	12-3	8529194	Intermediate Gear
550	12-4	8529193	Forms Feed Knob
551	12-5	8529183	Print Head
551	12-6	8529192	Ribbon Shield
551	12-7	8529195	Carriage Drive Assembly
551	12-8	8529190	Carriage Belt
551	12-9	8529189	Left Margin Assembly
000		8529200	Printer Misc. Hardware - Consisting of - Plane Washers C.T.P. Screws Retaining Rings, Type E CP Screws with OW Cup Screws Spacers Outside Toothed Lock Washers 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

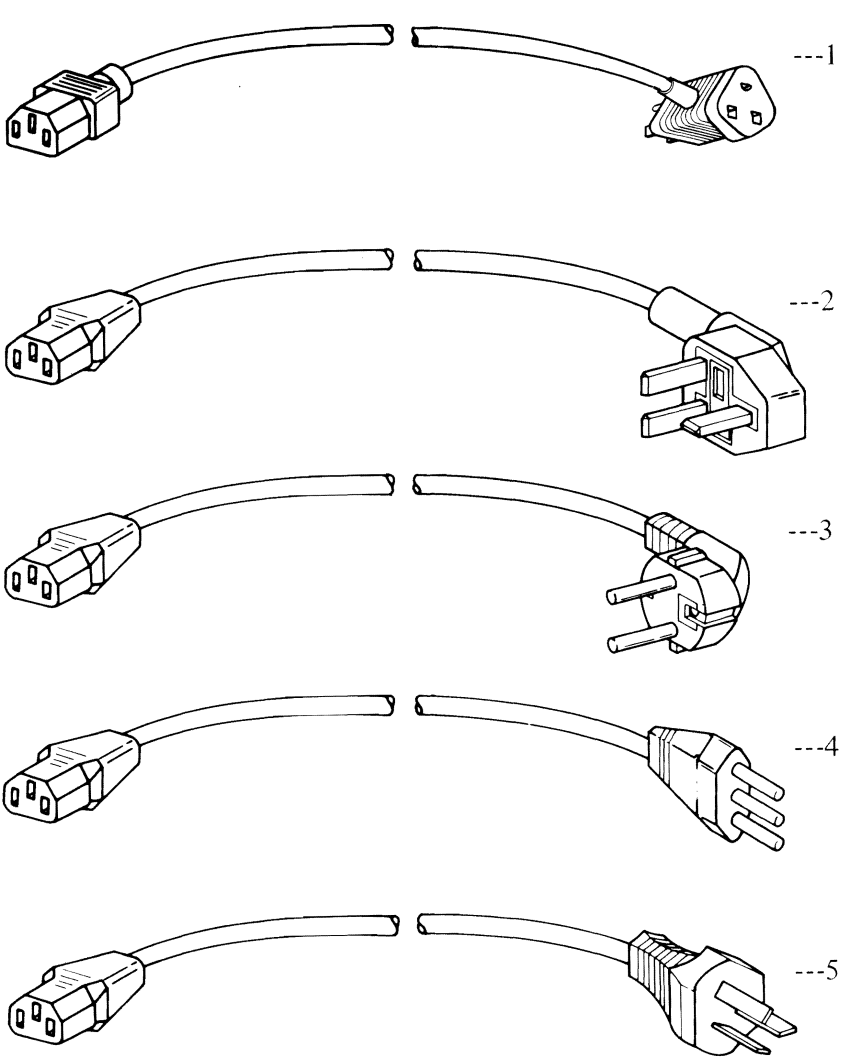
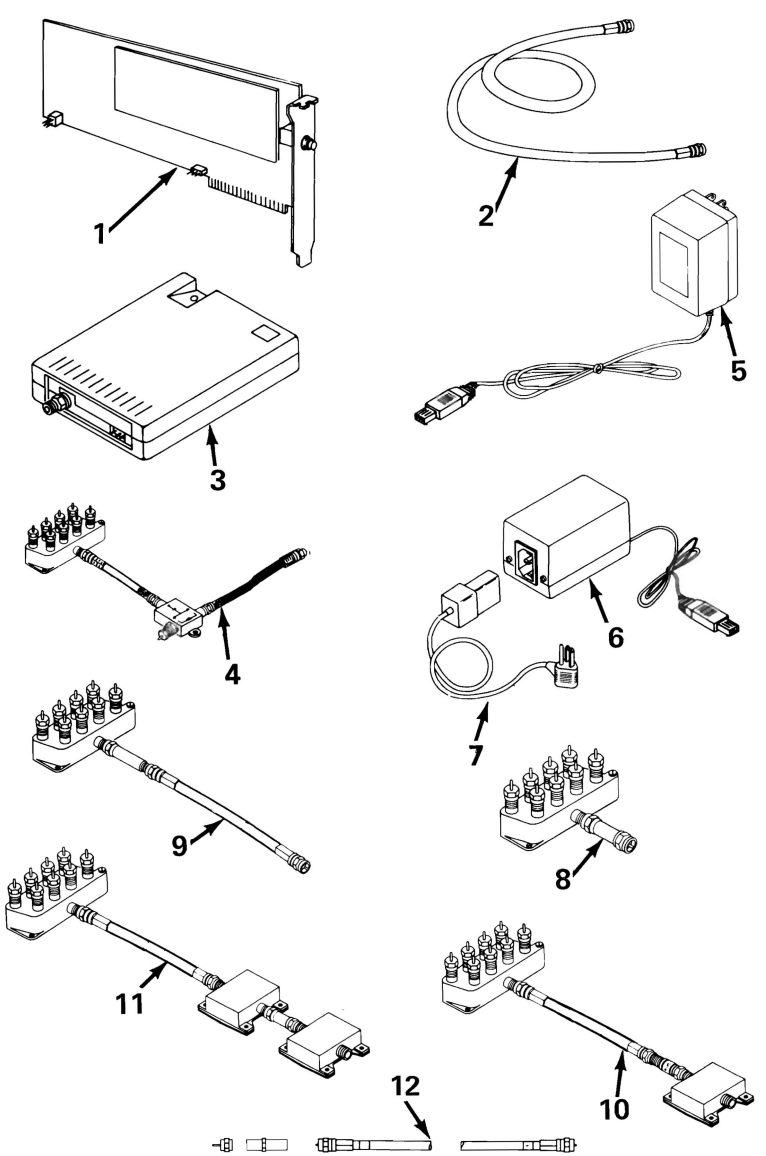


Figure 13

Power Cords

Major Unit Code	Figure Index Number	Part Number	Description
600	13-1	8286120	Power Cord U.S.* Power Cord Venezuela* Power Cord Colombia*
600	13-2	8529341	Power Cord U.K.* Power Cord Hong Kong* Power Cord Singapore*
600	13-3	8529281	Power Cord Germany* Power Cord France* Power Cord Spain*
600	13-4	8529282	Power Cord Italy*
600	13-5	8529284	Power Cord Australia* Power Cord New Zealand*
			* Use only the proper power cord certified for use in your country.

PC Network (5178)

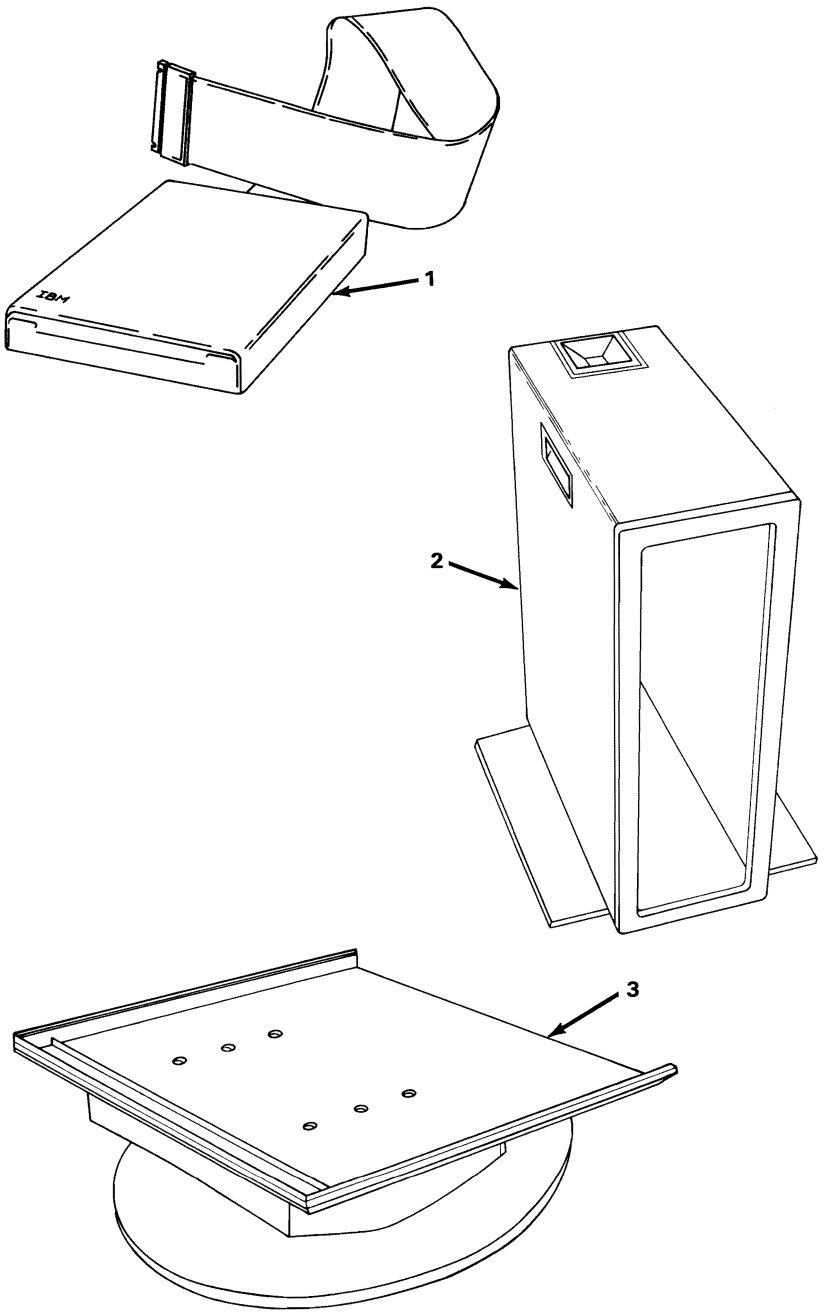


PC Network (5178)

Major Unit Code	Figure Index Number	Part Number	Description
115	1	8286171	PC Network Adapter
115	2	8286172	PC Network Adapter Cable
116	3	8286173	Translator Assembly
116	4	8286174	Connection Hardware Assembly
116		8286175	Spare Parts Kit -Consisting of- Wrenches,7/16-9/16 (2) 30Db Attenuator Labels - A Label Kit Assembly
116	5	8286176	PC Network 120v Transformer
116	6	8286177	PC Network 230v Transformer
116	7		Power Cord*
116	8	8286178	Base Expander
116	9	8286179	Short Distance Kit
116	10	8286180	Medium Distance Kit
116	11	8286181	Long Distance Kit
116	12	8286182	Cable, 7.62 M (25 Ft)
116	12	8286183	Cable, 15.24 M (50 Ft)
116	12	8286184	Cable, 30.48 M (100 Ft)
116	12	8286185	Cable, 60.96 M (200 Ft)

*See Power Cord parts list for proper power cord certified for your country.

Miscellaneous



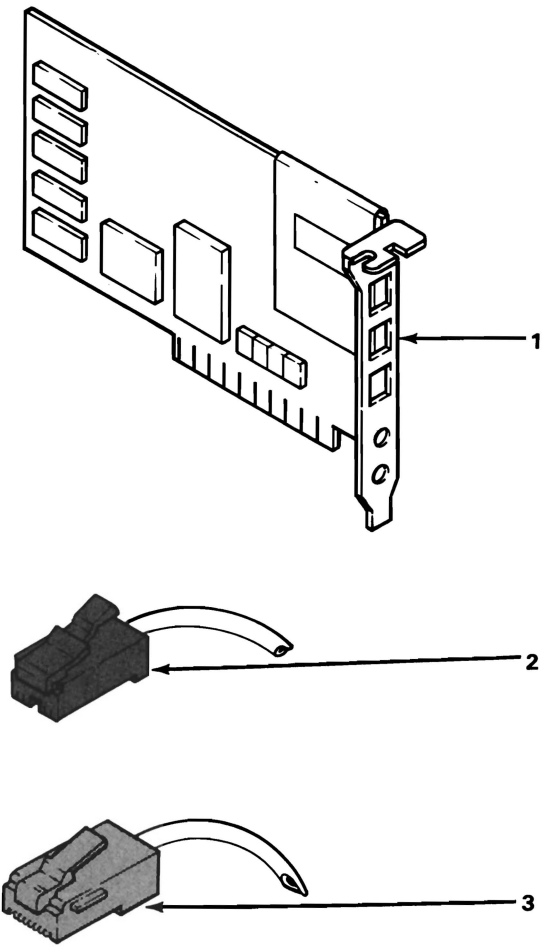
Miscellaneous

Major Unit Code	Figure Index Number	Part Number	Description
	1	6181769	Data Acquistion Distribution Panel
001	2	8286195	Floor Stand
001		8286196*	Front Trim Bezel
001		8286197*	Back Panel
001		8286198*	Rails
001	3	8286199	Display Stand
001		8286200*	Bottom Platter
001		8286201*	Top Platter
001		8286202*	Back Skirt
			* Restricted Availability

Notes:

Notes:

Voice Communications Adapter



Voice Communications Adapter

Major Unit Code	Figure Index Number	Part Number	Description
568	1	2684438	Voice Communications Adapter
568	2	2684462	Notched Black Telephone Cable
568	2	2684487	Notched White Telephone Cable
568	3	2684509	Tabbed Black Phone Line Cable
568	3	2684514	Tabbed White Phone Line Cable

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