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IBM RT PC Options Installation

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IBM RT PC Options Installation

Second Edition (September 1986)

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- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.

-
- Ensure that card slot covers are in place when no card is installed.
 - If peripherals not offered by IBM are used with this equipment, it is suggested to use shielded, grounded cables, with in-line filters if necessary.

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Instructions To User

This equipment generates and uses radio frequency energy. If not installed and used according to the operating instructions, reference, and service manuals, the equipment may cause interference to radio and television reception.

The equipment has been tested and found to comply with the limits for a Class B computing device according to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

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

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
- Ensure that card slot covers are in place when no card is installed.

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- If peripherals not offered by IBM are used with this equipment, it is suggested to use shielded, grounded cables, with in-line filters if necessary.

Consult the dealer service representative for additional suggestions.

IBM is not responsible for any radio or television interference caused by unauthorized modifications to this equipment. The user is responsible for correcting such interference.

About This Book

Purpose

IBM RT PC Options Installation shows you how to install optional adapters and drives in the IBM RT Personal Computer¹. The book is written to cover every possible IBM RT¹ PC system setup situation. Because each system is different, the book cannot tell you, in all cases, the exact slot for each adapter. The book does provide, however, the possible slots you can use, depending on the combination of adapters you have. The book also tells you where to install each of the optional drives.

This book provides step-by-step instructions to help you install optional adapters, fixed-disk drives, and diskette drives in the IBM 6150 system units and optional adapters in the IBM 6151 system unit. These instructions apply whether you are installing options in a new system or adding options to a system already in use.

Who Should Read This Book

This book is written for a person trained to install drives and adapters in the IBM RT PC¹ System units. The only tools you need are this book and two flat-bladed screwdrivers, small and medium sized.

You may find that this task goes more smoothly if only one person reads and follows the steps. However, two or more people should handle the heavier devices.

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How to Use This Book

Read Section 1, “Getting Started” for instructions on removing the covers from the system units. Read this section when installing options in a new system or when adding options to a system already in use.

Both system units are shown in many drawings. Select the appropriate drawing for reference.

To protect yourself and the equipment, do the steps in order and carefully read and follow the instructions under the Warning and Caution notices.

Section 2, “Removing and Installing Drives in the IBM 6150 System Units” gives instructions for installing the optional fixed-disk and diskette drives.

The instructions in Section 3, “Installing the Adapters” provide general information for installing the optional adapters and the system unit covers.

Section 4, “Processor Options” through Section 8, “Additional Options” contain the information needed to install the different optional adapters.

A Reader’s Comment Form and Book Evaluation Form are provided at the back of this book. Use the Reader’s Comment Form at any time to give IBM information that may improve the book. After you become familiar with the book, use the Book Evaluation Form to give IBM specific feedback about the book.

Related Information

You do not need to read any other books before you do this task, but you might find the following books helpful:

- *IBM RT PC Guide to Operations* describes the IBM 6151 and IBM 6150 system units, the displays, keyboard, and other devices that can be attached. This guide also includes procedures for operating the hardware and moving the IBM 6151 and IBM 6150 system units.
- *IBM RT PC Installing and Customizing the AIX Operating System* provides step-by-step instructions for installing and customizing the AIX Operating System², including how to add or delete devices from the system and how to define device characteristics. This book also explains how to create, delete, or change AIX and non-AIX minidisks.
- *IBM RT PC Problem Determination Guide* provides instructions for running diagnostic routines to locate and identify hardware problems. A problem determination guide for software and two high-capacity (1.2MB) diskettes containing the IBM RT PC diagnostic routines are included.
- *IBM RT PC User Setup Guide* provides instructions for setting up and connecting devices to the system units. This book also gives procedures for testing the setup (packaged with *IBM RT PC Options Installation*).

Ordering Additional Copies of This Book

To order additional copies of this publication, use either of the following sources:

- To order from your IBM representative, use Order Number SV21-8020.
- To order from your IBM dealer, use part 08F3464.

A binder is included with the order.

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See *IBM RT PC Bibliography and Master Index* for order numbers of IBM RT PC publications and diskettes.

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Section 1. Getting Started

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About This Section

This section shows you how to remove the system unit covers. See “IBM 6150 System Unit” on page 1-4 or “IBM 6151 System Unit” on page 1-10, whichever applies.

The section then shows you how to identify and record the options on the appropriate system unit diagram.

Removing the Covers From the System Units

To remove the covers from the system unit, follow the instructions under either “IBM 6150 System Unit” or “IBM 6151 System Unit” on page 1-10, whichever applies.

Note: Do not operate the system unit with the covers removed. Operating with the covers on ensures adequate cooling of the components.

IBM 6150 System Unit

You do not need any tools to remove the covers of the system unit.

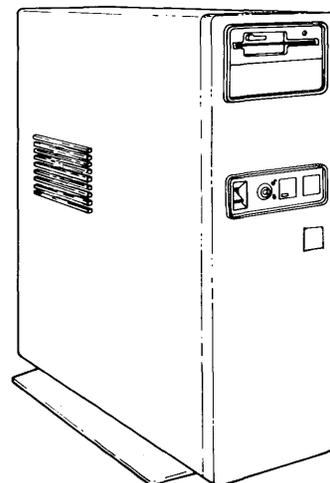
Note: You might find this task easier if you put the unit on a sturdy table.

CAUTION

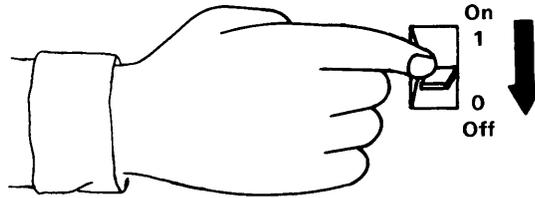
This device is heavy. Three or more people should lift the system unit, which weighs up to 42 kg (92 lb). Use a dolly if possible.

Do the following to remove the IBM 6150 covers:

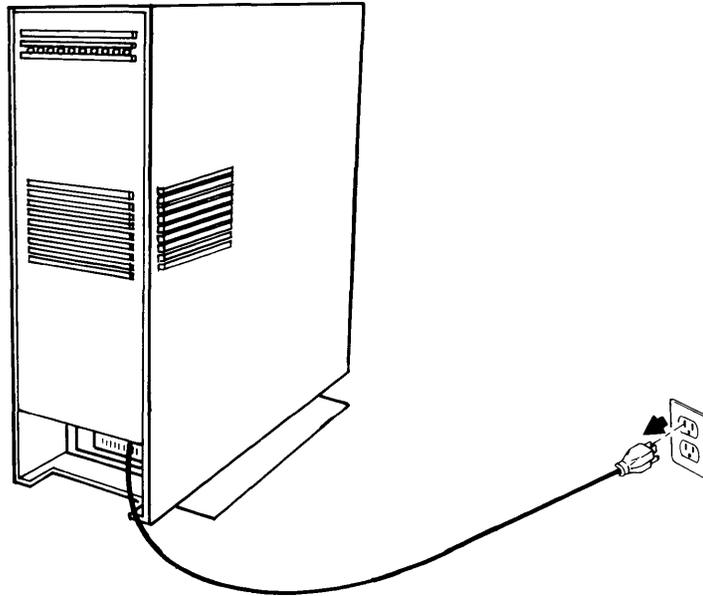
1. Turn the system off.



2. Turn any connected devices off.

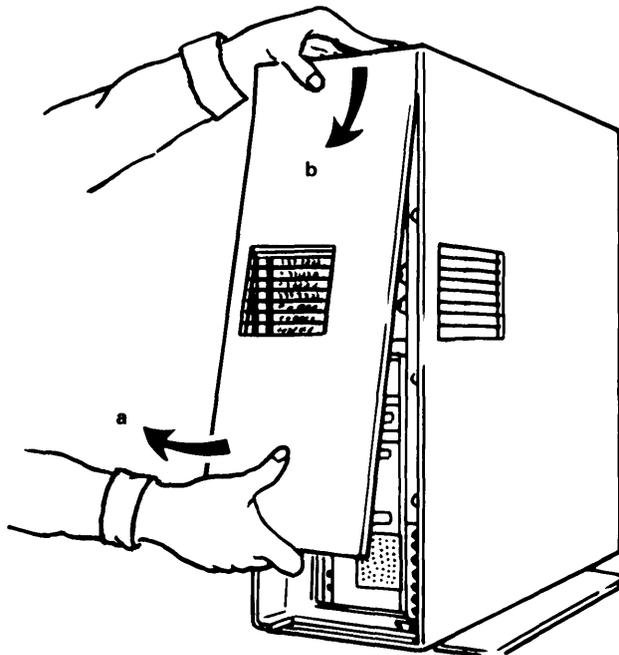


3. Unplug the power cable from the electrical outlet.

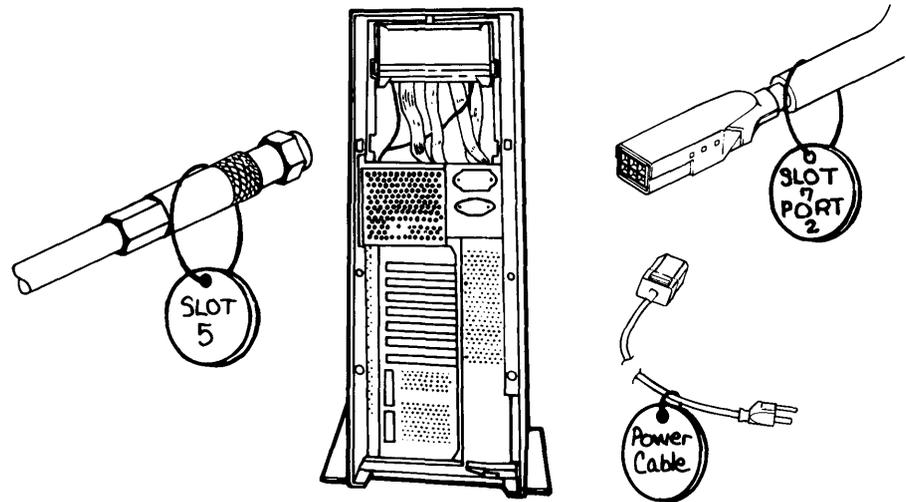


4. To remove the rear cover:

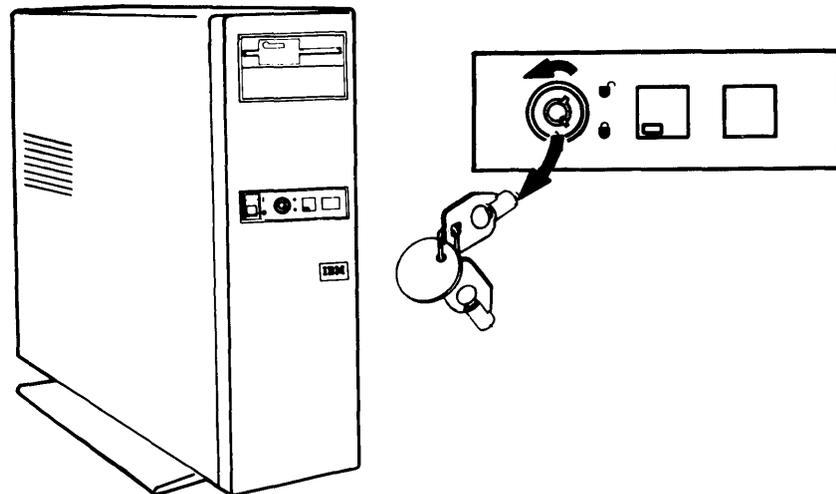
- a. Firmly grasp the bottom and snap the cover free.
- b. Rotate the cover outward until the hooks are clear of the top of the unit.



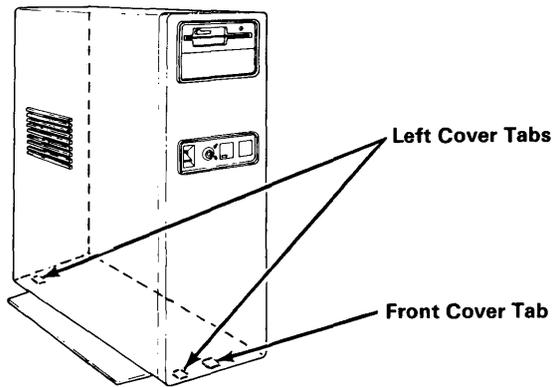
-
5. If connected, unplug the display power cable and system unit power cable. Label any cables you unplug from the rear of the system unit.



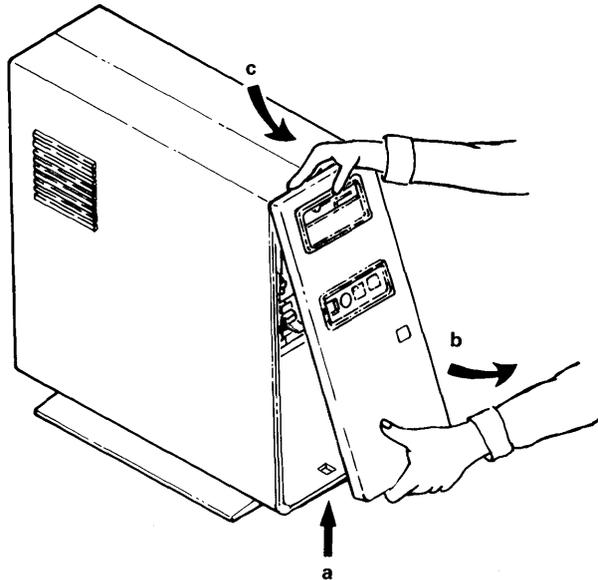
6. Unlock the keylock by turning the key counterclockwise. Remove the key.



-
7. Notice the location of the three tabs on the bottom of the system unit.

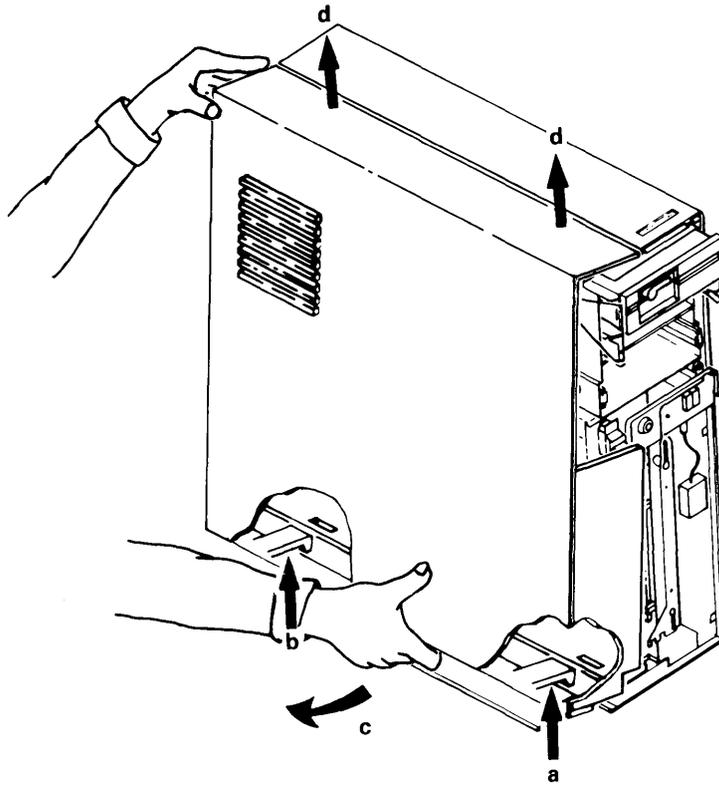


8. To remove the front cover:
- Push up on the tab until it is free from the hole in the bottom of the unit.
 - Rotate the cover out, away from the bottom of the unit.
 - Lower the cover until the hooks are clear of the top of the unit.



9. To remove the left side cover:

- a. Find the tab under one outside edge of the left-side cover. Push up on the tab until it is free of the hole in the cover.
- b. Do the same to the tab on the other side.
- c. Rotate the cover out, away from the bottom of the unit.
- d. Lift the side cover up until the hooks are free of the loops in the top of the unit.



IBM 6151 System Unit

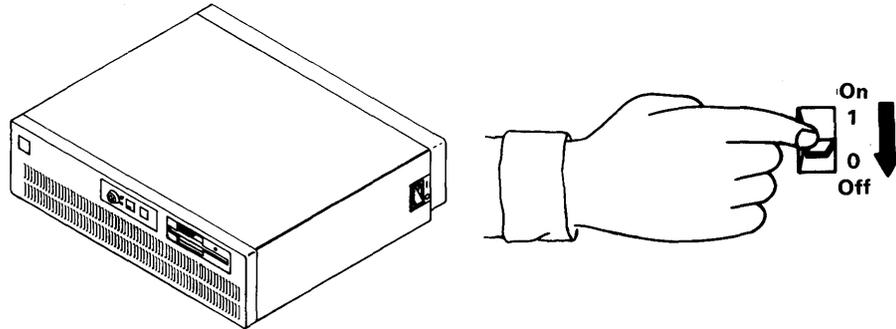
You need a medium-sized flat-bladed screwdriver to remove the system unit cover.

CAUTION

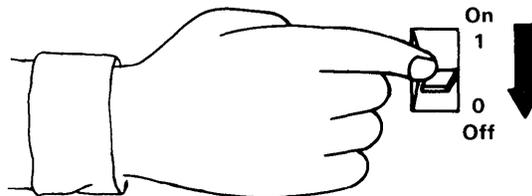
This device is heavy. Two or more people should lift the system unit, which weighs 25 kg (56 lb).

Do the following to remove the IBM 6151 covers:

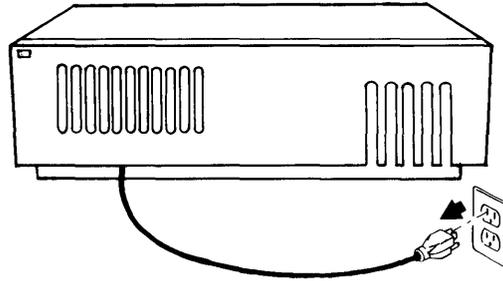
1. Turn the system off.



2. Turn any connected devices off.

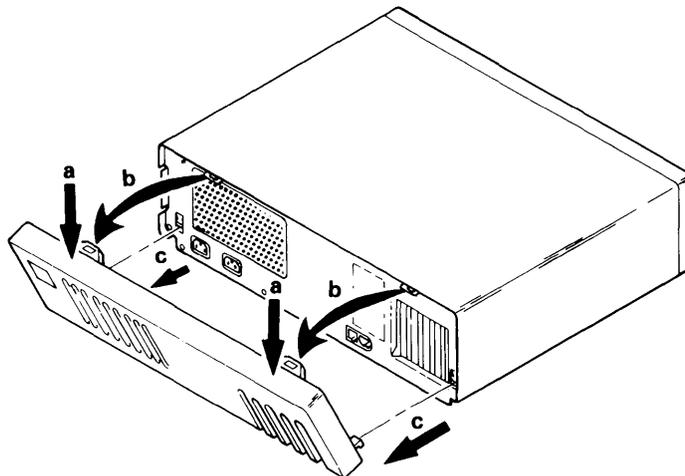


3. Unplug the power cable from the electrical outlet.

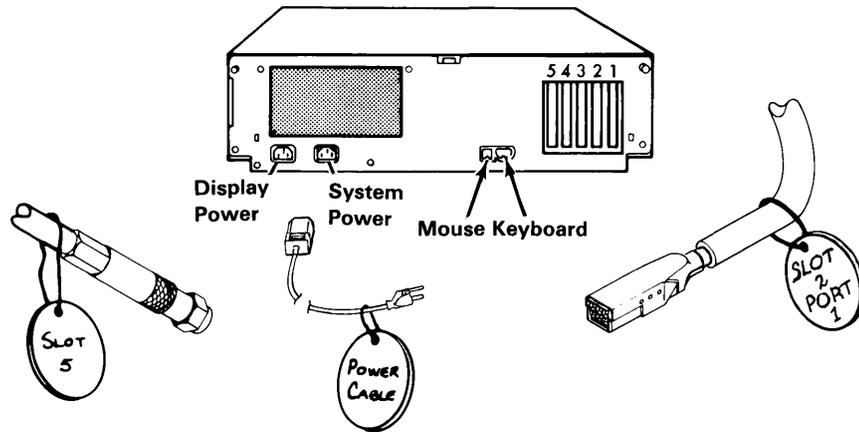


4. To remove the rear cover:

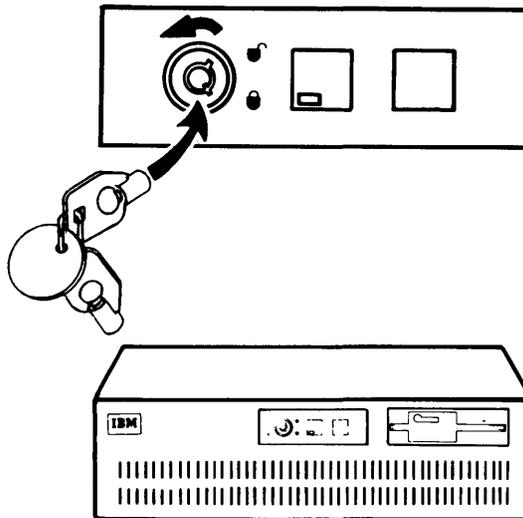
- a. Push down on the rear cover, directly over the two loops.
- b. Remove the loops from the top hooks.
- c. Lift the cover off the bottom hooks.



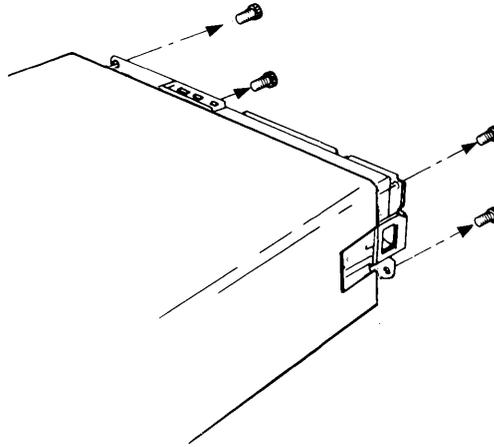
-
5. Label any cables you unplug from the rear of the system unit.



6. Unlock the keylock by turning the key counterclockwise. Remove the key.

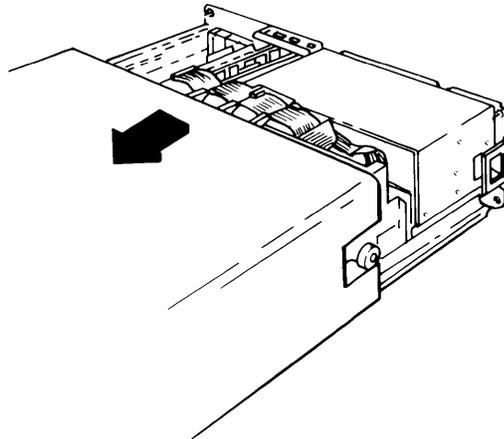


-
7. Remove the four screws holding the top cover in place.



8. Face the front of the unit and pull forward on the cover, sliding it off the system unit.

Note: Gently lift the center of the cover when sliding it off. This prevents the cover from snagging the flat cable.



Recording Optional Drives and Adapters

This book provides detailed instructions for installing the optional drives and adapters and for changing the addresses and interrupt levels on the adapters. The book is written to cover all possible system setups. Because each system is different, the book cannot tell you, in all cases, the exact slot for each adapter. The book does provide, however, the possible slots you can use, depending on the combination of adapters you have.

Unfold the system unit diagram in Appendix A (Figure A-1 on page A-2 or Figure A-2 on page A-3), whichever applies. These diagrams show the inside of the system units. Before you install the options, you must plan where to install them and then record their locations. You can then use the completed diagram as a guide when you install the options.

Read and work through the rest of this section, writing the names of the drives and adapters on the diagram as you learn where they must be installed.

Recording Drive Positions For IBM 6150 System Units

When originally purchased, IBM 6150s have one fixed-disk drive installed in position C. Optional second and third fixed-disk drives may be either 40M byte or 70M byte, depending on the fixed-disk and diskette drive adapter used. If you are installing a second or third fixed-disk drive, write the size of the drive in drive positions D and E on the diagram.

The diskette drive (an IBM Personal Computer AT® High Capacity Diskette Drive) is in drive position A. The second diskette drive can be either an IBM Personal Computer AT High Capacity Diskette Drive or an IBM personal Computer AT Dual-Sided Diskette Drive. If you are installing a second diskette drive, write the size of the drive in drive position B.

Identifying Adapter Positions

Look at the adapter slots on the system diagram you unfolded earlier. In the IBM 6150, notice that adapter slots 2, 4, 5, 7, and 8 have two tab slots, while adapter slots 3 and 6 have only one tab slot. If an adapter has one tab, try to put it in adapter slot 3 or 6, saving the positions with two slots for adapters with two tabs.

In the IBM 6151, notice that slots 2, 3, 4, and 5 have two tab slots, while slot 1 has only one tab slot. If an adapter has only one tab, try to put it in adapter slot 1, saving the slots with two tabs for adapters with two tabs.

The following illustration shows the tab positions of the adapters you can install in the system units. The adapters all have one of the following basic forms:

System Board Slots

Adapters having one central tab go in system board slots B, C, and D. Either the IBM RT PC Processor and Memory Management Card or the IBM RT PC Advanced Processor Card (APC) may be installed in slot A. Slot B is reserved for the optional IBM RT PC Floating-Point Accelerator or the IBM Advanced Floating-Point Accelerator. Slot C, *with one exception*, should contain the first memory option, and slot D is reserved for the second memory option. The IBM RT PC 8M-byte Fast Memory Expansion should always be installed in Slot D.

Note: Under certain conditions, you may have to move the first memory option if you install a second one; refer to “Installing Memory Options” on page 5-4. Do not move these adapters unless told to do so. No other adapters may be installed in slots B, C, or D.

Adapters in Fixed Positions

Certain adapters must be installed in specific adapter slots:

- **Fixed-Disk and Diskette Drive Adapters**

When the IBM Personal Computer AT Fixed-Disk and Diskette Drive is installed in adapter slot 1 of an IBM 6150, the first two 40M byte fixed-disk drives and the two diskette drives connect to this adapter. To add a third 40M byte fixed-disk drive, you must install a second IBM Personal Computer AT Fixed-Disk and Diskette Drive in adapter slot 2. The first drive adapter is preprinted on the system unit diagram in Appendix A.

If the IBM RT PC ESDI Magnetic Media Adapter is installed in adapter slot 1 of an IBM 6150, the first two IBM RT PC 70MB ESDI Fixed-Disk Drives (Type R70) and two diskette drives can be accommodated; a second ESDI Magnetic Media Adapter in adapter slot 2 is required for a third IBM RT PC 70MB ESDI Fixed-Disk Drive (Type R70). If a third fixed-disk drive is not installed, slot 2 may be used for a different adapter.

If the IBM RT PC Extended ESDI Magnetic Media Adapter is installed in adapter slot 1 of an IBM 6150, up to three IBM RT PC 70MB Extended ESDI Fixed-Disk Drives (Type E70) and two diskette drives can be installed. In this case, a second drive adapter is not needed, and a different adapter may be used in slot 2.

Warning: Use of the IBM RT PC Extended ESDI Magnetic Media Adapter requires use of the IBM RT PC Advanced Processor Card (APC) and the IBM RT PC 70MB Extended ESDI Fixed-Disk Drive (Type E70). The IBM RT PC 70MB Extended ESDI Fixed-Disk Drive (Type E70) and the IBM RT PC 70MB ESDI Fixed-Disk Drive (Type R70) have different formats and are *not* interchangeable.

Either an IBM Personal Computer AT Fixed-Disk and Diskette Drive, an IBM RT PC ESDI Magnetic Media Adapter, or an IBM RT PC Extended ESDI Magnetic Media Adapter may be installed in slot 6 of an IBM 6151. You cannot add additional drives to this system.

- **IBM RT PC Personal Computer AT Coprocessor Option**

If you have an IBM RT PC Personal Computer AT Coprocessor Option, it must be installed in adapter slot 8 of the IBM 6150 or in slot 5 of the IBM 6151. If you do not have the IBM RT PC Personal Computer AT Coprocessor Option, you may install a different adapter (but *not* an AT 512 KB Memory Expansion Option) in these two slots.

- **IBM PC Enhanced Graphics Adapter**

The IBM PC Enhanced Graphics Adapter must be installed in either slot 3 or 6 of the IBM 6150 and in slot 1 of the IBM 6151.

- **IBM Monochrome Display and Printer Adapter**

The IBM Monochrome Display and Printer Adapter must be installed in slot 3 of the IBM 6150 and in slot 1 of the IBM 6151.

Recording Adapter Positions

Look at the applicable system unit diagram and at the list of the adapters you bought. Decide where you can install the adapters, and write the adapter names on the appropriate system unit diagram.

Note: The positions of the components and modules on the adapters and drives may vary slightly from the drawings shown in this book, depending on the manufacturer. However, the options function in the same way, and you should install them as shown in this book.

Adapter Conflicts

The adapters you choose may conflict in memory address range, interrupt level or DMA channel.

Conflicting Memory Addresses

When adapters conflict due to identical or overlapping memory addresses, first try to resolve the conflict by changing address jumper modules on the adapters. If this action does not resolve the conflict, ensure that applicable software enables only one adapter at a time for memory address operations. If you are still unable to resolve the conflict, consult your place of purchase.

Conflicting Interrupt Levels.

The method of resolving interrupt level conflicts depends on whether the interrupt level is required or optional. A required level cannot be reset, but an optional level may be selected either by changing jumper module positions on the adapter or through applicable software.

Required and optional interrupt levels may be shareable or nonshareable. A shareable level may be used by more than one adapter on the same level (but not at the same time). A nonshareable level may not be used by any other adapter at any time.

Refer to the Interrupt and DMA Usage Chart on page 1-21 to plan your system configuration.

Conflicting DMA Channels

DMA channel conflicts usually may be resolved by changing DMA jumper modules on the applicable adapter. If the conflict cannot be resolved, one of the conflicting adapters must be deleted from your system.

Refer to the Interrupt and DMA Usage Chart on page 1-21 to plan your system configuration.

Determining Adapter Conflicts

The charts on this and the facing page shows interrupt levels and DMA channels used by various adapters.

Make a list of all the adapters you intend to use in one machine. To the right of the adapter list create two columns, one for interrupt level and one for DMA channel.

If any DMA channel appears twice, a conflict exists and must be resolved using the methods in “ Conflicting DMA Channels” on page 1-19.

If an interrupt level appears twice or more, determine whether the conflicting adapters have changeable or shareable interrupt levels. Then refer to “Conflicting Interrupt Levels ” on page 1-19 and to the installation text for the conflicting adapters.

Interrupt and DMA Usage																			
Device/Adapter	Interrupt Level										DMA Channel								
	3	4	5	6	7	9	10	11	12	14	15	0	1	2	3	5	6	7	8
Extended ESDI Fixed-Disk and Diskette Drive ^{1 2 3}				DX					(O)	(O)		FO	FO	DX	FO				
ESDI Fixed-Disk and Diskette Drive				DX							FX				DX				
Personal Computer AT Fixed-Disk and Diskette Drive				DX							FX				DX				
SCSI ²									(O)	(O)		O	O		O	O	O	O	
Streaming Tape										(X)									

X - Required
 O - Optional
 () - Shareable

DX - Required for Diskette
 FX - Required for Fixed-Disk
 FO - Optional For Fixed-Disk

¹Level 6 is used in nonshared mode for compatibility, or levels 12 and 14 can share for a new mode.

²Optional interrupt levels and DMA channels can be set through software.

³DMA Channel 3 is only available when a second Extended ESDI Adapter is used.

Interrupt and DMA Usage (Cont.)																			
Device/Adapter	Interrupt Level												DMA Channel						
	3	4	5	6	7	9	10	11	12	14	15	0	1	2	3	5	6	7	8
Megapel Display Adapter ⁸								(X)								O	O	OD	
Megapel Printer Port					X														
Advanced Mono. Graphics								(X)											
Extended Mono. Graphics								(X)										X	
Advanced Color Graphics								(X)											
Enhanced Graphics ⁴						X													
Mono./Printer					X														
Multiprotocol								(O)	(O)				OD		O				
Token-Ring								(O)	(O)						O	OD	O	O	
3278/79 Emulation ⁴						X													
PC Network ⁶	O							O							X				
Baseband Network	O	O	O	O	O	O													
Personal Computer AT Serial/Parallel Adapter	SO	SO	PO		PO														
4-Port Asynchronous								(O)	(O)	(O)									
5080 Peripheral Attachment								(O)	(O)	(O)									
5080 Attachment ⁵								(X)							O	OD	O		
5/370 Host Interface ⁵								(X)							OD	O	O		
Personal Computer AT Coprocessor Option												(X)							X
6150 Serial Port A (2) ⁷													O		O				
6150 Serial Port B (1)														O		O			

X - Required
O - Optional
DO - Optional Default
(Shipped W/This Setting)

() - Shareable
PO - Optional for Parallel
SO - Optional for Serial

⁴The enhanced graphics adapter (EGA) and 3278/79 Emulation adapter may be used together; at this printing, there is no known program that uses interrupt level 9 on the EGA.

⁵The 5080 attachment adapter and the S/370 host interface adapter are designed to operate together at the defined default values. If these adapters are reconfigured for the other optional DMA channels, the user must provide driver/application software.

⁶DMA channel 3 is only required when the PC Network Adapter is used with the Personal Computer AT Coprocessor Option.

⁷The AIX operating system restricts serial port A (2) to use of DMA channel 0; DMA channel 2 is used by the diskette adapter. DMA channel 2 may be available when other operating systems are used.

⁸DMA Channels 5 and 6 are not supported by IBM software.



Section 2. Removing and Installing Drives in the IBM 6150 System Units

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About This Section

This section gives general instructions for handling drives to prevent damage from static electricity discharge.

Instructions are also given for installing and removing additional fixed-disk drives, drive adapters, and the second diskette drive. For a drawing of the drive positions, see the IBM 6150 system unit diagram.

Handling Static-Sensitive Drives

Warning: Fixed-disk drives and diskette drives are sensitive to static electricity discharge. The drives are wrapped in antistatic bags to prevent this damage.

Take the following precautions:

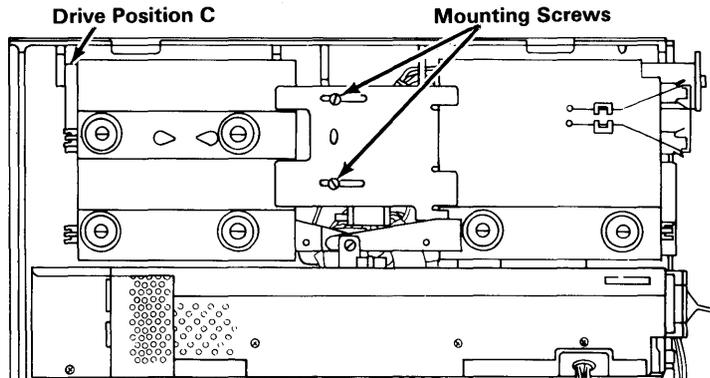
- Do not remove the antistatic bag from the drive until you are ready to install the drive in the system unit.
- Do not grasp the center part of the fixed-disk drive when you are handling the drive. The squeezing action could damage the circuit board. Handle the drive by the frame only.
- Do not drop or lay the fixed-disk drive down roughly; that action may permanently damage the drive.

Observe the following general procedures to protect the drive from static discharge:

1. Lay the fixed-disk drive (still wrapped in its antistatic bag) on a flat surface near the system unit.
2. Position yourself so you won't have to walk around while exchanging the drive. This helps prevent the generation of static electricity.
3. Touch a metal part of your system unit with one hand and the antistatic bag with the other hand. This will place your body, the drive, and the system unit as the same ground potential, thus preventing an accidental static discharge.
4. Slide the antistatic bag off the fixed-disk drive.
5. Handle the fixed-disk drive by the frame only while installing or removing it. It is recommended that you use both hands to reduce the chance of dropping the drive.
6. If you are exchanging a drive, put the exchange fixed-disk drive back in the antistatic bag.

Cooling Fan Removal

1. Loosen the two mounting screws and slide the fan bracket to the right.
2. Remove the cooling fan assembly.
3. Disconnect the cooling fan power connector at drive position C.

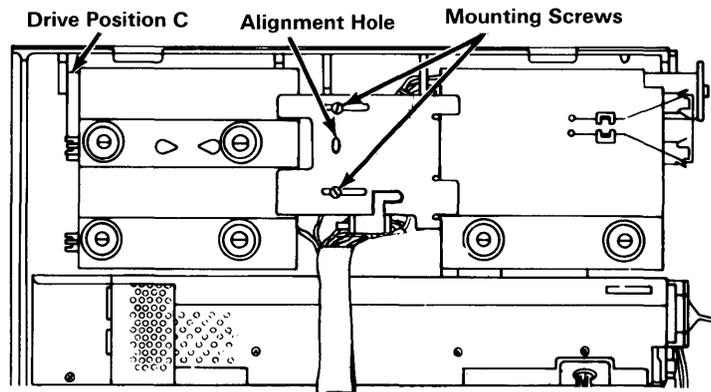


Cooling Fan Replacement

1. Connect the fan power connector at drive position C. Be sure to connect drive C also.

Note: Be sure the cooling fan assembly is mounted as shown.

2. Insert the right end of the cooling fan assembly onto the front cage, then slide the fan bracket to the left behind the rear cage until the alignment holes, between the two screws, align.
3. Tighten the two mounting screws.



Fixed-Disk Options

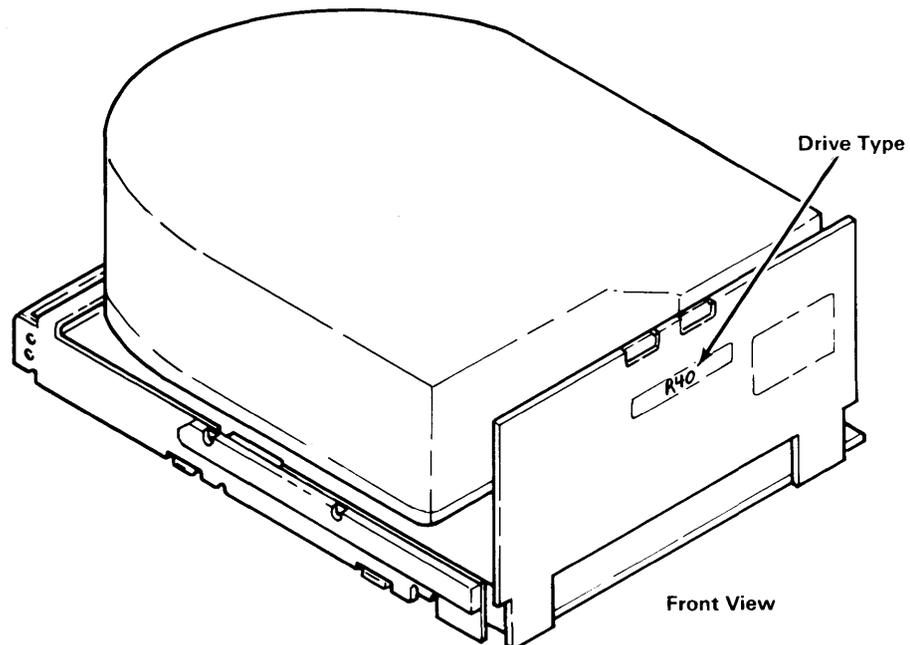
The IBM 6150s have one fixed-disk drive installed in drive position C. This drive is connected to a fixed-disk and diskette drive adapter installed in adapter slot 1 and to the disk and diskette cable bundle, which are already installed.

If you are installing a second drive, use the chart on 2-9 to determine the correct drive position and installation procedures for the new drive.

If you are installing a third drive, use the chart on 2-10 to determine the correct drive position and installation procedures for the new drive.

Warning: The fixed-disk drives installed in drive positions C and D must be the same type drives. Different type drives will not operate correctly on the same adapter.

The picture below shows the location of the drive type label.



Installing the Second Fixed-Disk Drive

Use the following chart to determine the correct position of the new drive and the installation procedure you need to use.

Note: If you are installing two drives of the same type (for example, two R70 drives), and you have an R40 drive installed in position C, **do not** use this chart. Go to page 2-10, use Steps 2 through 5 from the next to the last box, and install your two new drives in drive positions C and D. Use the same steps if you have an R70 drive installed in position C and you are installing two R40 drives.

Type of Drive Shipped in System *	New Drive Type	Position of New Drive	Installation Procedure to Use
R40	R40	D	"Installing a Fixed-Disk Drive in Position D" on Page 2-20
	R70	E	"Installing a Fixed-Disk Drive in Position E" on page 2-29
R70	R40	E	"Installing a Fixed-Disk Drive in Position E" on page 2-29
	R70	D	"Installing a Fixed-Disk Drive in Position D" on page 2-20
E70	E70	D	"Installing a Fixed-Disk Drive in Position D" on page 2-20

* If you are not sure which drive type was shipped with your system, see "Fixed-Disk Drive Locations" to locate the type label on your drive. Return to this chart when you have verified the drive type installed.

Installing the Third Fixed-Disk Drive

Type of Drives Now Installed in System			New Drive Type	New Drive Pos.	Installation Procedure to Use
C	D	E			
R40	R40		R40 or R70	E	R40 "Installing a Fixed-Disk Drive In Position E" on page 2-29. or R70 "Installing a Fixed-Disk Drive In Position E" on page 2-29.
R70	R70		R40 or R70	E	R40 Same as above or R70 Same as above
R40	xxx	R70	R40	D	R40 "Installing a Fixed-Disk in Position D" on page 2-20
R70	xxx	R40	R70	D	R70 Same as above
R40	xxx	R70	R70	D	R70 <ol style="list-style-type: none"> 1. "Removing Fixed-Disk in Position E" on page 2-44 2. "Removing Fixed-Disk in Position C" on page 2-40 3. "Installing a Fixed-Disk Drive in Position C" on page 2-11 4. "Installing a Fixed-Disk Drive in Position D" on page 2-20 5. "Installing a Fixed-Disk Drive in Position E" on page 2-29
R70	xxx	R40	R40	D	R40 Same as above.

Type of Drives Now Installed in System			New Drive Type	New Drive Pos.	Installation Procedure to Use
C	D	E			
E70	E70	xxx	E70	E	E70 "Installing a Fixed-Disk Drive In Position E" on page 2-29.

Up to three IBM RT PC 70MB Extended ESDI Fixed-Disk Drives (Type E70) may be used with a single IBM RT PC Extended ESDI Magnetic Media Adapter.

Warning: Use of the IBM RT PC Extended ESDI Magnetic Media Adapter requires the use of the IBM RT PC Advanced Processor Card (APC) and the IBM RT PC 70MB Extended ESDI Fixed-Disk Drive (Type E70). The IBM RT PC 70MB Extended ESDI Fixed-Disk Drive (Type E70) and the IBM RT PC 70MB ESDI Fixed-Disk Drive (Type R70) have different formats and are *not* interchangeable.

Installing a Fixed-Disk Drive in Position C

In order for drive types to match in drive positions C and D, you may be required to swap the positions of drives C and E. Use the following steps to install the drive in position C and to move the disk adapter to the correct slot.

Warning: Handle the fixed-disk drive carefully. Dropping, shaking, or rough handling can damage both the drive and any stored data and can cancel the warranty.

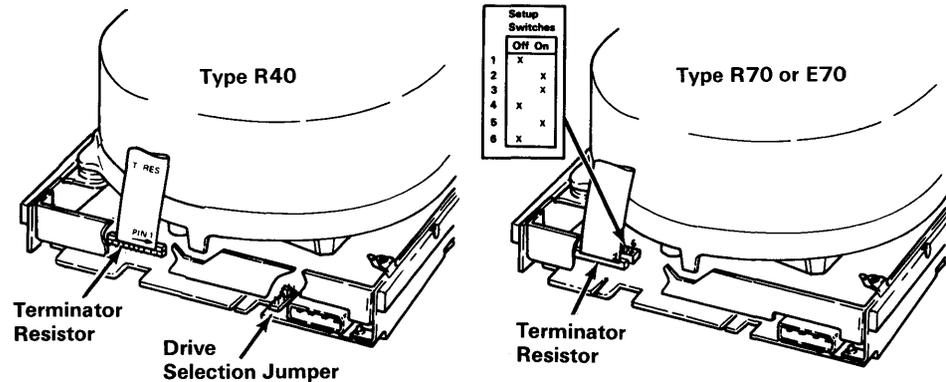
Refer to the system unit diagram for a picture of drive position C.

Refer to "Handling Static-Sensitive Drives" on page 2-4 before beginning this section.

Use the following steps to install the fixed-disk drive in position C:

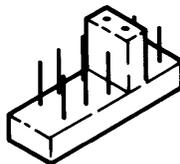
Warning: Follow *all* instructions under “Removing the Covers from the System Units” on page 1-4 before installing the drive in position C.

1. Remove the cooling fan assembly. Refer to “Cooling Fan Removal” on page 2-6.
2. Use the following illustration to identify which drive you are installing.

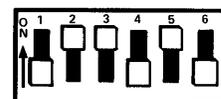


3. Check the drive selection jumper or switches for the correct setting and make sure the terminating resistor is present on the drive.

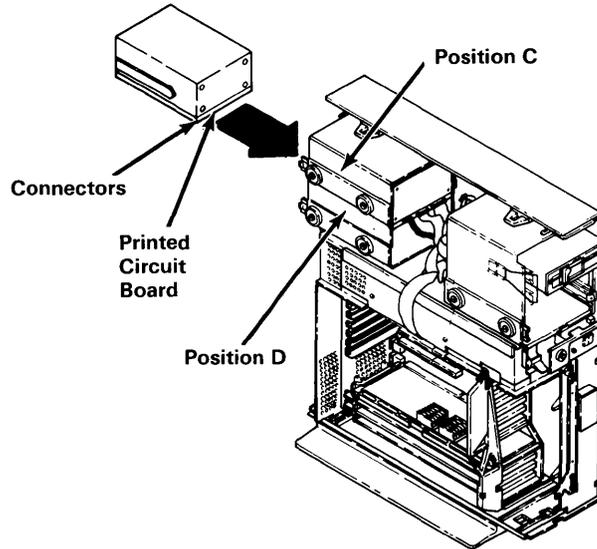
Drive Selection Jumper



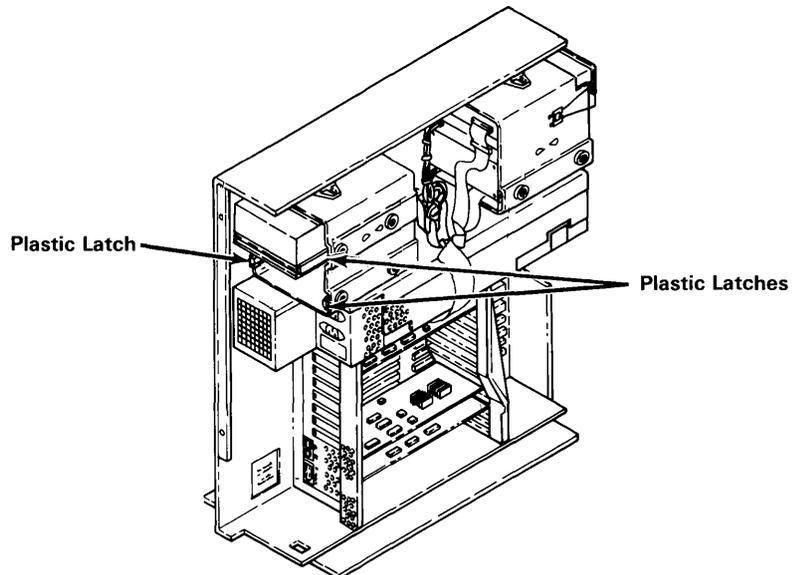
Setup Switches



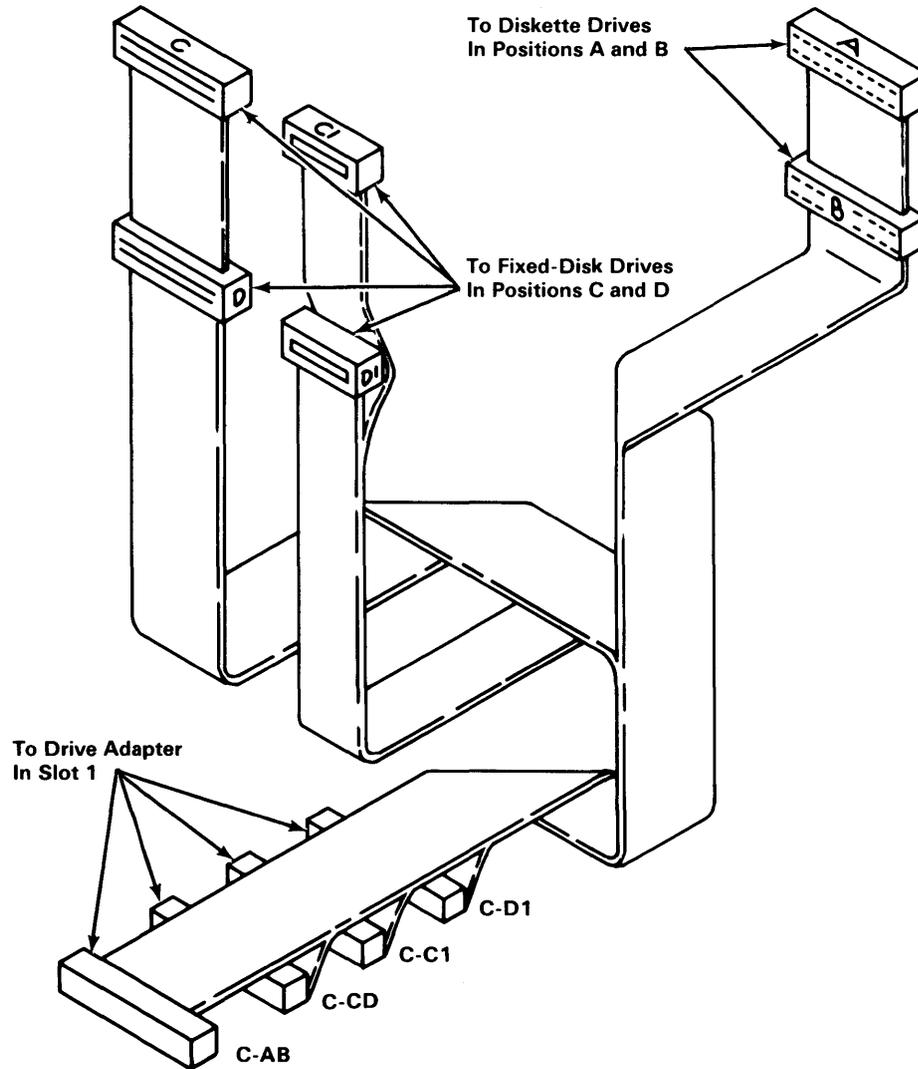
-
4. Hold the drive with the printed circuit board on the bottom and the connectors toward the center of the unit.



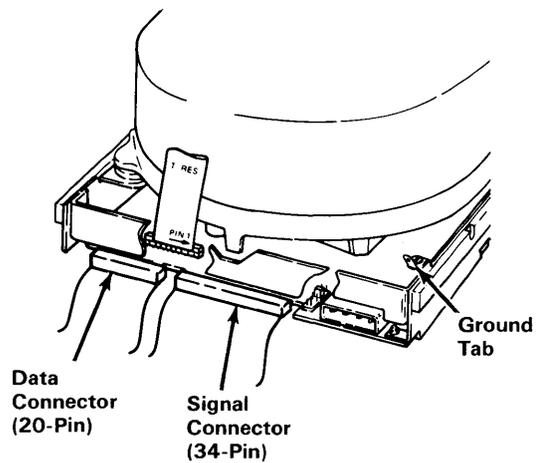
5. Facing the rear of the unit, place the drive on the side rails and slide it into drive position C. Push the drive in until the plastic latches snap into position, holding the drive in place.



6. Look at the diagram of the disk and diskette cable bundle.

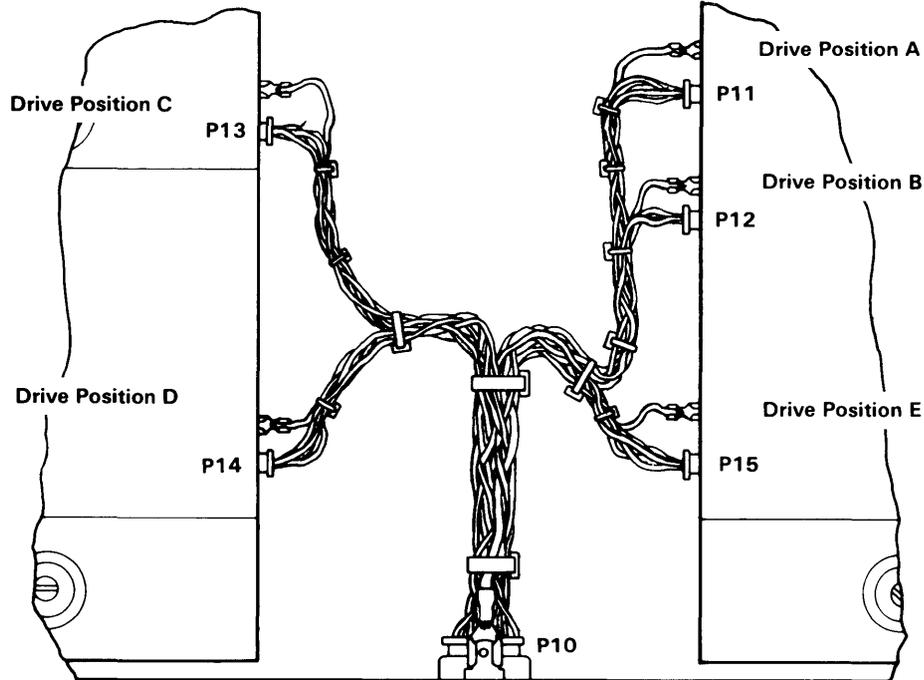


-
7. Connect C on the cable to the 34-pin connector on the rear of the drive in position C. Connect C1 to the 20-pin connector on the drive.

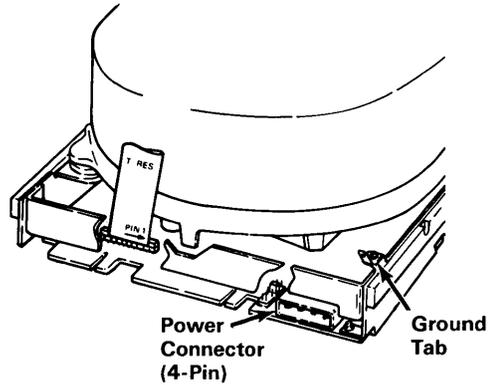


8. Look at the diagram of the power cable. The 4-pin connectors connect as follows:

- P10 is connected to the power supply.
- P11 is connected to the first diskette drive, position A.
- P12 connects to the second diskette drive, position B.
- P13 connects to the first fixed-disk drive, position C.
- P14 connects to the second fixed-disk drive, position D.
- P15 connects to the third fixed-disk drive, position E.



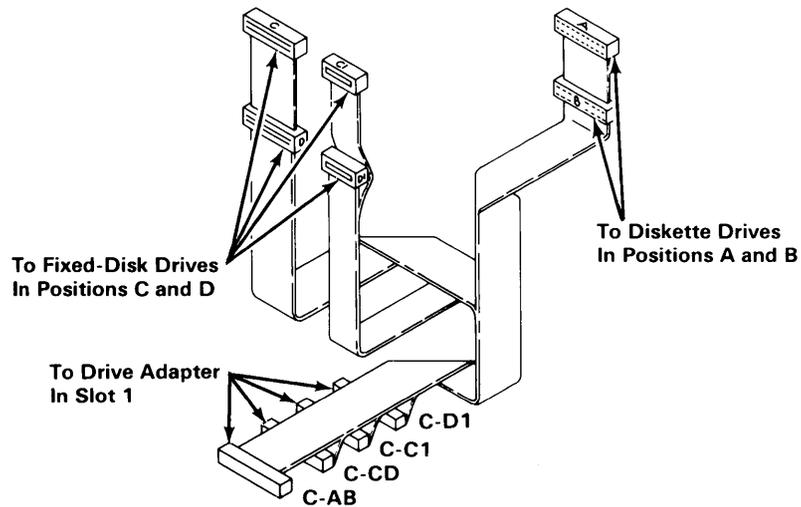
-
9. Connect P13 on the power cable to the 4-pin connector on the rear of the fixed-disk drive in position C. Connect the ground wire from the power cable to the ground tab on the drive.



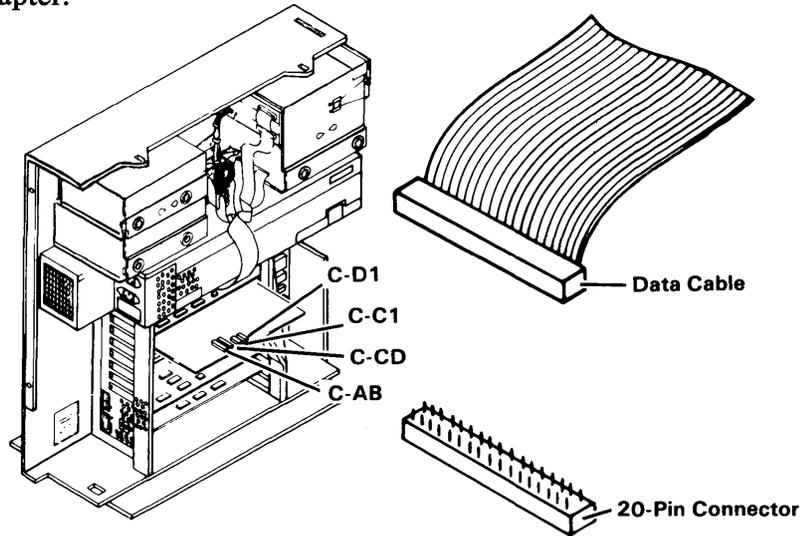
10. Look at the diagram of the cable bundle.

Warning: The jumpers on the adapter must be reset if the adapter was previously installed in adapter slot 2. See “IBM Personal Computer AT Fixed-Disk and Diskette Drive Adapter” on page 2-37, if the new drive is a R40 fixed-disk drive, or “IBM RT PC ESDI Magnetic Media Adapter” on page 2-38, if the new drive is a R70 fixed-disk drive, for jumper settings.

Using the drive adapter previously removed from drive position E, connect C-AB and C-CD to the 34-pin connectors on the adapter.



-
11. Connect C-C1 on the cable bundle to the 20-pin connector on the drive adapter.



12. Put the adapter in adapter slot 1. Replace the screw.
13. If this is the last drive to be installed, replace the cooling fan assembly. See “Cooling Fan Replacement” on page 2-7.

Installing a Fixed-Disk Drive in Position D

Warning: Handle the fixed-disk drive carefully. Dropping, shaking, or rough handling can damage both the drive and any stored data and can cancel the warranty.

The fixed-disk drive types installed in drive positions C and D **MUST** be the same drive type. The drives will not operate correctly if drive types are mixed.

Refer to the system unit diagram for a picture of drive position D.

Refer to “Handling Static-Sensitive Drives” on page 2-4 before beginning this section.

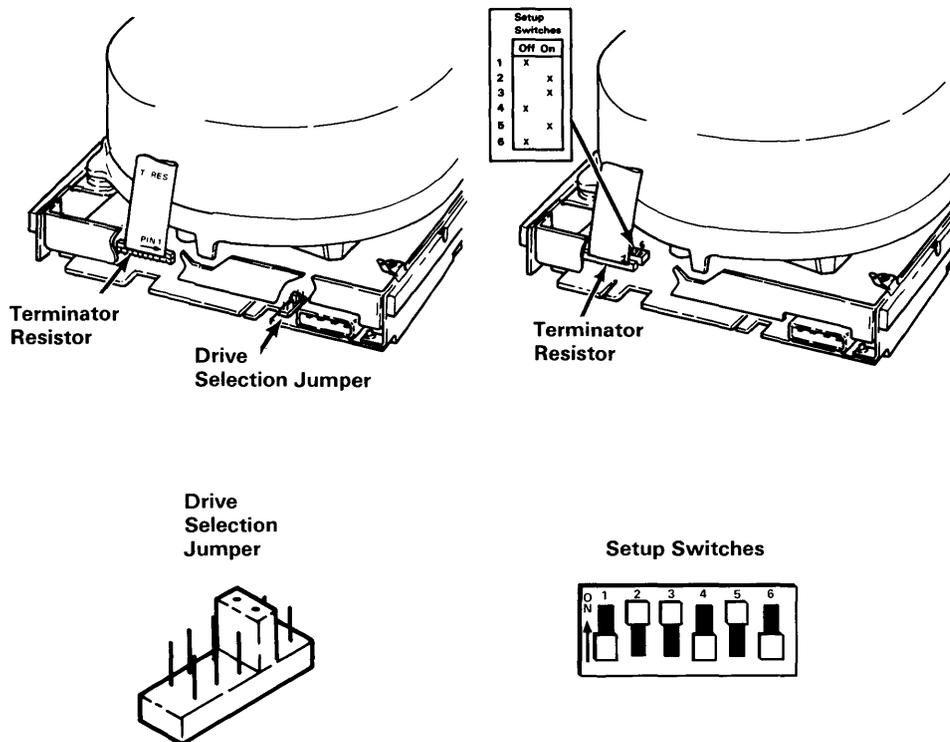
Warning: Follow *all* instructions under “Removing the Covers From the System Units” on page 1-4 before installing the second drive.

Use the following steps to install the fixed-disk drive in position D:

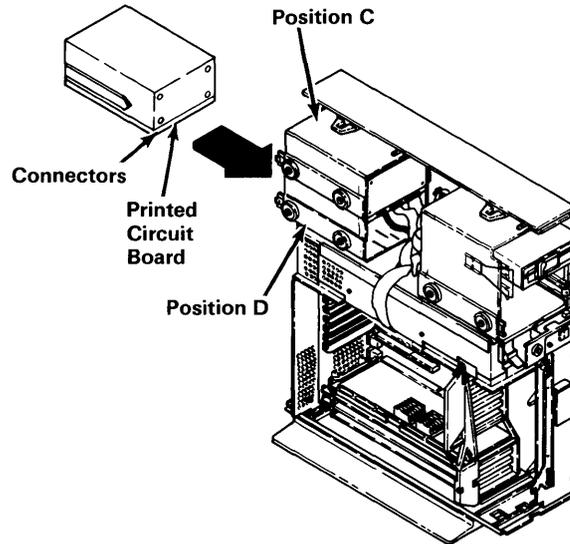
1. Remove the cooling fan assembly. See “Cooling Fan Removal” on page 2-6.

Warning: Do not bend the pins!

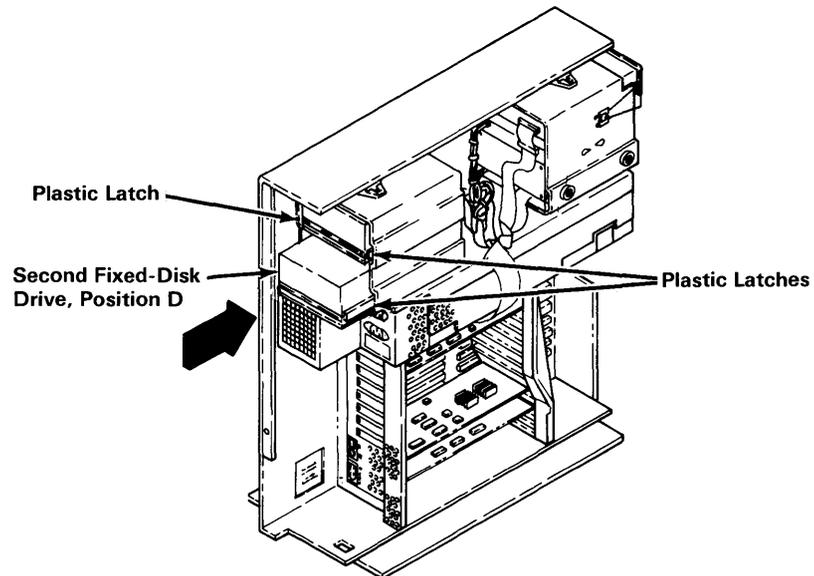
2. Remove the terminating resistor by pulling the paper tab, if present, or inserting a small, flat-bladed screwdriver under the resistor. Carefully lift, alternating ends of the resistor to lift evenly.
3. Check the drive selection jumper or switches for the correct setting.



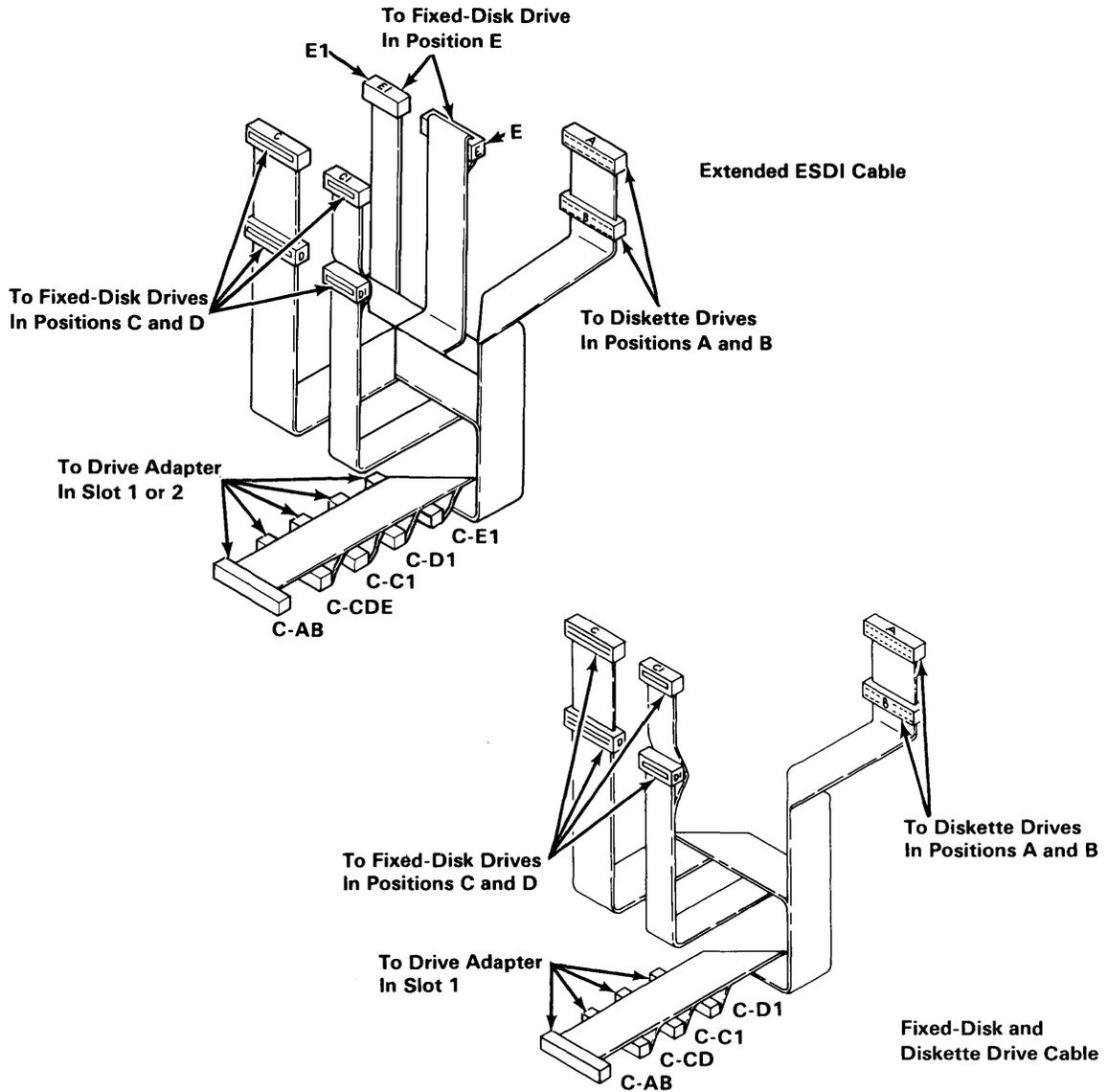
-
4. Hold the drive with the printed circuit board on the bottom and the connectors toward the center of the unit.



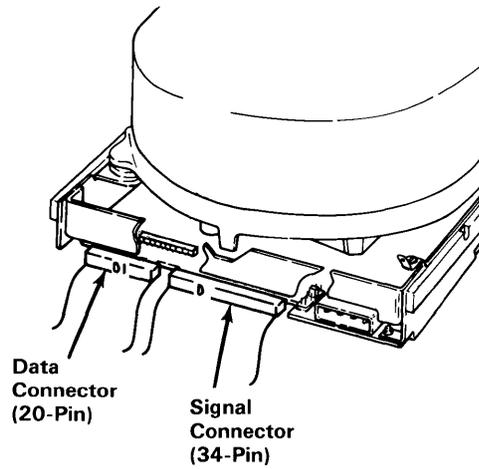
5. Facing the rear of the unit, place the drive on the side rails and slide it into drive position D. Push the drive in until the plastic latches snap into position, holding the drive in place.



- Look at the diagram of the disk and diskette cable bundle that applies to your system.

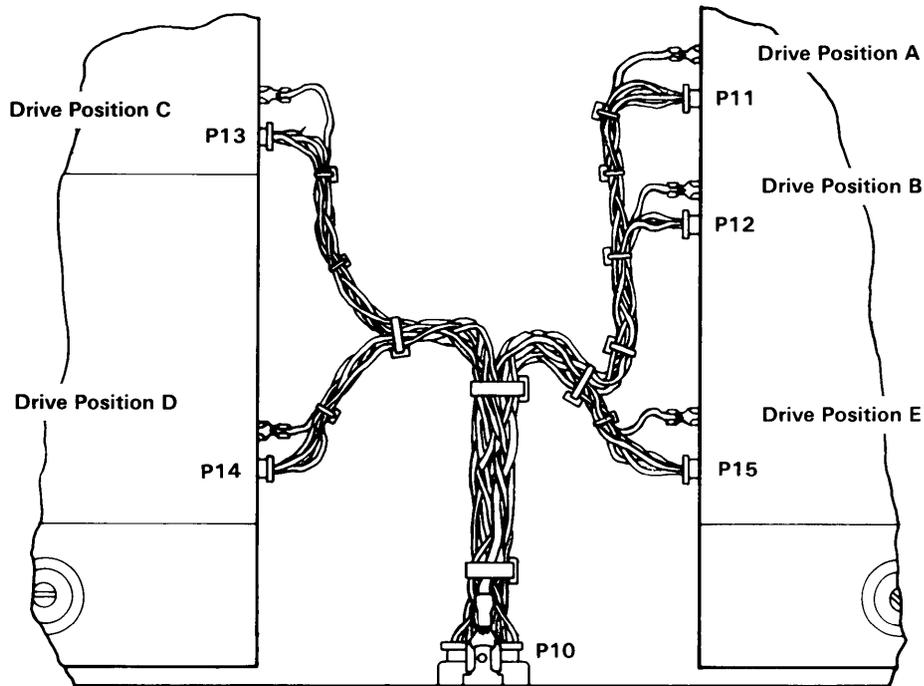


7. Connect D on the cable to the 34-pin connector on the rear of the drive in position D. Connect D1 to the 20-pin connector on the drive.

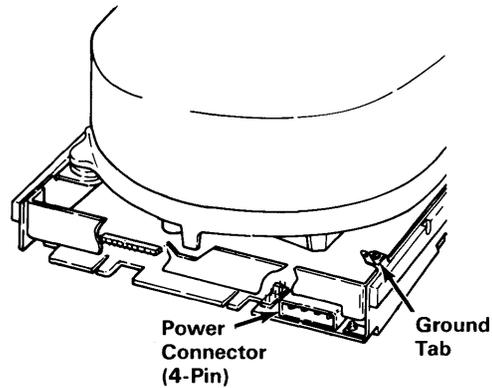


8. Look at the diagram of the power cable. The 4-pin connectors connect as follows:

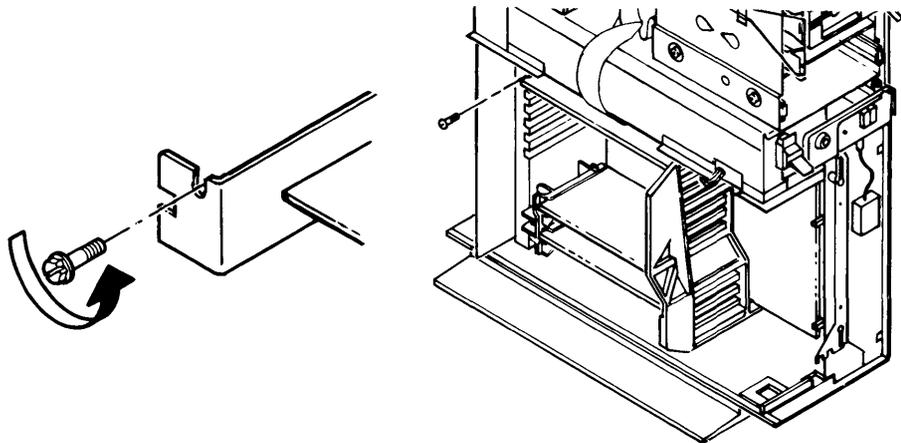
- P10 is connected to the power supply.
- P11 is connected to the first diskette drive, position A.
- P12 connects to the second diskette drive, position B.
- P13 is connected to the first fixed-disk drive, position C.
- P14 connects to the second fixed-disk drive, position D.
- P15 connects to the third fixed-disk drive, position E.



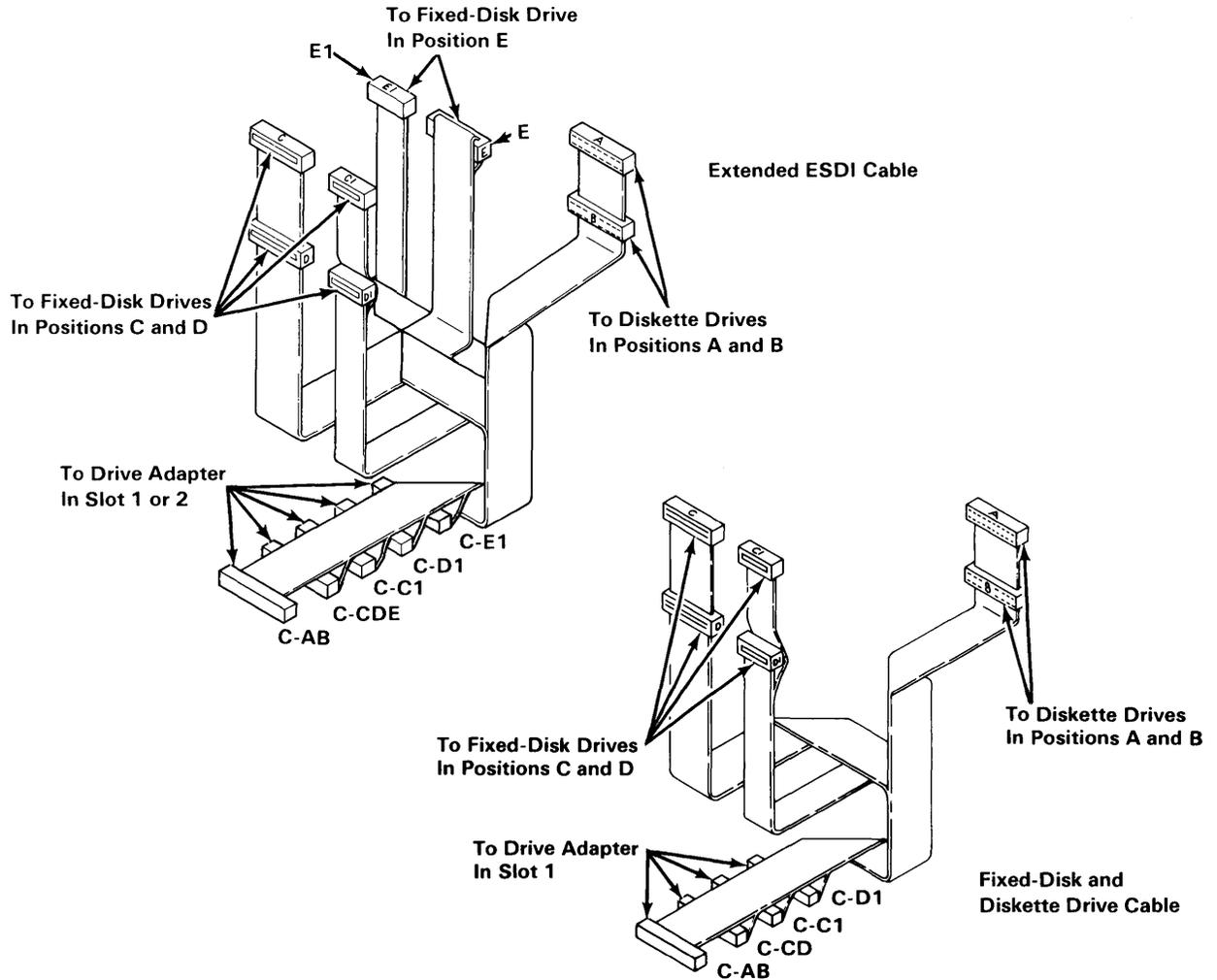
9. Connect P14 on the power cable to the 4-pin connector on the rear of the fixed-disk drive in position D. Connect the ground wire from the power cable to the ground tab on the drive.



10. Remove the screw holding the drive adapter in adapter slot 1. Slide the adapter out of the slot.

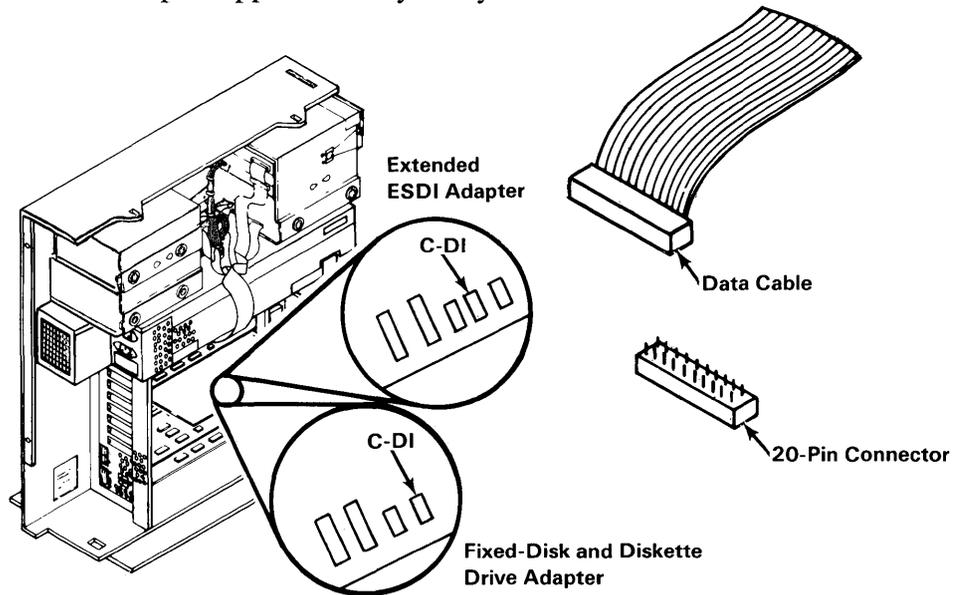


11. Look at the diagram of the cable bundle that applies to your system.

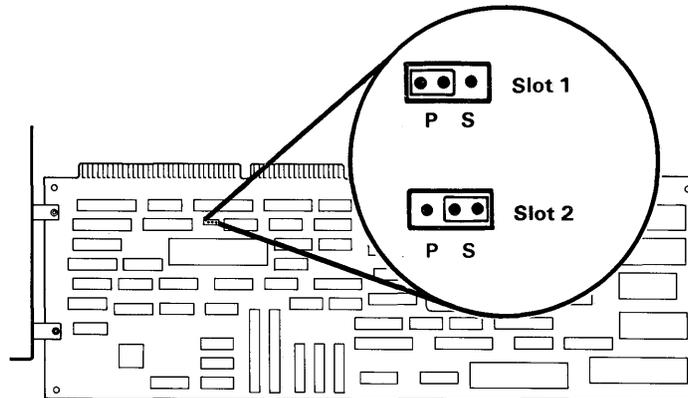


C-AB and C-CD or C-CDE are connected to the 34-pin connectors on the drive adapter, and C-C1 is connected to the 20-pin connector.

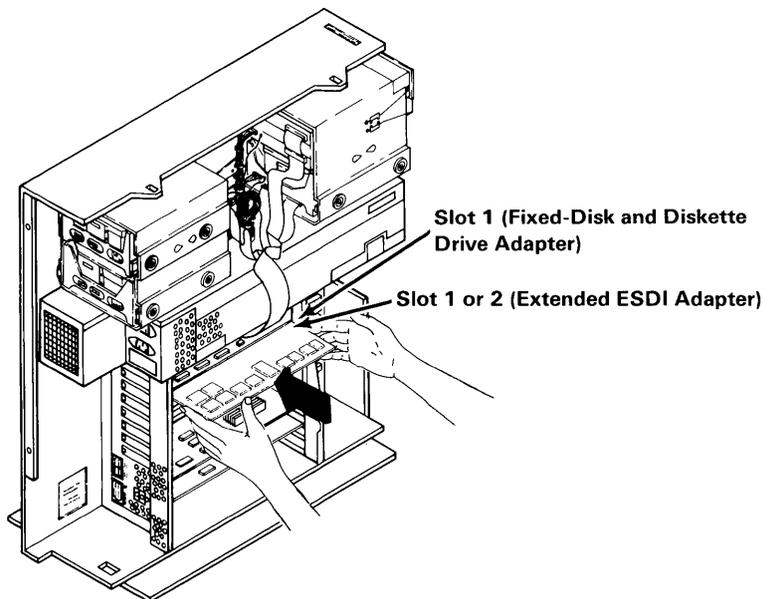
12. Connect C-D1 on the cable bundle to the 20-pin connector on the drive adapter applicable to your system.



13. If your system uses the IBM RT PC Extended ESDI Magnetic Media Adapter, set Jumper J6 according to which slot the adapter will occupy.



- Put whichever drive adapter your system uses back in the appropriate slot as shown below, and replace the screw.



- If this is the last drive to be installed, replace the cooling fan assembly. See "Cooling Fan Replacement" on page 2-7.

Installing a Fixed-Disk Drive in Position E

Warning: Handle the fixed-disk drive carefully. Dropping, shaking, or rough handling can damage both the drive and any stored data and can cancel the warranty.

Refer to the system unit diagram for a picture of drive position E.

Refer to “Handling Static-Sensitive Drives” on page 2-4 before beginning this section.

Warning: Follow *all* instructions under “Removing the Covers From the System Units” on page 1-4 before you install the fixed-disk drive in drive position E.

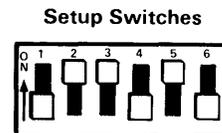
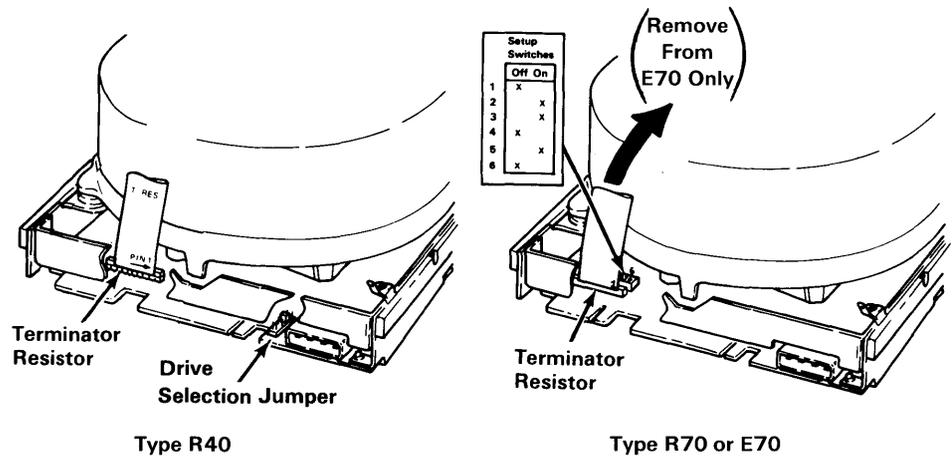
Use the following steps to install the fixed-disk drive in position E:

1. Remove the cooling fan assembly. See “Cooling Fan Removal” on page 2-6.

CONTINUE

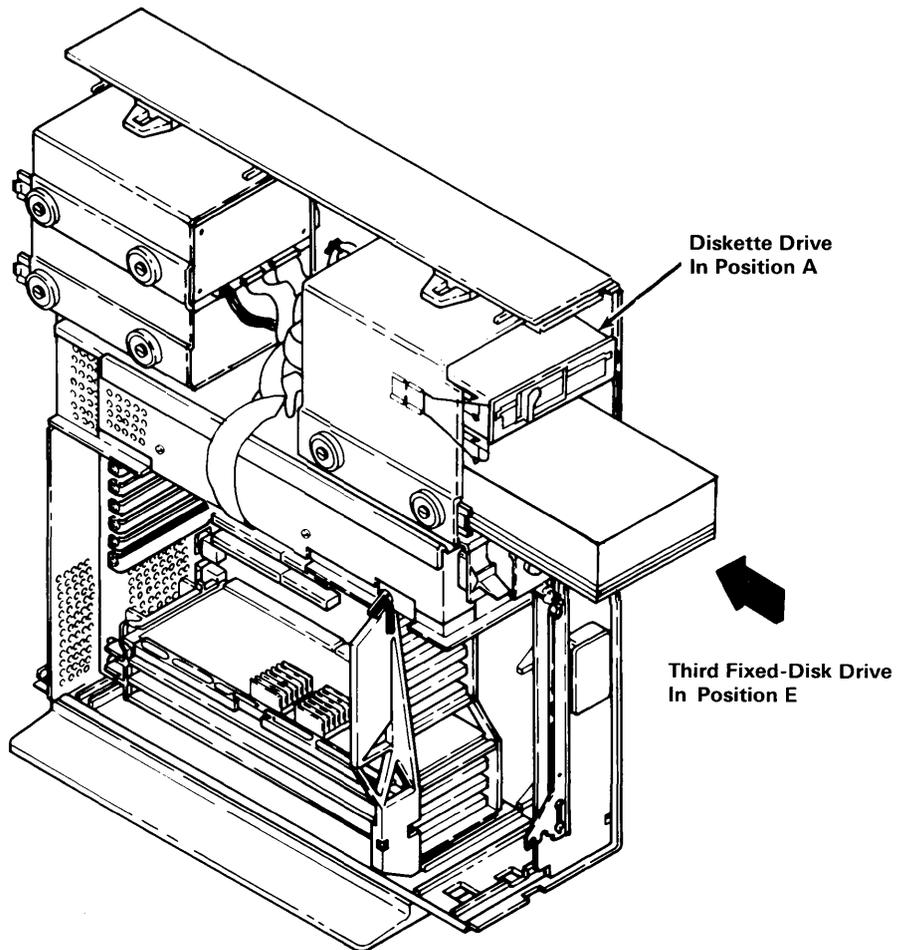
2. Check the drive selection jumper or switch for the correct setting, and take the following actions with the terminating resistor:
 - If the third fixed-disk drive is a Type R40 or R70, ensure that the terminating resistor is in place.
 - If the third fixed-disk drive is a Type E70, remove the terminating resistor by pulling the paper tab, if present, or by inserting a small, flat-bladed screwdriver under one end of the resistor. Carefully pry up, alternating ends to lift evenly.

Warning: Failure to remove the terminating resistor from the third E70 fixed-disk drive may result in adapter module damage.

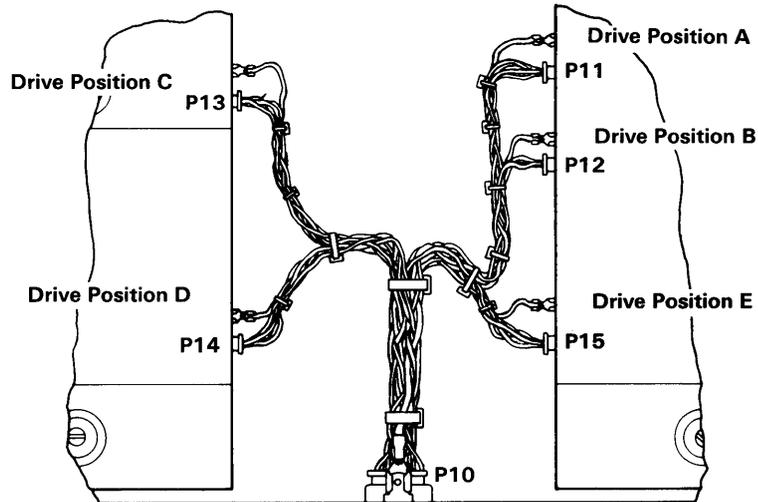


-
3. Hold the drive with the printed circuit board on the bottom and the connectors toward the center of the system unit. Place the drive on the side rails and slide it into drive position E.

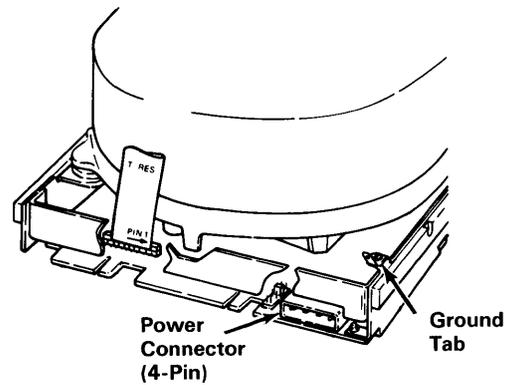
Push the drive in until the plastic latches snap into position, holding the drive in place.



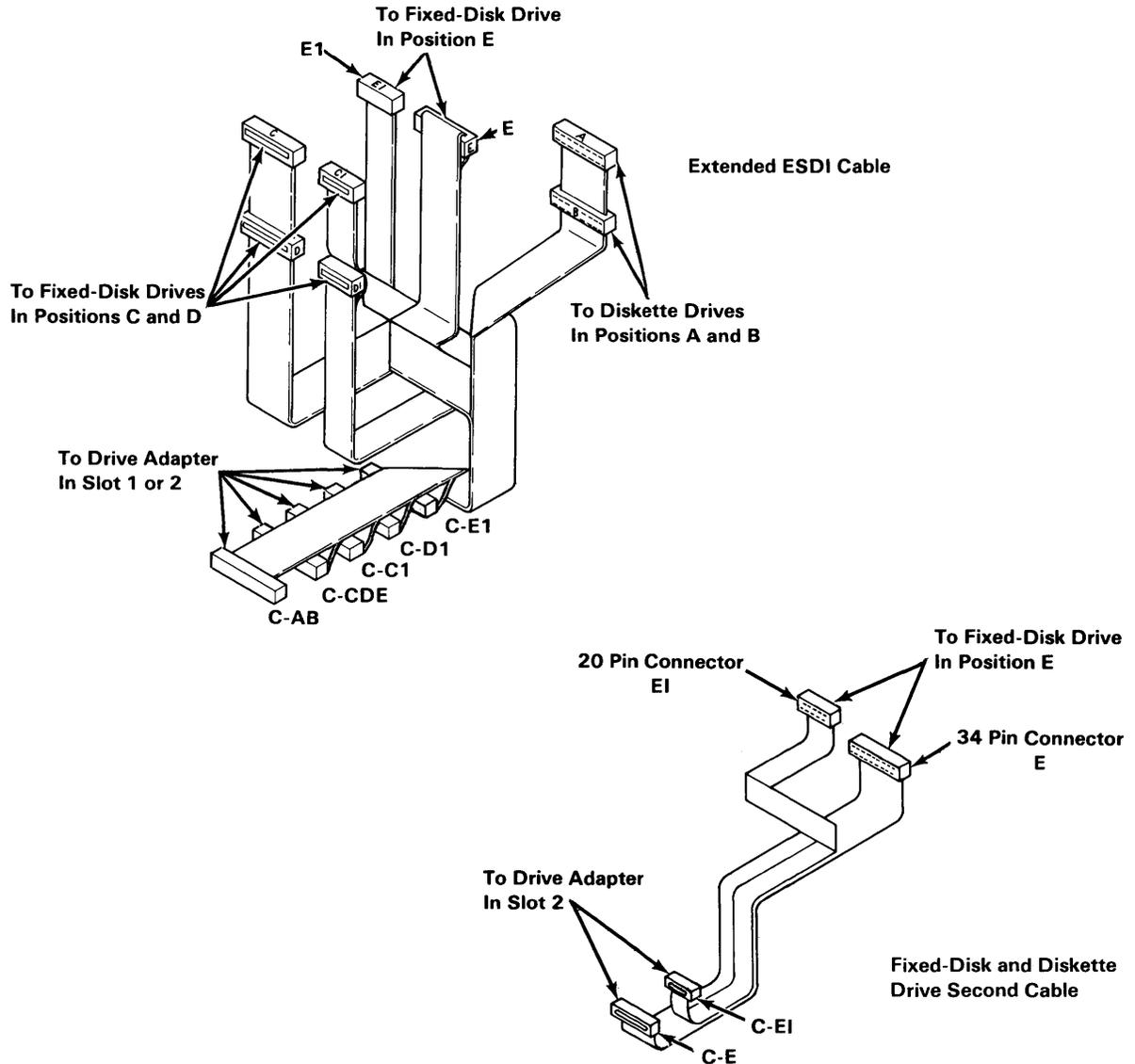
-
4. Look at the diagram of the power cable. The drive in position E connects to connector P15.



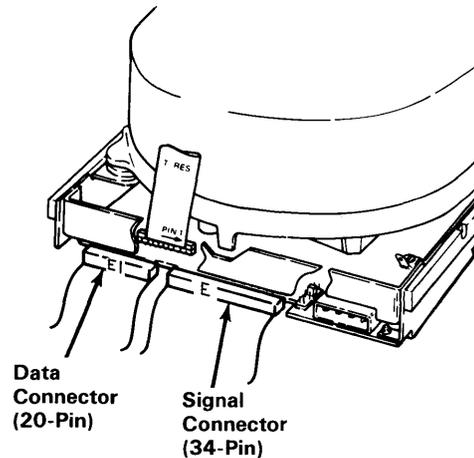
5. Connect P15 on the power cable to the 4-pin connector on the rear of the fixed-disk drive. Connect the ground wire to the ground tab on the drive.



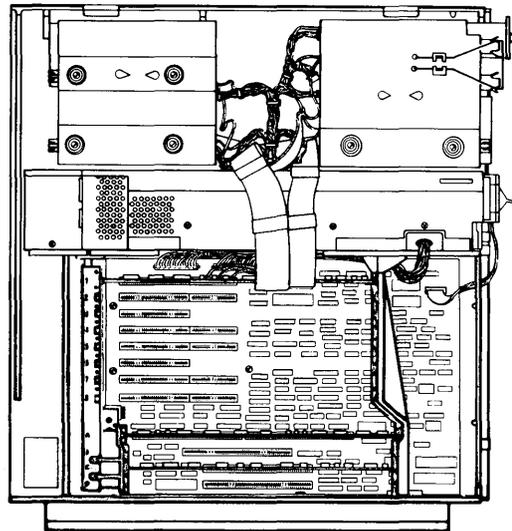
6. Look at the diagram of the cable bundle applicable to your system.



7. Connect E on the cable to the 34-pin connector on the rear of the new fixed-disk drive. Connect E1 to the 20-pin connector on the drive.



8. If you are installing R40 or R70 fixed-disk drives, route the fixed-disk and diskette drive second cable bundle around and in front of the power supply.



9. Set the jumpers on the drive adapter according to which drive type you are installing:

- If you are using R40 fixed-disk drives, refer to “IBM Personal Computer AT Fixed-Disk and Diskette Drive Adapter” on page 2-37.

Warning: The jumpers on the IBM Personal Computer AT Fixed-Disk and Diskette Drive Adapter must be reset if the adapter was previously installed in adapter slot 1.

- If you are using R70 fixed-disk drives, refer to “IBM RT PC ESDI Magnetic Media Adapter” on page 2-38.

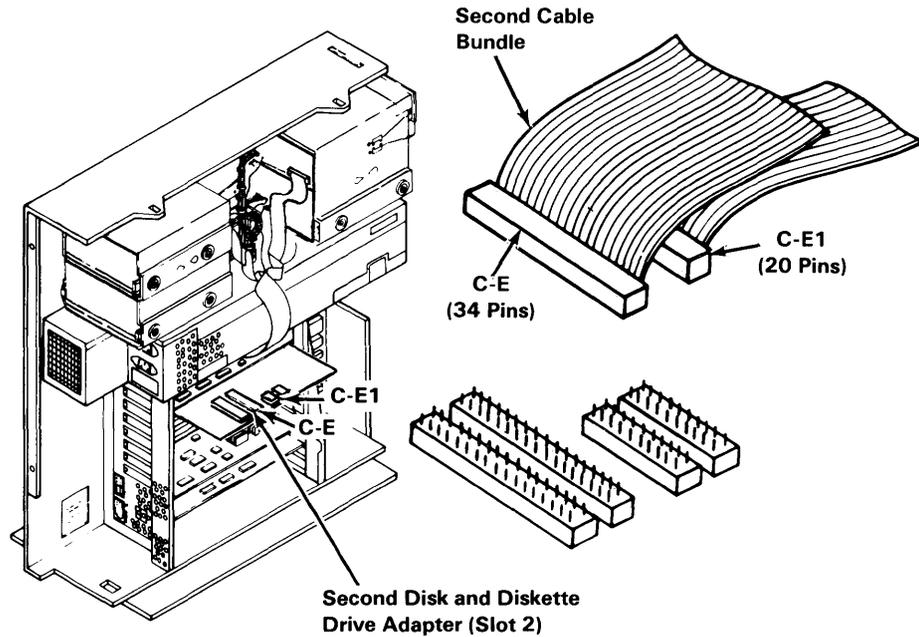
Warning: The jumpers on the IBM RT PC ESDI Magnetic Media Adapter must be reset if the adapter was previously installed in adapter slot 1.

- If you are using E70 fixed-disk drives, first remove the IBM RT PC Extended ESDI Magnetic Media Adapter as shown in Step 10, page 2-26. If you wish to change adapter slot positions, set Jumper J6 as shown in Step 13, page 2-28.

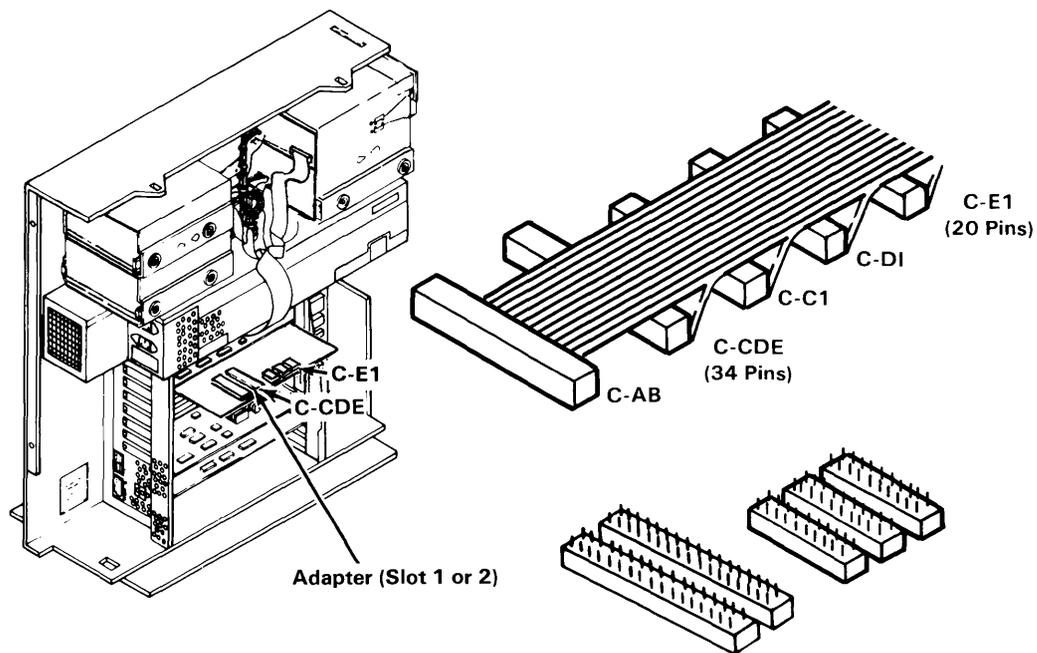
Warning: Jumper J6 on the IBM RT PC Extended ESDI Magnetic Media Adapter must be set according to which adapter slot is used.

10. Connect the cable bundle to the drive adapter applicable to your system:

- If you are installing an R40 or R70 fixed-disk drive, connect C-E and C-E1 of the fixed-disk and diskette drive second cable bundle as shown.

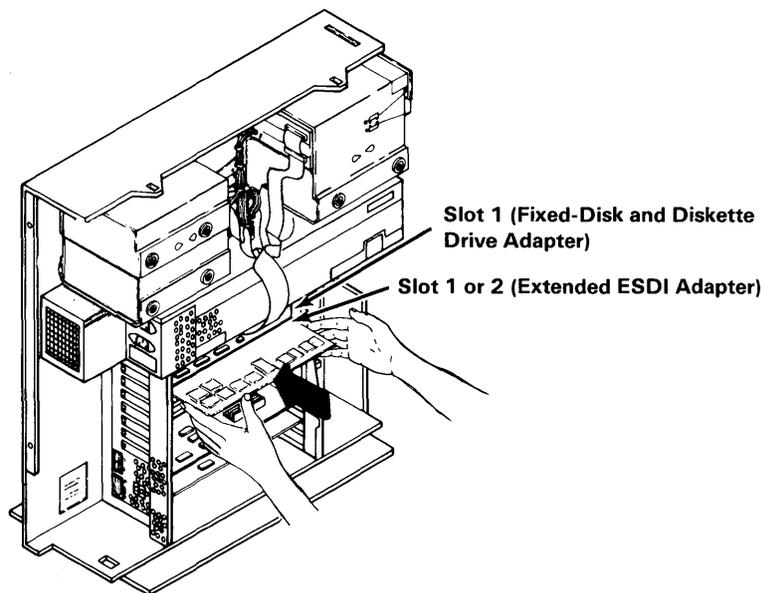


- If you are installing an E70 fixed-disk drive, connect C-E1 (C-CDE is already connected) to the IBM RT PC Extended ESDI Magnetic Media Adapter as shown.



11. Install the adapter:

- If you are installing an R40 or R70 fixed-disk drive, install the second drive adapter in adapter slot 2. If you need instructions for installing the adapter, see “Installing Adapters” on page 3-8.
- If you are installing an E70 fixed-disk drive, install the IBM RT PC Extended ESDI Magnetic Media Adapter in the slot determined by the J6 jumper setting in Step 13, page 2-28. If you need instructions for installing the adapter, see “Installing Adapters” on page 3-8.

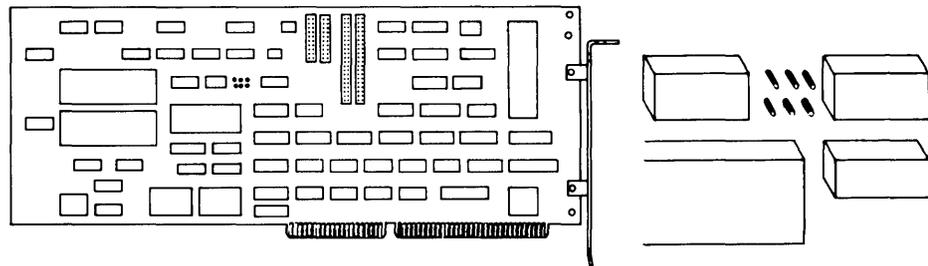


12. Replace the cooling fan assembly. See “Cooling Fan Replacement” on page 2-7.

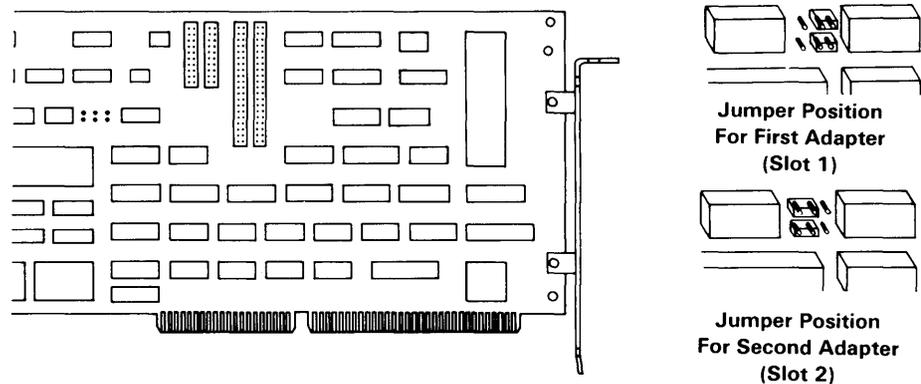
IBM Personal Computer AT Fixed-Disk and Diskette Drive Adapter

The IBM Personal Computer AT Fixed-Disk and Diskette Drive Adapter is used with the R40 fixed-disk drive. You may use up to two Personal Computer AT Fixed-Disk and Diskette Drive Adapters. The adapter in slot 1 can operate one or two R40 fixed-disk drives in drive positions C and D; in slot 2, the adapter can operate an R40 fixed-disk drive in drive position E. The Personal Computer AT Fixed-Disk and Diskette Adapter *will not* operate an R70 fixed-disk drive.

Before installing the drive adapter, you must set the jumpers.



To set the jumpers, lift the jumpers off the pins and install them as shown below:

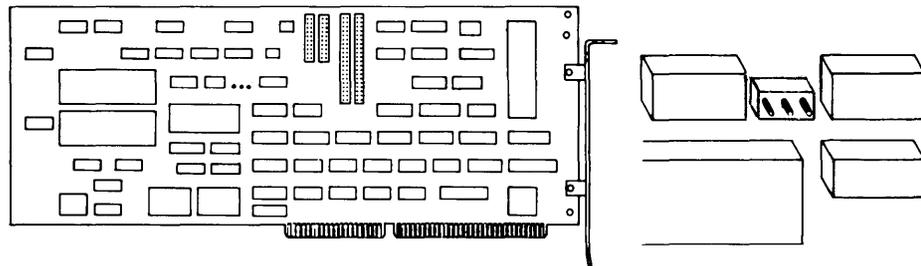


Note: Do not install the drive adapter until told to do so in the drive installation instructions.

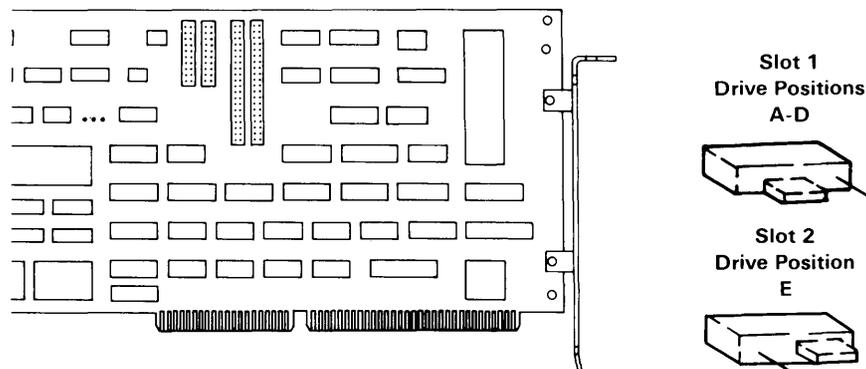
IBM RT PC ESDI Magnetic Media Adapter

The IBM RT PC ESDI Magnetic Media Adapter is used with the R70 fixed-disk drive. You may use up to two IBM RT PC ESDI Magnetic Media Adapters. The adapter in slot 1 can operate one or two R70 fixed-disk drives in drive positions C and D; in slot 2, the adapter can operate an R70 fixed-disk drive in drive position E. The IBM RT PC ESDI Magnetic Media Adapter *will not* operate a R40 fixed-disk drive.

Before installing the drive adapter, you must set the jumpers.



To set the jumpers, lift the jumpers off the pins and install them as shown in the following drawing:

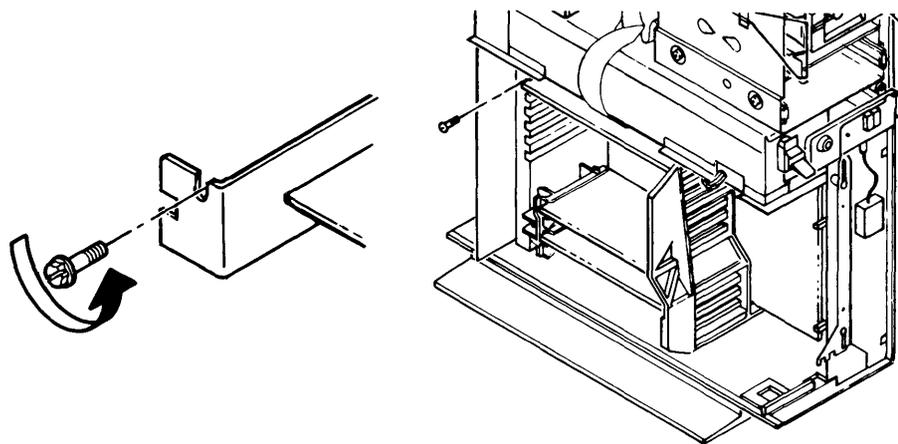


Note: Do not install the drive adapter until told to do so in the drive installation instructions.

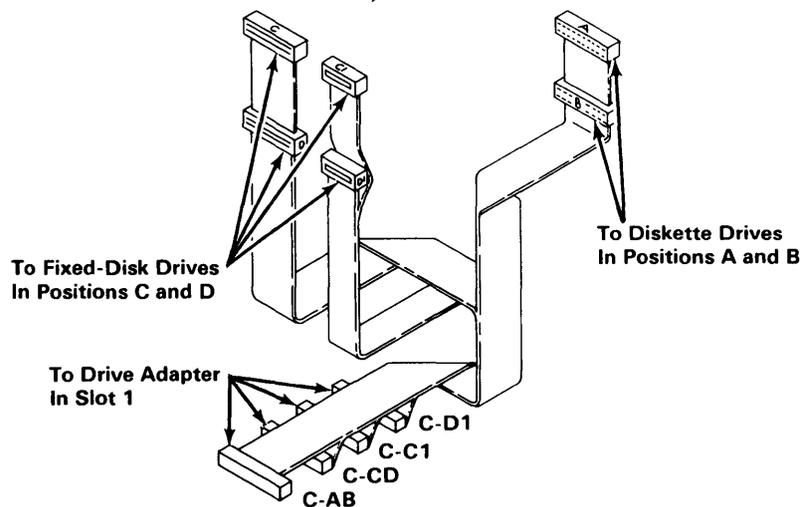
Removing Fixed-Disk in Position C

Follow these instructions to remove the fixed-disk drive installed in drive position C:

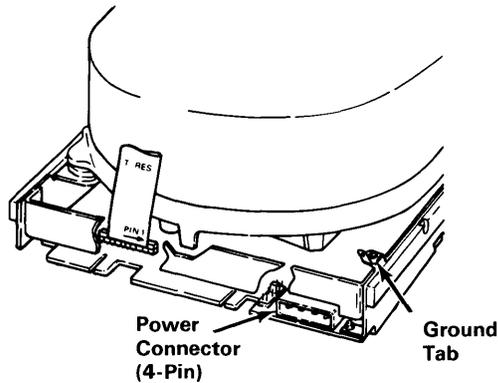
1. Remove the screw holding the drive adapter in adapter slot 1. Slide the adapter out of the slot.



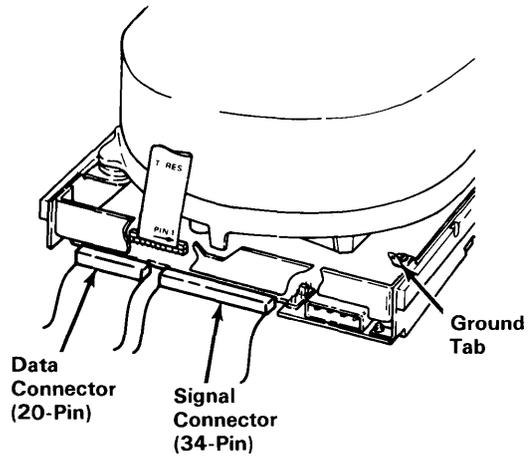
2. Disconnect the 34-pin connectors C-AB and C-CD and the 20-pin connectors C-C1 and if connected, C-D1.



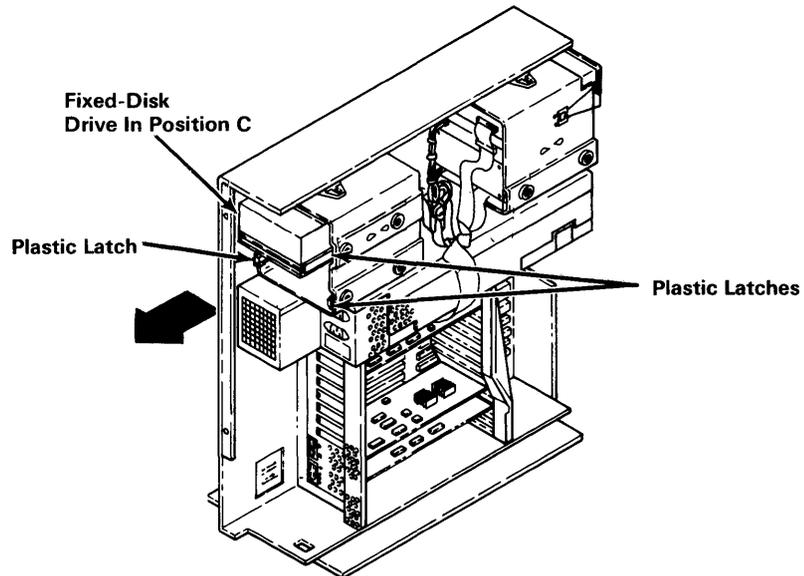
-
3. If the drive is to be reinstalled in drive position E, set the adapter to the side. It will be reinstalled in a later procedure.
 4. Remove the cooling fan assembly. See “Cooling Fan Removal” on page 2-6.
 5. Disconnect P13 on the power cable from the 4-pin connector on the rear of the fixed-disk drive in position C. Disconnect the ground wire from the ground tab on the drive.



-
6. Disconnect data cable C1 from the 20-pin connector on drive C.
Disconnect signal cable C from the 34-pin connector on the drive.



-
7. Facing the rear of the unit, release the plastic latches holding the drive in place and carefully remove the drive from position C.

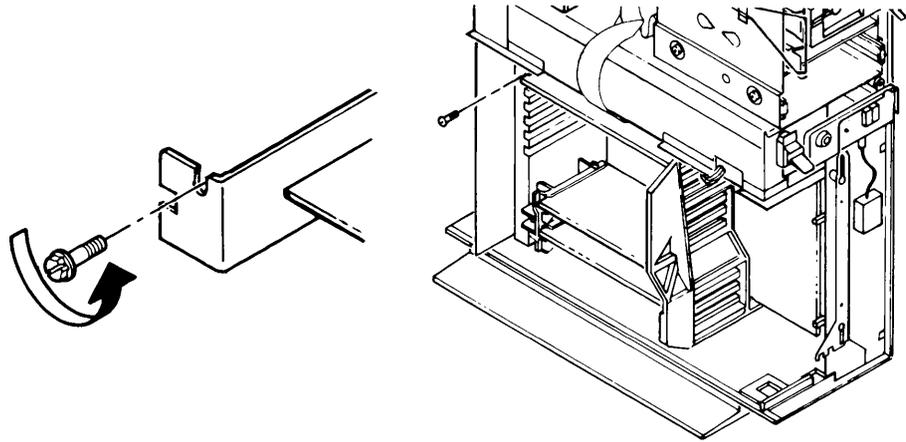


8. If drive is to be reinstalled in drive position E, see "Installing a Fixed-Disk Drive in Position E" for installation of the drive and the replacement of the cooling fan.

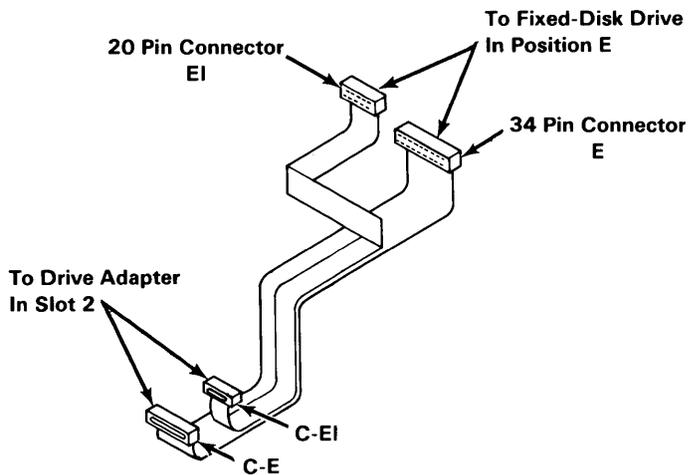
Removing Fixed-Disk in Position E

Follow these instructions to remove the fixed-disk drive installed in drive position E:

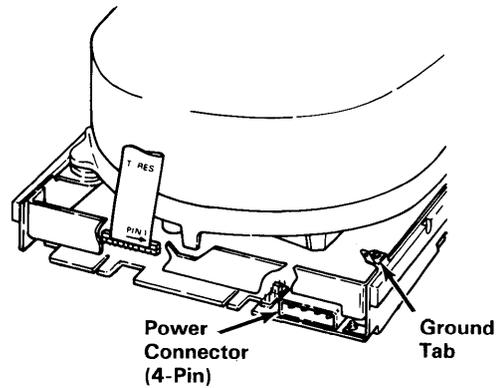
1. Remove the screw holding the drive adapter in adapter slot 2. Slide the adapter out of the slot.



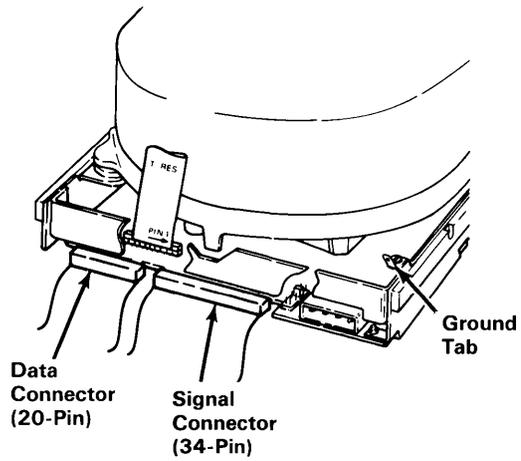
2. Disconnect the 34-pin connector C-E and the 20-pin connector C-E1.



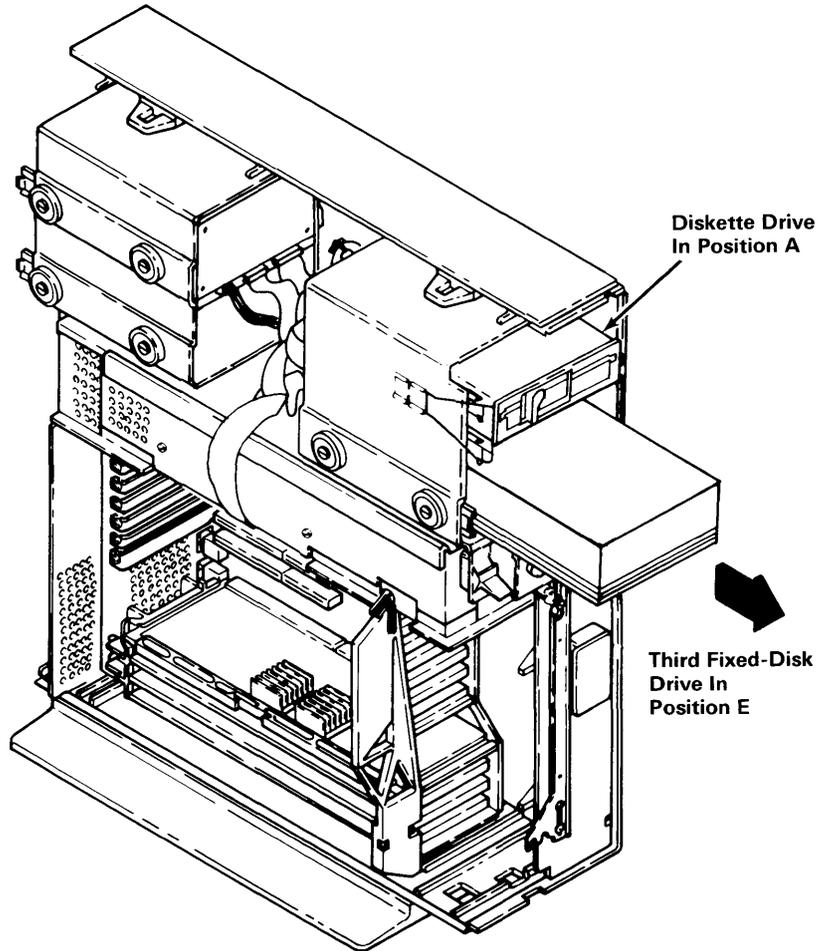
-
3. If the drive is to be reinstalled in drive position C, set the adapter to the side. It will be reinstalled in a later procedure.
 4. Remove the cooling fan assembly. See “Cooling Fan Removal” on page 2-6.
 5. Disconnect P15 on the power cable from the 4-pin connector on the rear of the fixed-disk drive in position E. Disconnect the ground wire from the ground tab on the drive.



-
6. Disconnect data cable E1 from the 20-pin connector on drive E.
Disconnect signal cable E from the 34-pin connector on the drive.



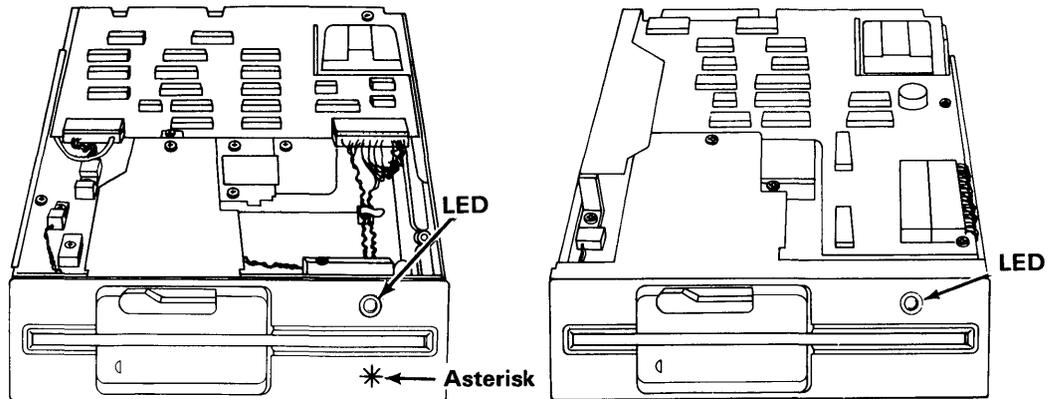
-
7. Facing the front of the unit, release the plastic latches holding the drive in place and carefully remove the drive from position E.



8. If drive is to be reinstalled in drive position C, see “Installing a Fixed-Disk Drive in Position C” for installation of the drive and replacement of the cooling fan.

Diskette Options

You can install either an IBM Personal Computer AT High Capacity Diskette Drive (1.2M-byte memory) or an IBM Personal Computer AT Dual-Sided Diskette Drive (360K-byte memory) in position B. See the system unit diagram for a picture of the correct position.



360K-Byte Drive

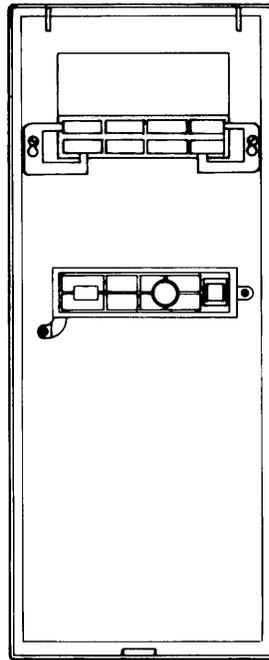
1.2 M-Byte Drive

Refer to “Handling Static-Sensitive Drives” on page 2-4 before beginning this section.

Warning: Follow *all* instructions under “Removing the Covers From the System Units” on page 1-4 before you begin this task.

Use the following steps to install the second diskette drive:

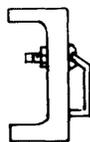
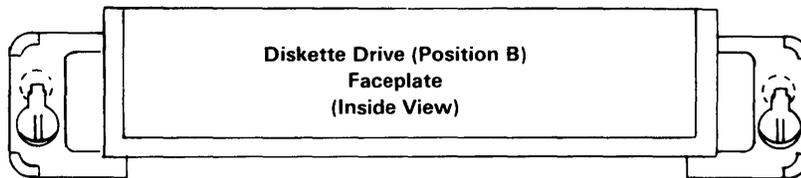
1. On the system unit, locate the faceplate covering the second diskette position.



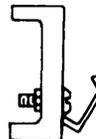
**System Unit Cover
(Inside View)**

2. Remove the faceplate as follows:

- a. Pull the plastic tabs out of the way. You may need to use a screwdriver to do this.

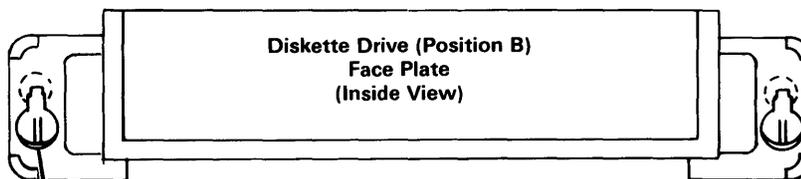


1. Before

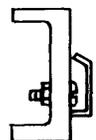


2. Pull the Tab Out.

- b. Slide the faceplate up until the bolts are in the large openings.

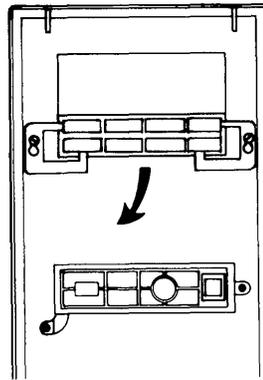


Bolt In
Large Opening



3. After

-
- c. Pull the faceplate off the two bolts holding it in place.

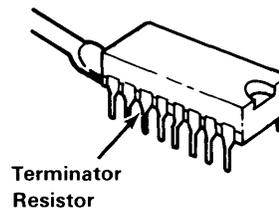
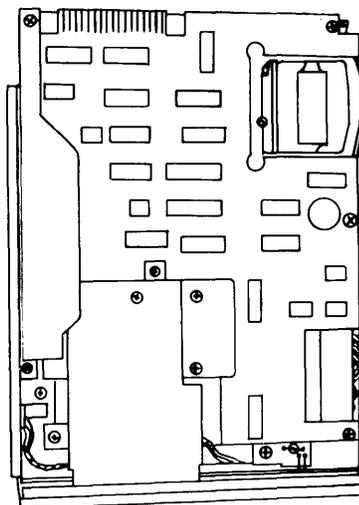


Remove the
Face Plate.

3. Remove the cooling fan assembly. See “Cooling Fan Removal” on page 2-6.
4. Turn the diskette drive upside down and locate the terminating resistor.

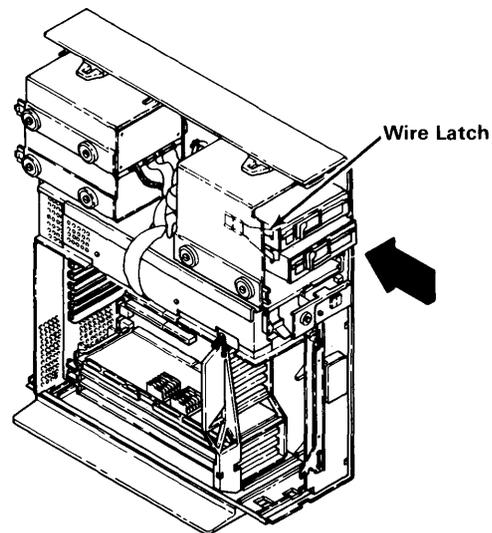
Warning: Do not bend the pins!

5. Insert a small, flat-bladed screwdriver under the resistor and lift. Alternate ends of the resistor to lift evenly.

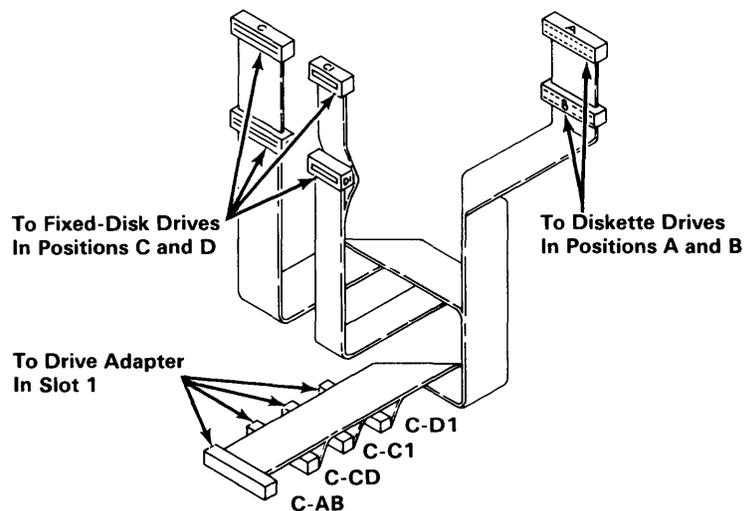


Terminator
Resistor

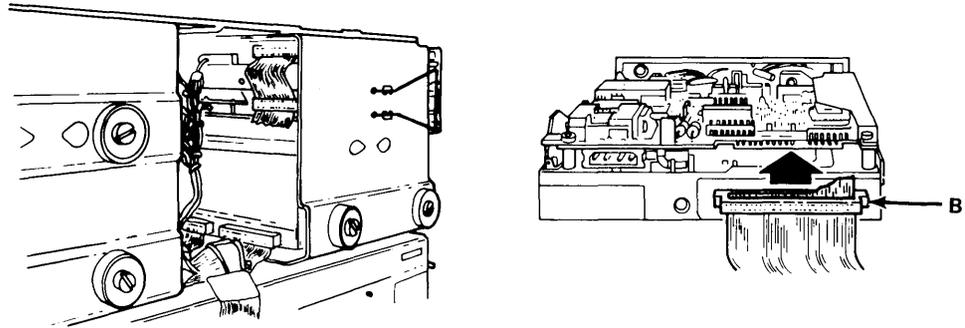
-
6. Pull the wire latch aside, place the diskette drive on the rails, and slide it into drive position B. Ensure that the wire latches hold the drive firmly in place.



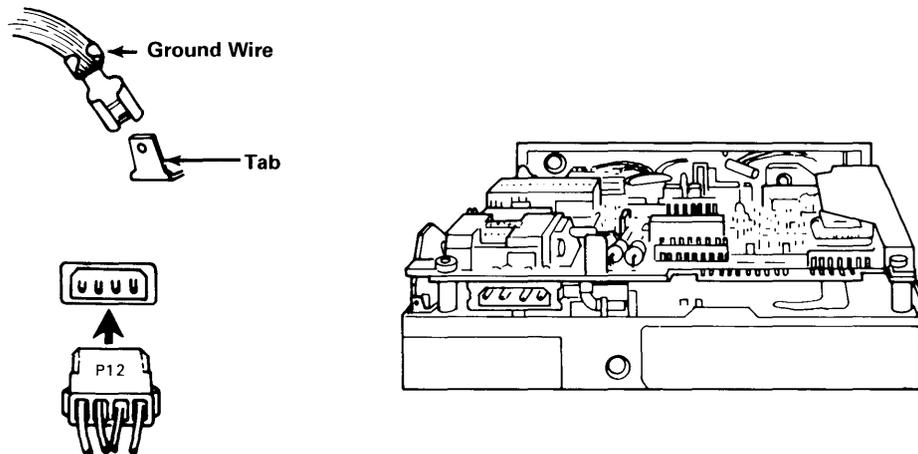
7. Look at the diagram of the disk and diskette cable bundle, which is already installed. The first two (if two are installed) fixed-disk drives and the diskette drive in position A connect to this cable bundle.



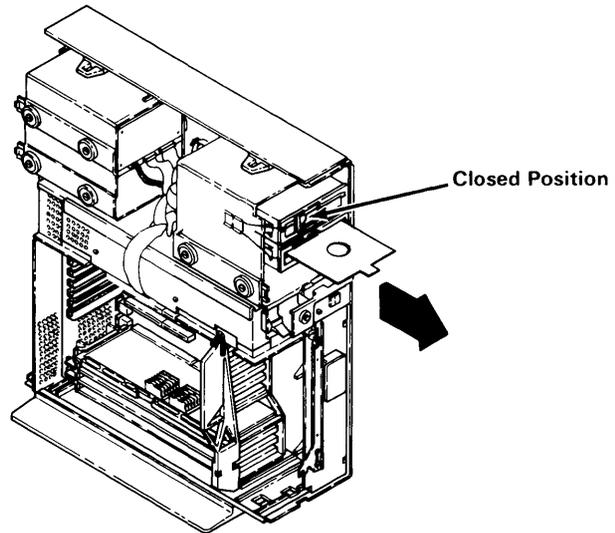
-
8. Connect B on the cable to the 34-pin connector on the rear of the second diskette drive.



9. Connect P12 on the power connector to the 4-pin connector on the rear of the diskette drive. (See page 2-25 for a diagram of the power cable and connectors.) Connect the ground wire to the ground tab on the second diskette drive.



-
10. Turn the diskette drive lever counterclockwise to open it and remove the shipping card, if one is present.



11. Replace the cooling fan assembly. See "Cooling Fan Replacement" on page 2-7.

You have finished installing the drives. If you need to install adapters, go to Section 3, "Installing the Adapters."



Section 3. Installing the Adapters

CONTENTS

About This Section	3-4
General Instructions	3-5
Handling Static-Sensitive Adapters	3-6
Installing Adapters	3-8
Installing the Covers on the System Units	3-15
IBM 6150 System Unit	3-15
IBM 6151 System Unit	3-18

About This Section

This section gives general instructions for handling and installing adapters. Once you are familiar with how to install an adapter, go to the appropriate adapter section for slot, jumper and switch information.

General Instructions

The following pages supply general instructions for handling adapters. Read these instructions now, but *do not* unpack any adapters until you read the instructions for installing each one.

Before doing any procedure, ensure that you turn off the power to the system unit and that you unplug the power cable from the electrical outlet.

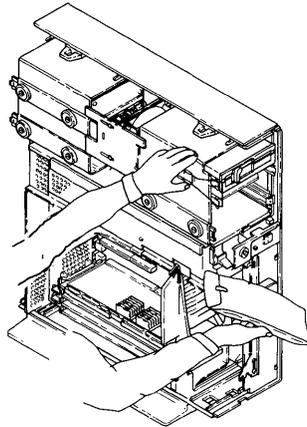
When you are finished, see “Installing the Covers on the System Units” on page 3-15.

Handling Static-Sensitive Adapters

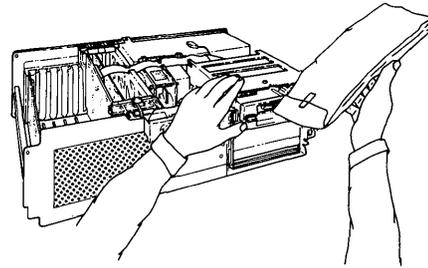
Warning: Adapters can be damaged by static electricity discharge. The adapters are wrapped in antistatic bags to prevent this damage.

Take the following precautions when handling devices sensitive to static electricity discharge:

1. Hold the device (still in the antistatic bag) in one hand, and with the other hand, touch the metal on the system unit frame.

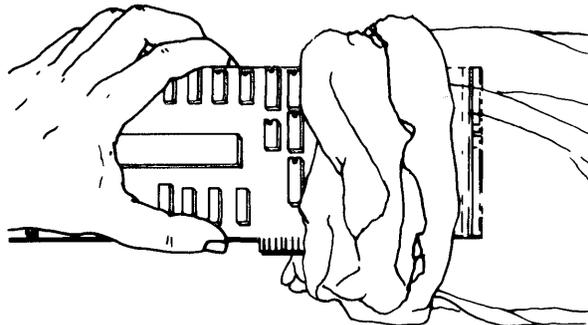


IBM 6150



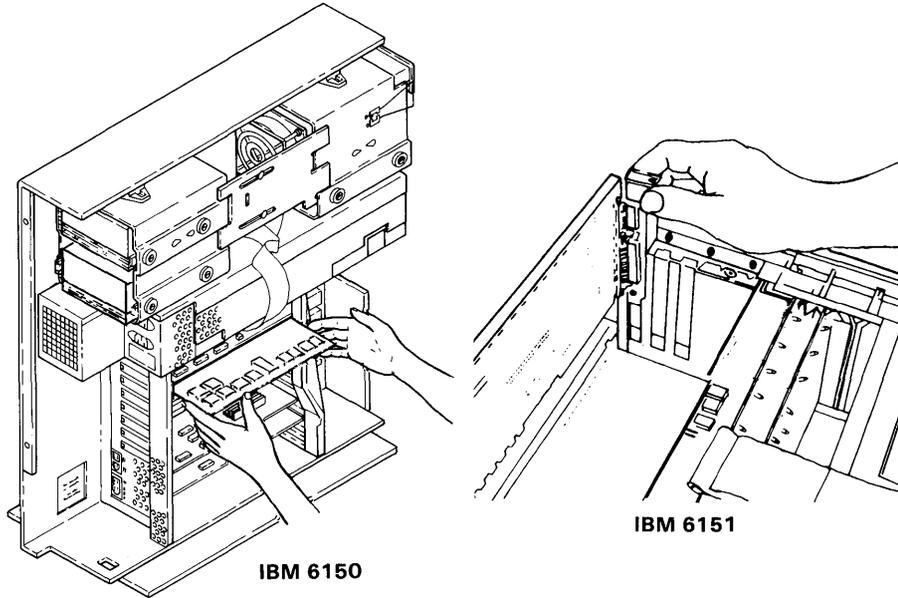
IBM 6151

2. Immediately remove the device from the antistatic bag.

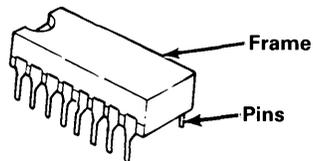


When handling devices:

- **Hold adapters by the corners or bracket only. Do not touch the components, modules, or connections.**



- **Hold modules by the frames.**



CAUTION

Do not touch the pins. The pins are sharp.

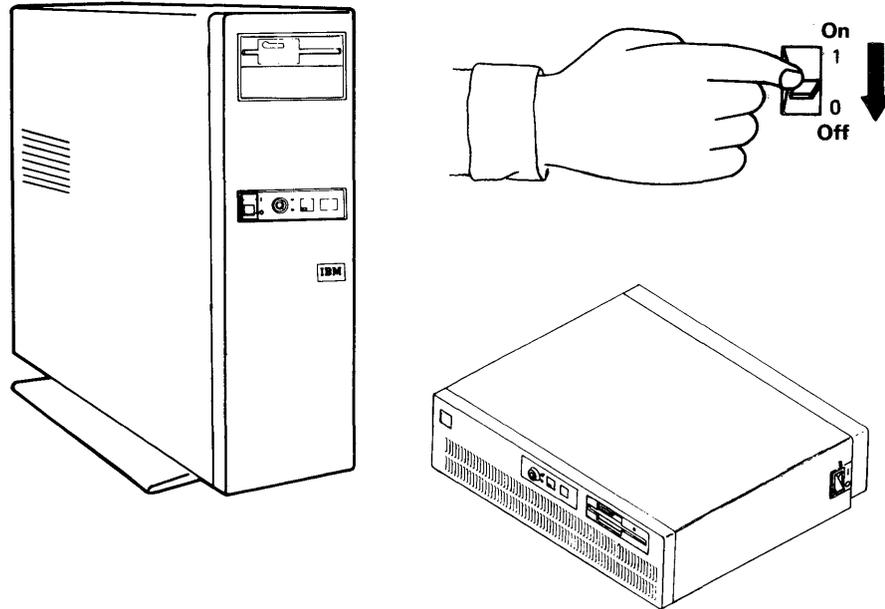
Installing Adapters

The following pages give detailed instructions for installing adapters in the system unit. Some of the adapters in the numbered adapter slots have connectors to which you can connect devices outside of the system unit. Adapters in the four system board slots (A, B, C, and D) do not connect to external devices.

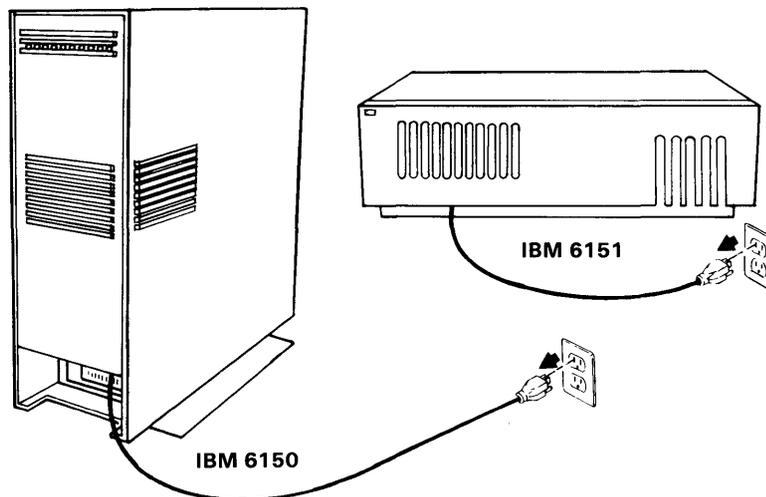
Instructions are given from the following arrangement: the system unit is on a table. For IBM 6150, the front of the unit is toward your right hand. You are facing the left side of the unit with all three covers removed. For IBM 6151, you are facing the front of the system unit with the top and rear covers removed.

The steps for installing optional adapters are:

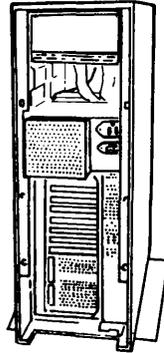
1. Turn off the power on the system unit.



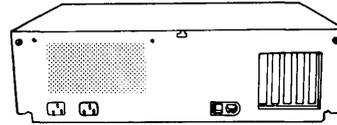
2. Unplug the power cable on the system unit from the electrical outlet.



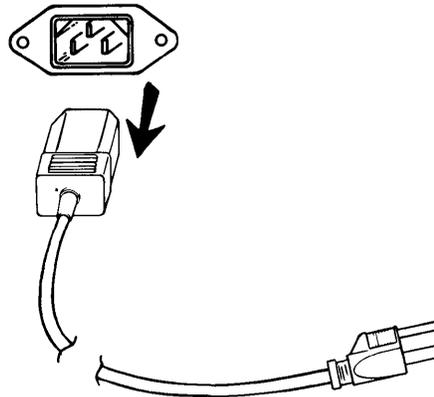
-
3. If connected, unplug the display power cable and system unit power cable from the system unit.



IBM 6150

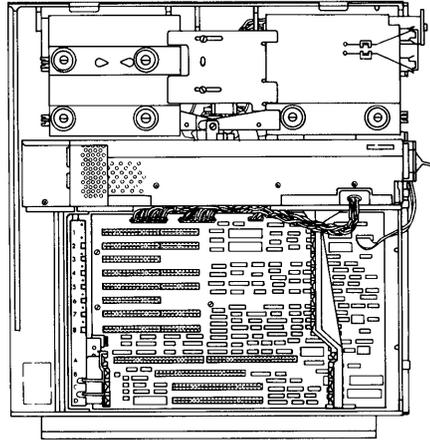
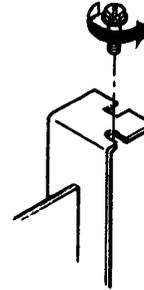
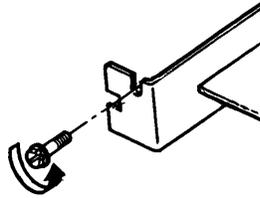


IBM 6151

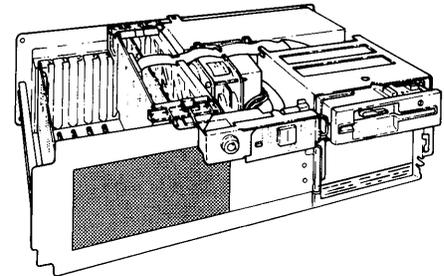


4. Remove the covers using the instructions under “Removing the Covers From the System Units” on page 1-4.

-
5. For the numbered adapter slots, remove the screw holding the adapter slot cover in place. Save the screw to install the adapter later. Save the adapter slot cover in case you remove an adapter in the future. You must have either an adapter or a slot cover in each slot.



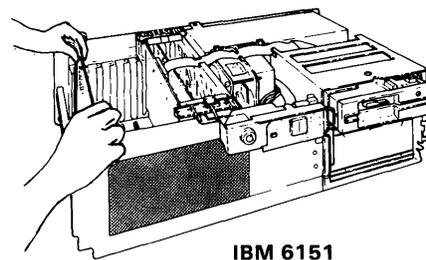
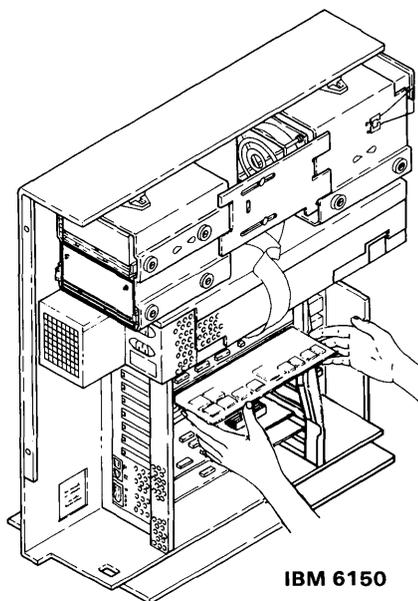
IBM 6150



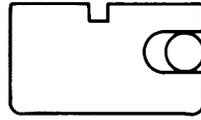
IBM 6151

6. Unpack the adapter using the instructions under “Handling Static-Sensitive Adapters” on page 3-5.

-
7. Hold the adapter by the bracket and edges. Point the tab toward the slot on the system board and press the adapter into place. Ensure that the right edge is in the plastic guides and the adapter is completely in position.



-
8. Align the screw holes and ensure that the adapter bracket is even with the frame.

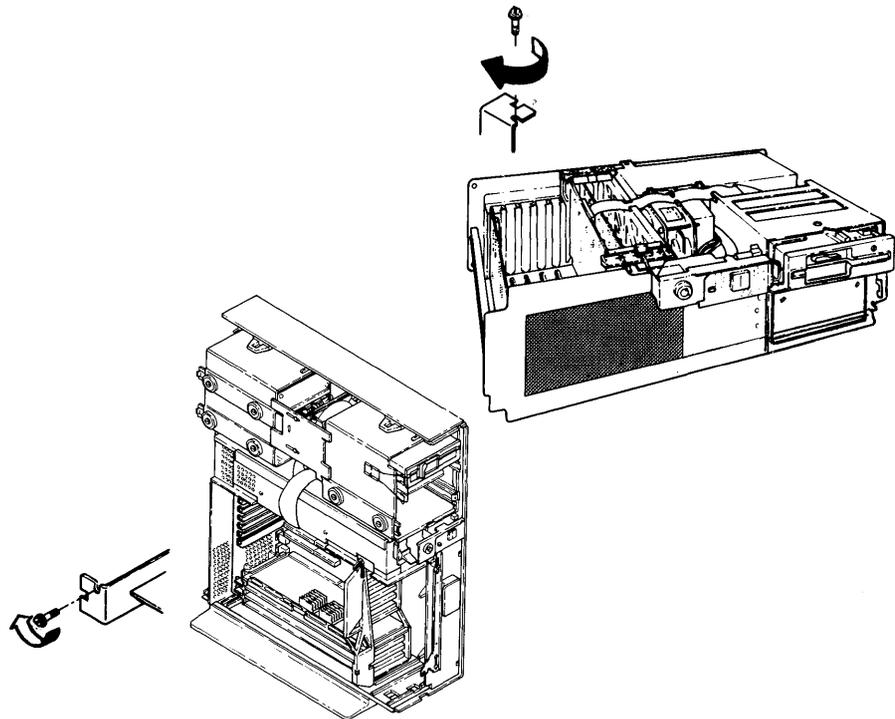


**Not
Aligned**



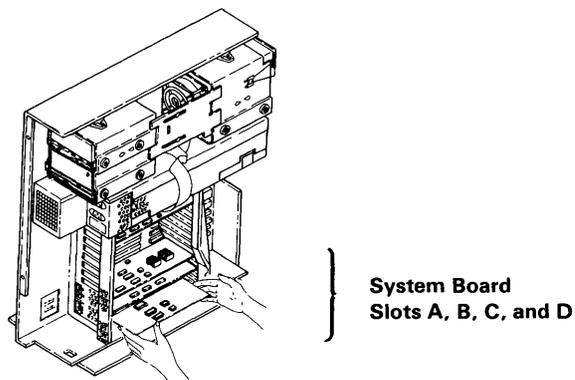
**Correctly
Aligned**

9. Install the screw you removed in step 2.

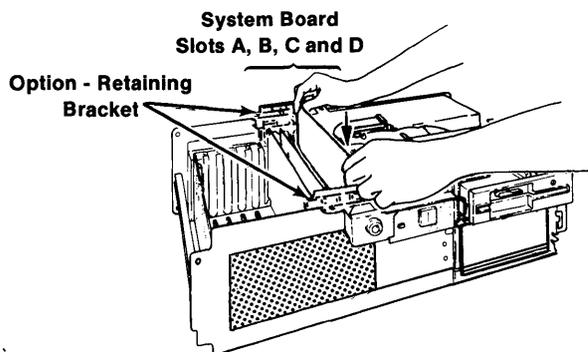


Adapters in system board slots B, C, and D have no screws or brackets. Slide these adapters into the slots as in Steps 6 and 7.

In IBM 6150, the left cover holds these adapters in place.



In IBM 6151, the plastic option retainers hold the adapters in place. Open the retainers, slide the adapters into the slots as in Steps 6 and 7, and close the retainers.



Refer to the system unit diagram for the locations of the adapters. Use the table of contents and go to the instructions for the specific adapter.

Installing the Covers on the System Units

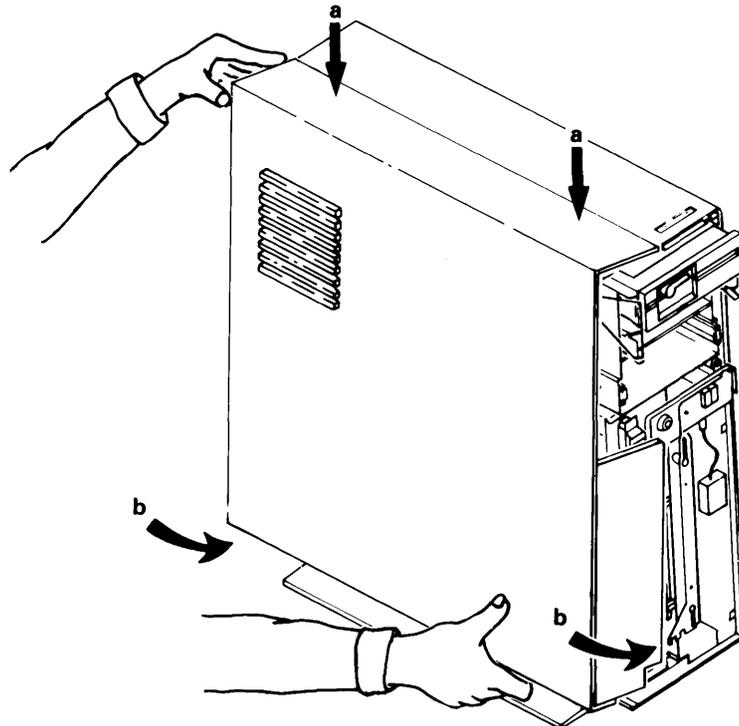
Ensure that you have installed all options before you install the covers on the system unit.

Note: Do not operate the system unit with the covers removed. Operating with the covers on ensures adequate cooling of the components.

IBM 6150 System Unit

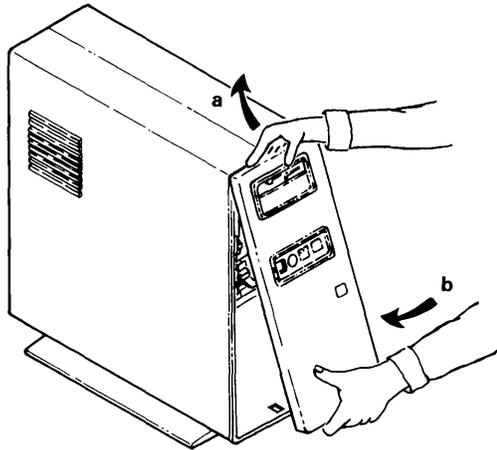
Do the following to install the covers on IBM 6150:

1. To install the left side cover:
 - a. Insert the top hooks in the loops in the top of the frame.
 - b. Rotate the bottom of the cover inward and snap the cover in place.

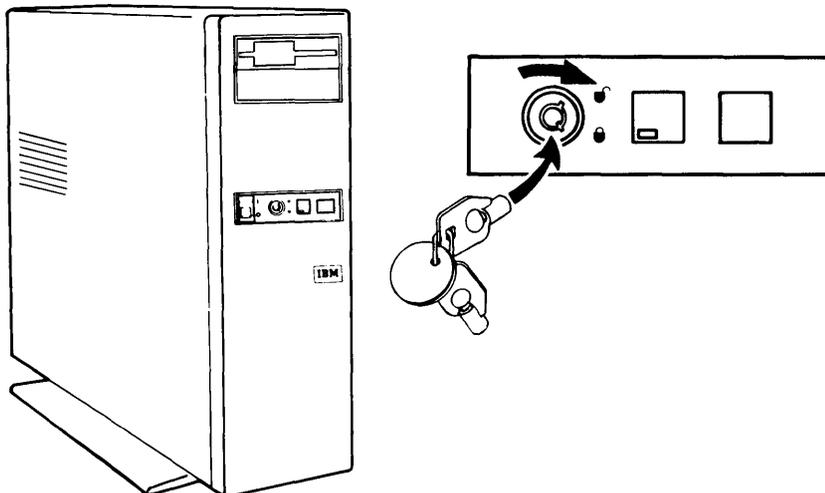


2. To install the front cover:

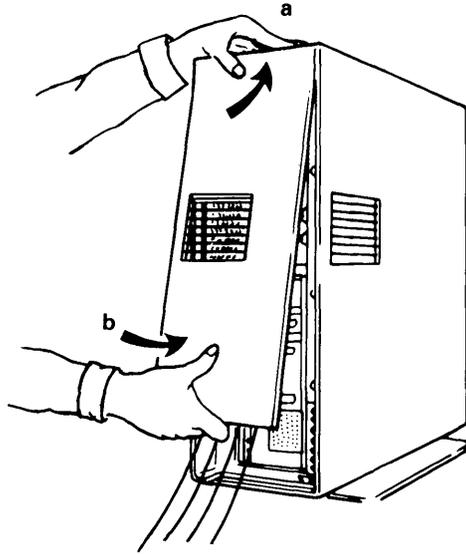
- a. Insert the hooks under the top cover edge.
- b. Rotate the cover in and snap the cover in place.



3. Insert the key into the keylock and turn the key clockwise.



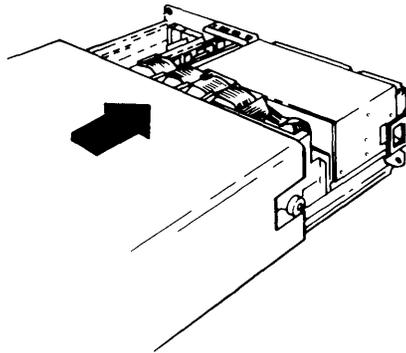
-
4. Connect any cables you disconnected earlier. Arrange the cables so that you can fit the rear cover in place.



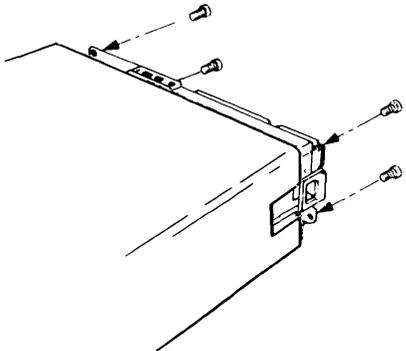
IBM 6151 System Unit

Ensure that you have installed all optional adapters before you put the cover on the system unit. Do the following:

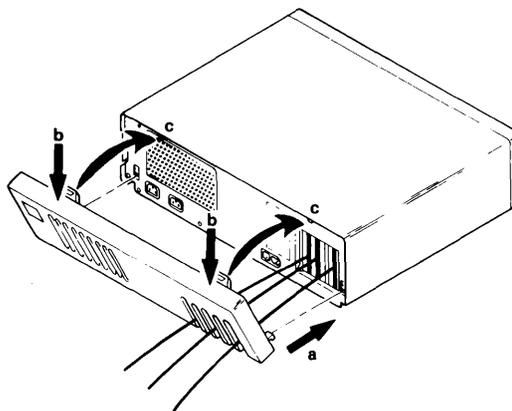
1. To install the top cover, face the front of the system unit and slide the cover over the unit. Ensure that all cables are safely pushed out of the way.



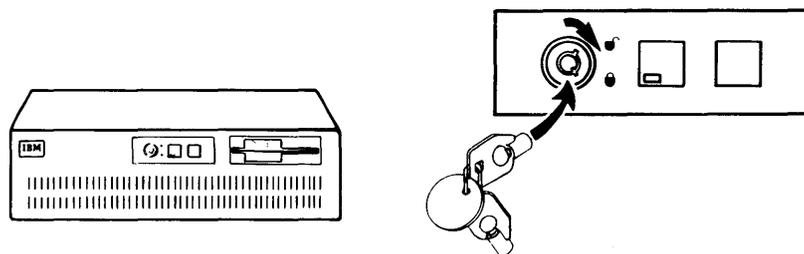
2. Fit the rear cover plate in place. Tighten the screws.



-
3. Connect any cables you disconnected earlier. Then, to install the rear cover, slide the cables into the slots in the cover.
 - a. Insert the bottom hooks into the holes.
 - b. Push down on the cover.
 - c. Insert the top clips into the loops.



4. Insert the key into the keylock and turn the key clockwise.



After you have installed the options, you need to record the hardware changes on the record stored in the system. Go to *IBM RT PC Problem Determination Guide* to find the Diagnostics 1 (DIAG-1) diskette and run the diagnostics. On the DIAGNOSTIC SELECTION menu, select option 1, System Checkout.

If you need to set up the system, go to the check list in Section 1 of *IBM RT PC User Setup Guide* for instructions to continue the setup process.

Section 4. Processor Options

CONTENTS

About This Section	4-3
Installing Processor Options	4-4
IBM RT PC Personal Computer AT Coprocessor Option	4-5
IBM RT PC Floating-Point Accelerator	4-7
IBM Advanced Floating-Point Accelerator	4-8

About This Section

The following pages show how to install various processing options. None of the option cards connect to devices outside of the system units.

Installing Processor Options

CAUTION

Turn off the power on the system unit and unplug the power cable from the electrical outlet.

If you have not removed the covers, see “Removing the Covers From the System Units” on page 1-4.

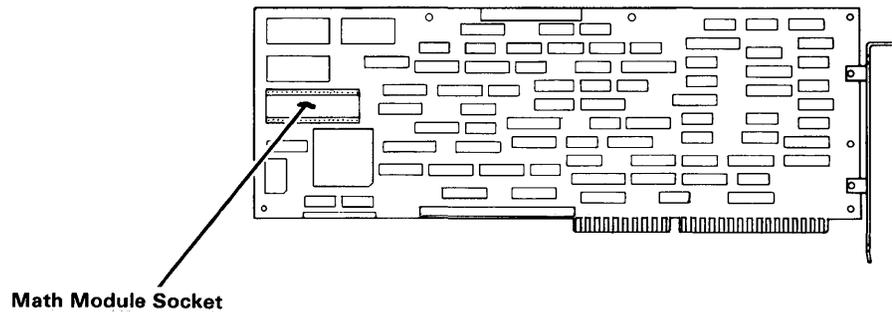
You may carefully lay the IBM 6150 system unit on its side to install adapters, if you need to do so.

Refer to “General Instructions” on page 3-4 when necessary for information on installing adapters.

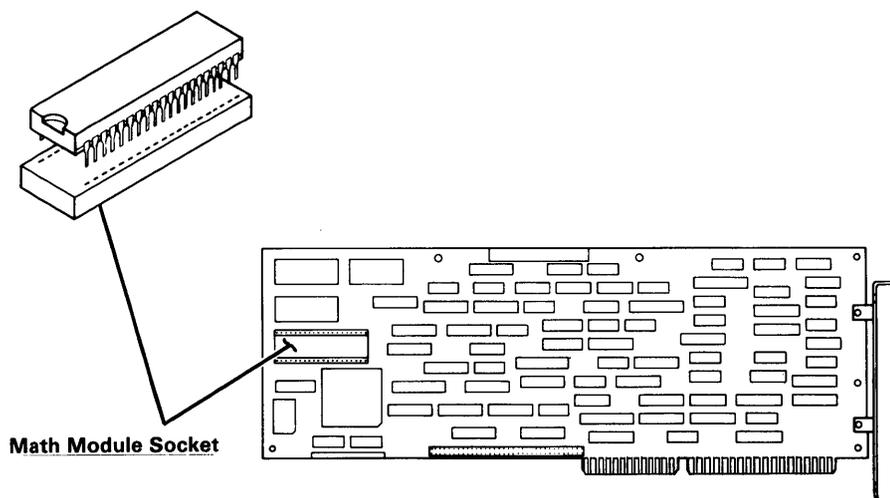
IBM RT PC Personal Computer AT Coprocessor Option

You can install one IBM RT PC Personal Computer AT Coprocessor Option in a system unit.

If you have the IBM Personal Computer AT Math Co-Processor, install it in the position shown in the following drawing:



To install the IBM Personal Computer AT Math Co-Processor, align the pins on the module with the connector on the IBM RT PC Personal Computer AT Coprocessor Option. Align the notch on the module with the notch on the connector. Press the module into place.

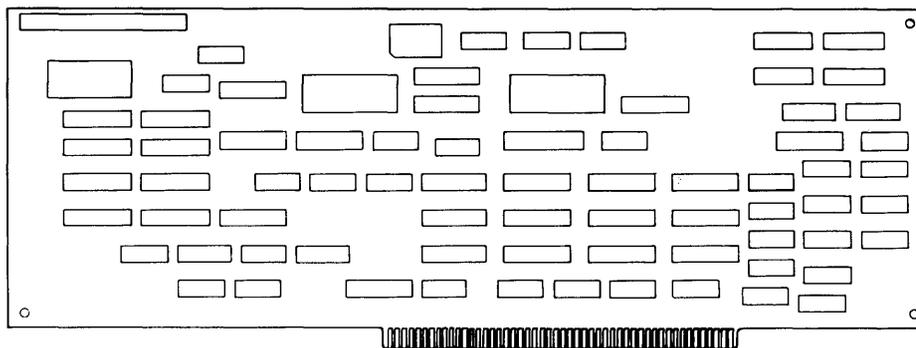


Warning: You must install the IBM RT PC Personal Computer AT Coprocessor Option in adapter slot 8 in IBM 6150 and in adapter slot 5 in IBM 6151.

Installing: See the system unit diagram for the correct adapter slot.

IBM RT PC Floating-Point Accelerator

You can install one IBM RT PC Floating-Point Accelerator in a system unit.

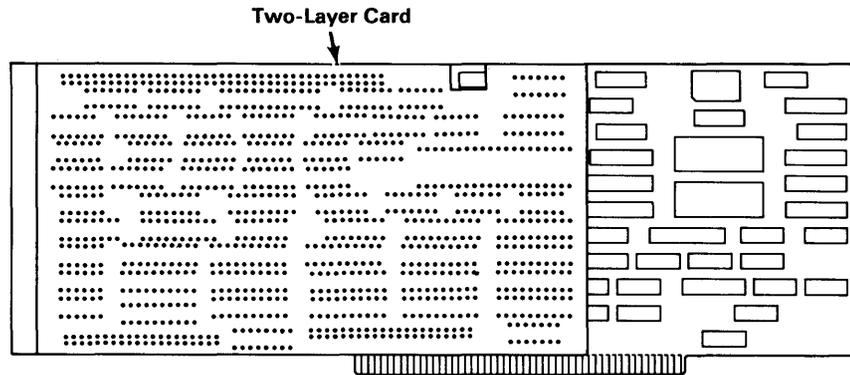


Warning: You must install this option in system board slot B.

Installing: See the system unit diagram for the location of system board slot B.

IBM Advanced Floating-Point Accelerator

You may install one IBM Advanced Floating-Point Accelerator in a system unit.



Warning: This option replaces the IBM RT PC Floating-Point Accelerator, if installed, and must be located in slot B of the system board.

Installing: See the system unit diagram for the location of system board slot B.

Section 5. Memory Options

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IBM RT PC 1MB Memory Expansion Option	5-7
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IBM RT PC 4MB Memory Expansion Option	5-9
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IBM RT PC 8MB Fast Memory Expansion Option	5-11

About This Section

The following memory options supply additional memory for the system. Memory board modules may be in different locations, depending on the manufacturer. The module positions do not effect the function of the memory option, and installation of the option remains unchanged.

Installing Memory Options

CAUTION

Turn off the power on the system unit and unplug the power cable from the electrical outlet.

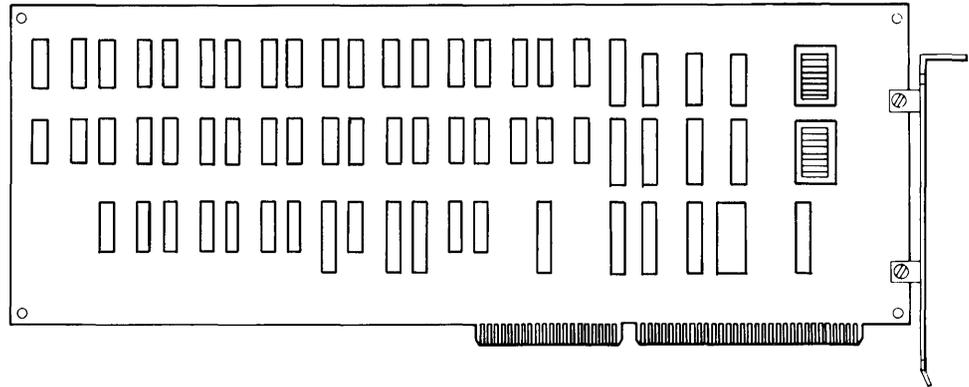
If you have not removed the covers, see “Removing the Covers From the System Units” on page 1-4.

Memory option slot assignments differ, depending on which memory option or combination of memory options you choose.

Refer to “General Instructions” on page 3-4 when necessary for information on installing adapters.

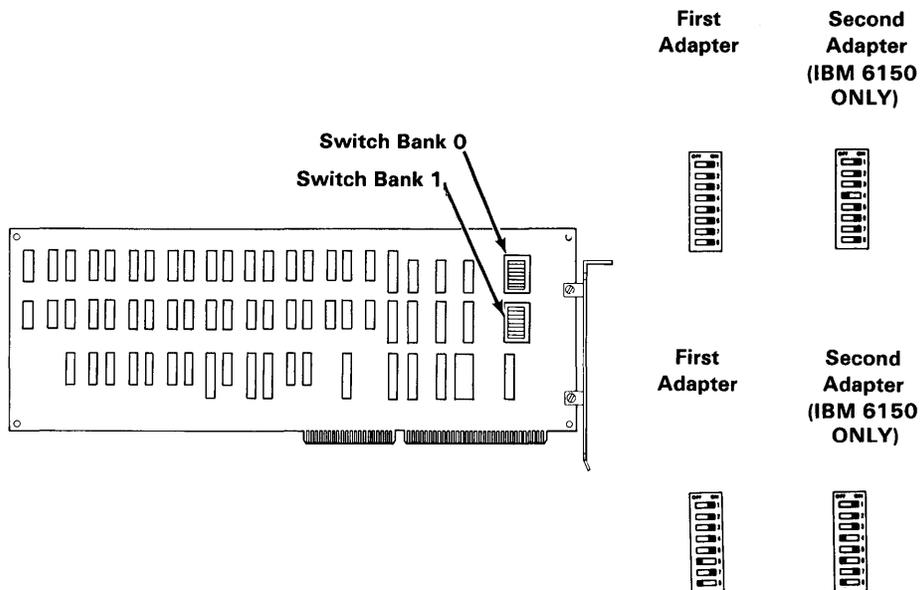
IBM Personal Computer AT 512KB Memory Expansion Option

You can install two IBM Personal Computer AT 512KB Memory Expansion Options in IBM 6150 and one in IBM 6151.



Note: The IBM Personal Computer AT 512KB Memory Expansion Option should only be used in conjunction with the IBM RT PC Personal Computer AT Coprocessor Option.

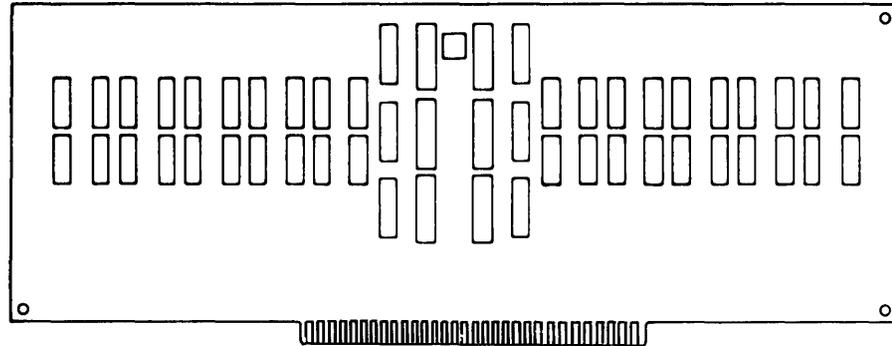
If you need to reset the switches, use an opened paper clip or a ball-point pen to do so. Set the switches as shown in the following drawing:



Warning: Do not install this adapter in slot 8 in IBM 6150 or in slot 5 in IBM 6151.

Installing: This adapter can be installed in adapter slot 2, 4, 5, or 7 in the IBM 6150 and in adapter slot 2, 3, or 4 in the IBM 6151. See the system unit diagram to locate the adapter slots.

IBM RT PC 1MB Memory Expansion Option



The IBM RT PC 1MB Memory Expansion Option is designed for use *only* with the IBM RT PC Processor and Memory Management Card.

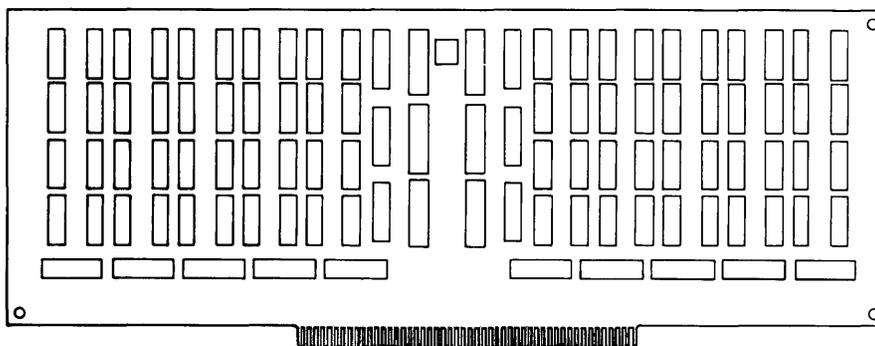
Warning: You must install this memory option in system board slot C or D.

Installing: When the IBM RT PC 1MB Memory Expansion Option is used alone, it should be installed in slot C.

When the IBM RT PC 1MB Memory Expansion Option is used with another memory option, the smaller capacity memory option should be installed in slot D. Both memory options *must* be designed for use with the IBM RT PC Processor and Memory Management Card.

See the system unit diagram for the correct adapter slot.

IBM RT PC 2MB Memory Expansion Option



The IBM RT PC 2MB Memory Expansion Option is designed for use *only* with the IBM RT PC Processor and Memory Management Card.

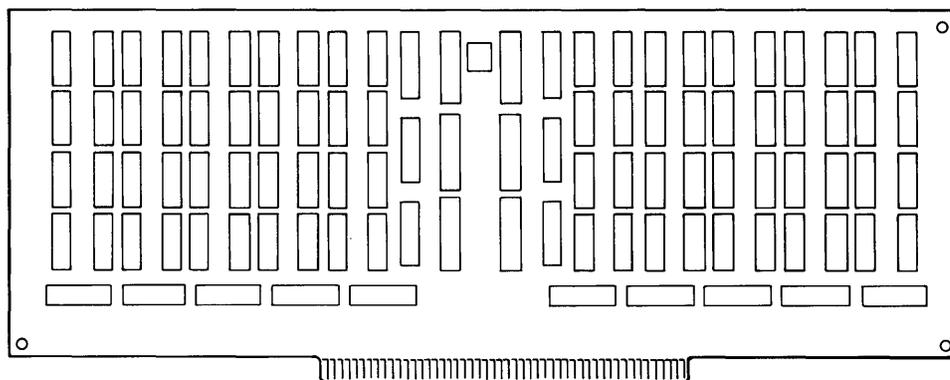
Warning: You must install this memory option in system board slot C or D.

Installing: When the IBM RT PC 2MB Memory Expansion Option is used alone, it should be installed in slot C.

When the IBM RT PC 2MB Memory Expansion Option is used with another memory option, the smaller capacity memory option should be installed in slot D. Both memory options *must* be designed for use with the IBM RT PC Processor and Memory Management Card.

See the system unit diagram for the correct adapter slot.

IBM RT PC 4MB Memory Expansion Option



The IBM RT PC 4MB Memory Expansion Option is designed for use *only* with the IBM RT PC Processor and Memory Management Card.

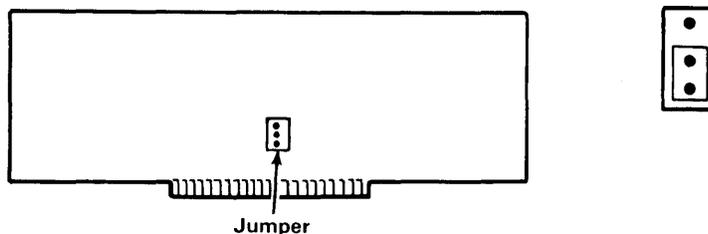
Warning: You must install this memory option in system board slot C or D.

Installing: When the IBM RT PC 4MB Memory Expansion Option is used alone, it should be installed in slot C.

When the IBM RT PC 4MB Memory Expansion Option is used with a second memory option, the smaller capacity memory option should be installed in slot D. Both memory options *must* be designed for use with the IBM RT PC Processor and Memory Management Card.

See the system unit diagram for the correct adapter slot.

IBM RT PC 4MB Fast Memory Expansion Option



The IBM RT PC 4MB Fast Memory Expansion Option is designed for use *only* with the IBM RT PC Advanced Processor Card (APC). The IBM RT PC 4MB Fast Memory Expansion Option can be identified by the inscription “4MB Enhanced ECC Memory.”

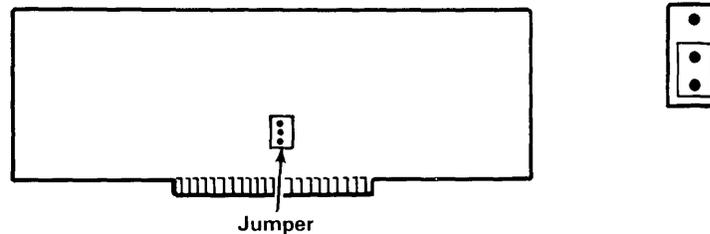
Warning: You must install this memory option in system board slot C or D.

Installing: When the IBM RT PC 4MB Fast Memory Expansion Option is used alone, it should be installed in slot C.

When the IBM RT PC 4MB Fast Memory Expansion Option is used with a second memory option, the smaller capacity memory option should be installed in slot D. Both memory options *must* be designed for use with the IBM RT PC Advanced Processor Card.

See the system unit diagram for the correct adapter slot.

IBM RT PC 8MB Fast Memory Expansion Option



The IBM RT PC 8MB Fast Memory Expansion Option is designed for use *only* with the IBM RT PC Advanced Processor Card (APC).

The IBM RT PC 8MB Fast Memory Expansion Option can be identified by the inscription “8MB Enhanced ECC Memory.”

Warning: You must install this memory option in board slots C or D.

Installing: When the IBM RT PC 8MB Fast Memory Expansion Option is used alone, it should be installed in slot C.

When the IBM RT PC 8MB Memory Expansion Option is used with a second memory option, the smaller capacity memory option should be installed in slot D. Both memory options *must* be designed for use with the IBM RT PC Advanced Card.

See the system unit diagram for the correct adapter slot.

Section 6. Communication and Network Adapter Options

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About This Section

Communication and network adapters allow the system to communicate with other systems, terminals, work stations, modems, printers, and plotters. On IBM 6150, you can also use Serial Ports 1 and 2 for these connections.

Installing Communication and Network Options

CAUTION

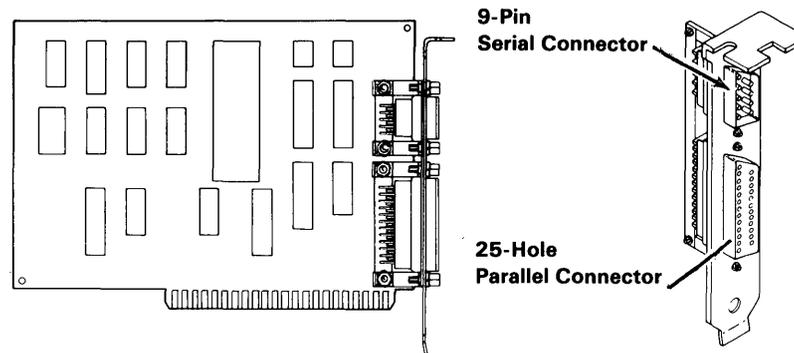
Turn off the power on the system unit and unplug the power cable from the electrical outlet.

If you have not removed the covers, see “Removing the Covers From the System Units” on page 1-4.

Refer to “General Instructions” on page 3-4 when necessary for information on installing adapters.

IBM Personal Computer AT Serial/Parallel Adapter

You may install a total of two IBM Personal Computer AT Serial/Parallel Adapters in the system unit. See “Federal Communications Commission (FCC) Statement” on page v.



Jumper Module Positions

Whether or not you use the IBM Monochrome Display and Printer Adapter together with one or two IBM Personal Computer AT Serial/Parallel Adapters determines the position of jumper modules on each serial/parallel adapter.

After locating your system configuration in the examples on the next page, use the instructions there and on following pages to set the appropriate jumper modules.

Note: Because of the varied parallel printer port configurations that are possible when the IBM Monochrome Display and Printer Adapter is used with one or two IBM Personal Computer AT Serial/Parallel Adapters, ensure that the parallel printer ports are correctly set up with the AIX DEVICES command. Refer to “Adapter Conflicts” on page 1-19 for more information.

- **IBM Monochrome Display and Printer Adapter not used**
 - The first adapter jumper modules should be set to the primary (Interrupt Level 4 for the serial jumper and Interrupt Level 7 for the parallel jumper) position.
 - The second adapter jumper modules should be set to the alternate positions (Interrupt Level 3 for the serial jumper and Interrupt Level 5 for the parallel jumper).
- **IBM Monochrome Display and Printer Adapter used**
 - With *one* IBM Personal Computer AT Serial/Parallel Adapter:

Set the jumper modules to the alternate position (Interrupt Level 3 for the serial jumper and Interrupt Level 5 for the parallel jumper).
 - With *two* IBM Personal Computer AT Serial/Parallel Adapters:

The first adapter jumper modules should be set to the alternate positions (Interrupt Level 3 for the serial jumper and Interrupt Level 5 for the parallel jumper).

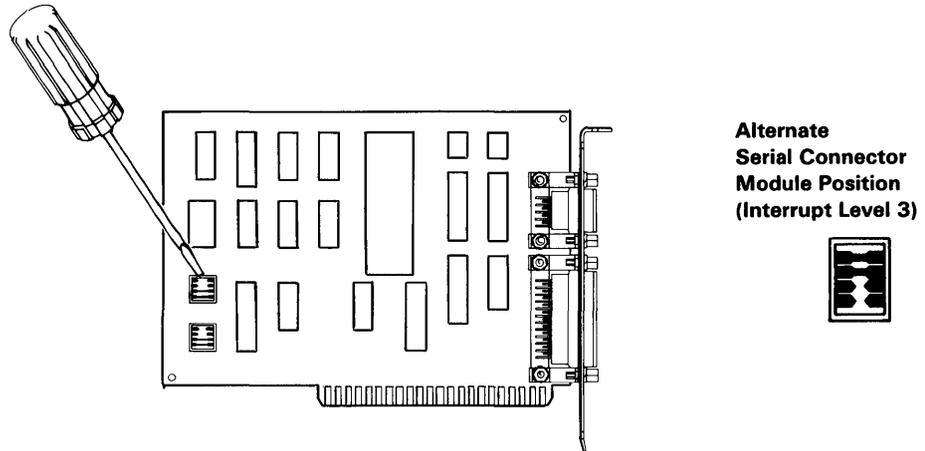
The second adapter jumper modules should be set to the primary position (Interrupt Level 4 for the serial jumper and Interrupt Level 7 for the parallel jumper).

Note: The parallel port of the second serial/parallel adapter is not used in this case. Ensure that the parallel port of the second adapter is not activated by the AIX DEVICES command, or a conflict will exist on Interrupt Level 7.

Serial Jumper Module

To change the serial jumper module position, do the following:

1. Locate the top jumper module, which sets the interrupt level for the serial port.



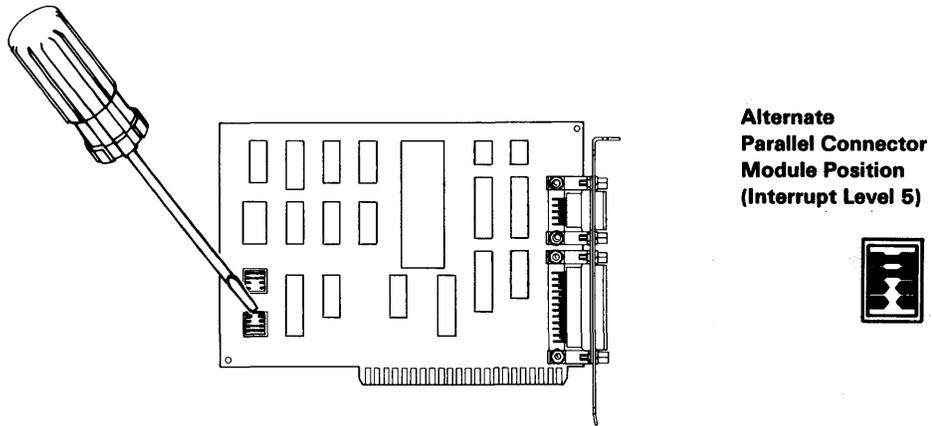
Warning: Do not bend the pins!

2. Carefully insert a small, flat-bladed screwdriver under the module and lift, alternating ends to lift the module evenly.
3. Rotate the jumper module to the desired position, and reinstall.

Parallel Jumper Module

To change the parallel jumper module position, do the following:

1. Locate the bottom jumper module, which sets the interrupt level for the parallel connector.

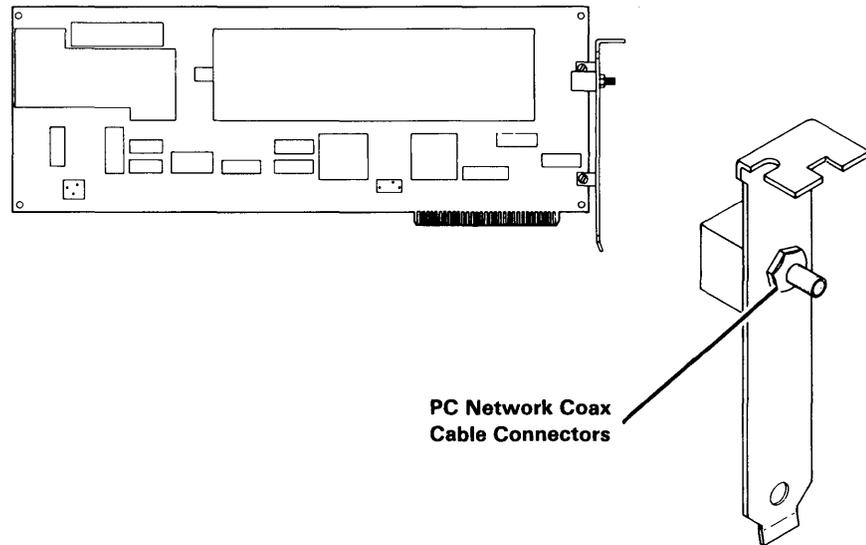


2. Carefully insert a small, flat-bladed screwdriver under the module and lift, alternating ends to lift the module evenly.
3. Rotate the jumper module to the desired position, and reinstall.

Installing: You may install this adapter in adapter slots 2 through 8 in IBM 6150 and in slots 1 through 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

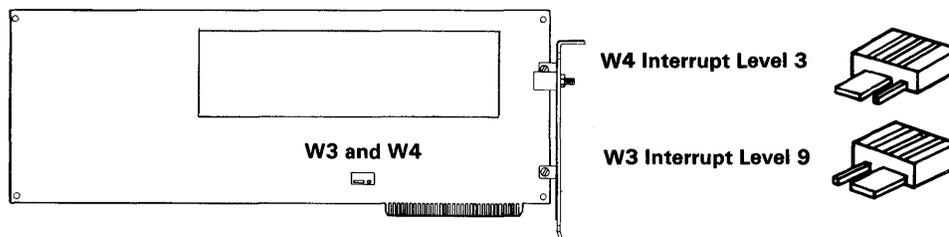
IBM PC Network Adapter

You can install one IBM PC Network Adapter in an IBM RT PC System Unit. See “Federal Communications Commission (FCC) Statement” on page v.



The jumpers on this adapter can be set to either interrupt level 3 or 9. If you have the IBM PC Enhanced Graphics Adapter or the IBM Personal Computer 3278/79 Emulation Adapter, ensure that the interrupt level on the IBM PC Network Adapter is set to 3, since these other two adapters use 9. To set the interrupt level to 3, set jumper W4 as shown. To set the interrupt level to 9, set the same jumper (called W3 when set at 9) as shown in the illustration below.

Note: See *Installing and Customizing the AIX Operating System* for additional information about interrupt conflicts. Also see “Adapter Conflicts” on page 1-19.

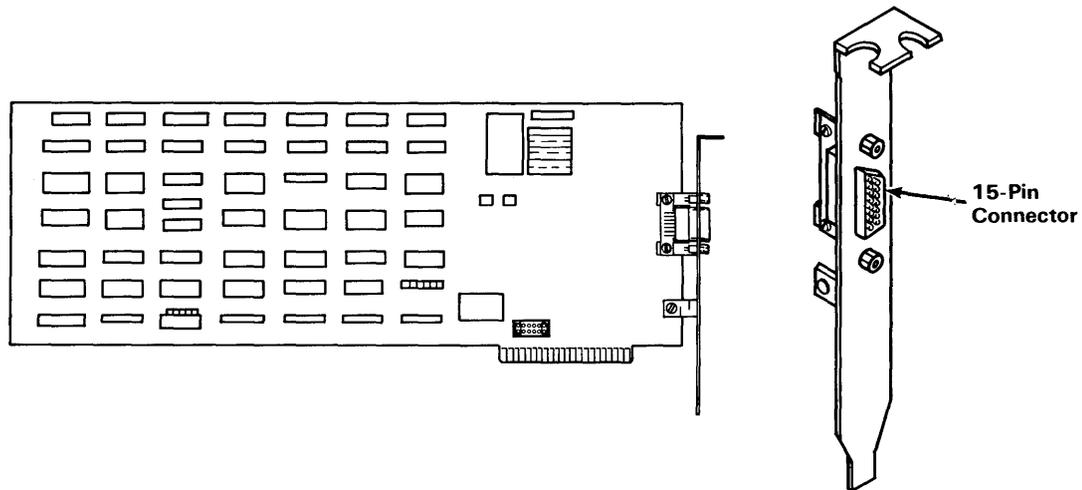


Installing: You can install this adapter in slots 2 through 8 in IBM 6150 and in slots 1 through 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

In IBM 6151, you can more easily connect cables if you install the adapter in a slot other than adapter slot 1.

IBM RT PC Baseband Adapter

You can install two IBM RT PC Baseband Adapters in an IBM RT PC System Unit. The Baseband Adapter is used with the Ethernet¹ Network. See "Federal Communications Commission (FCC) Statement" on page v.



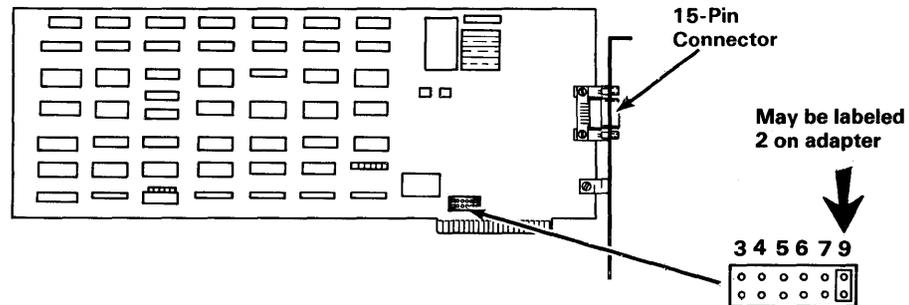
Note: Use the instructions on the following pages to set the jumpers on the Baseband adapter.

¹ Registered trademark of Xerox Corporation

Interrupt Selection Jumper (W9)

Set the interrupt level of the Interrupt Selection Jumper to any of the available interrupt levels except interrupt 6, which is used by the diskette drives. If you are using two Baseband Adapters, ensure that different interrupt levels have been selected. See "Adapter Conflicts" on page 1-19.

Note: The factory setting for this jumper is interrupt 9.

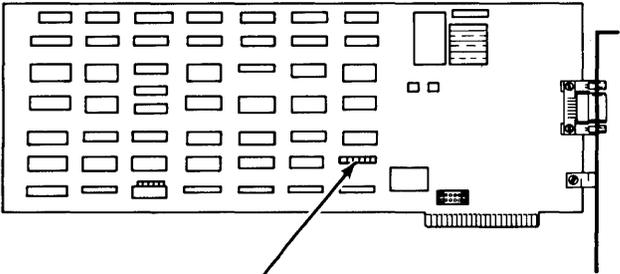


I/O Memory Address Jumpers (W10-W13)

When using two Baseband Adapters, you must change the factory-set I/O memory address of one. Note the configuration of jumpers W10-W13, and use the following chart to select a different address.

When using a single Baseband Adapter, you may change the I/O memory address jumpers W10-W13 to an alternate setting listed below.

Note: Ensure that memory addresses do not conflict with those of other adapter options. See “Conflicting Memory Addresses” on page 1-19.

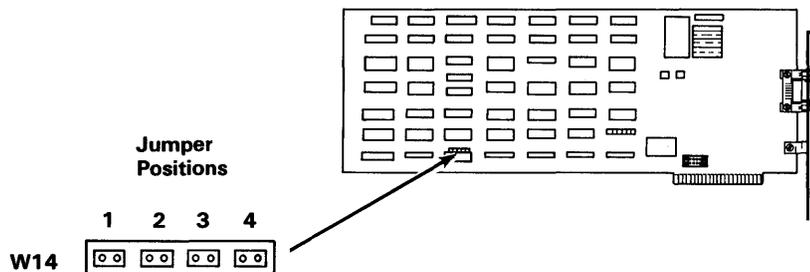


I/O Memory Address

	W10	W11	W12	W13		
080000					0C0000	
088000					0C8000	
090000					0D0000	
098000					0D8000	
0A0000					0E0000	
0A8000					0E8000	
0B0000					0F0000	
0B8000					0F8000	

Software Interrupt Timer Jumper (W14)

The setting of W14 determines the interrupt request rate. Use the following chart to set the jumper to the desired setting.



Position 1	Interrupts every 9.1 ms
Position 2	Interrupts every 18.3 ms
Position 3	Interrupts every 36.6 ms
Position 4	Interrupts every 73.2 ms

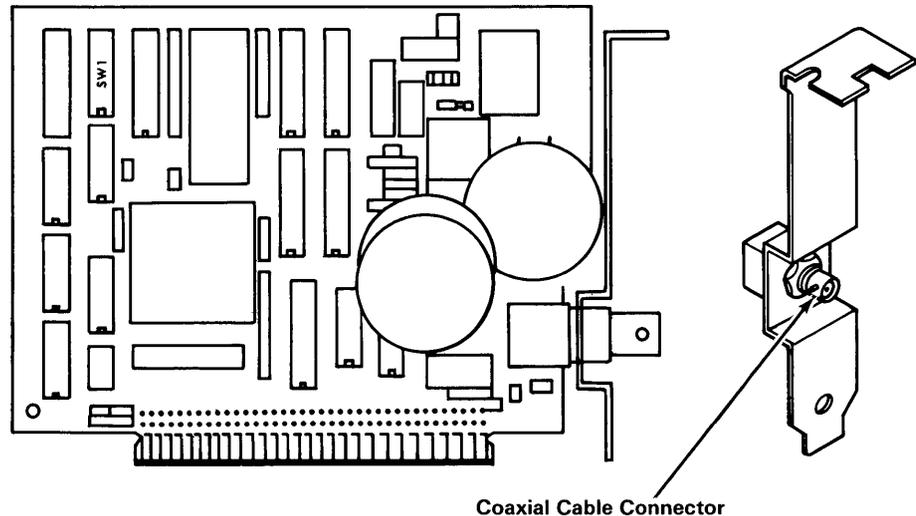
Installing: You can install this adapter in slots 2 through 7 in IBM 6150 and in slots 1 through 4 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

In IBM 6151, you can more easily connect cables if you install the adapter in a slot other than adapter slot 1.

IBM Personal Computer 3278/79 Emulation Adapter

There are two versions of 3278/79 Emulation Adapters in use. The long adapter is the earlier design and has no jumper or switch settings. You may install one early version adapter per system unit. The later, short adapter version has a switch bank, and up to four adapters of this version may be installed per system unit. See "Federal Communications Commission (FCC) Statement" on page v.

Warning: The early, long adapter version of the 3278/79 Emulation Adapter cannot be used in the same machine with the later, short version, nor can the long adapter be used with the IBM PC 3278/79 Emulation Adapter Distributed Function Terminal (DFT) Device Driver.



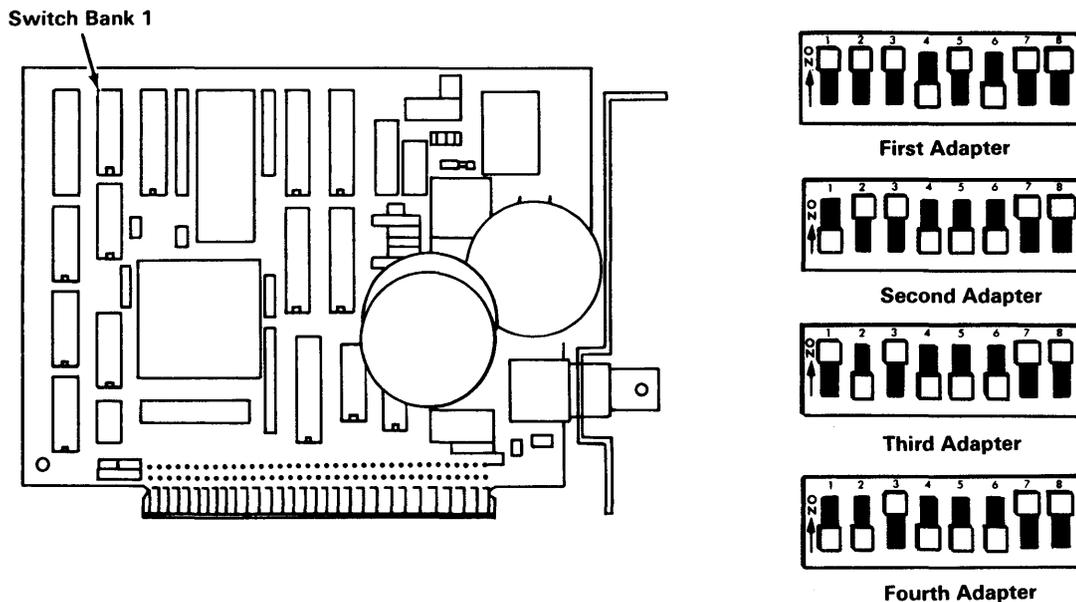
Note: The connector extends beyond the bracket. Rotate or tilt the adapter to install it.

Use the table on the following page to set the switches on the short adapter version.

Setting Switch Bank 1

Set Switch Bank 1 as shown below.

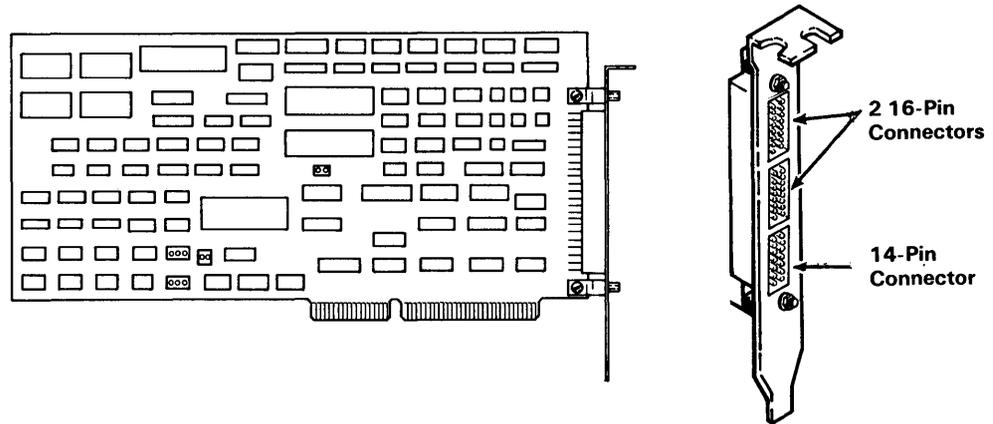
Note: Remove any tape that may be covering the switch bank.



Installing: You may install this adapter in slots 2 through 8 in the IBM 6150 and in slots 1 through 5 in the IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

IBM RT PC Multiprotocol Adapter

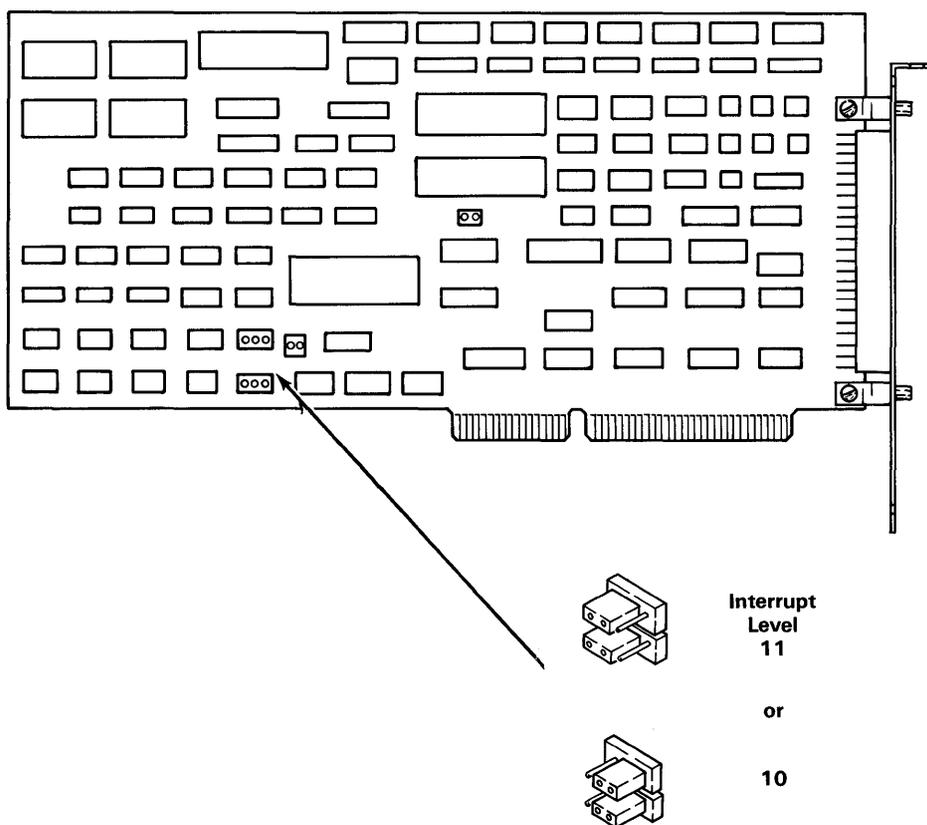
You may install two Multiprotocol Adapters in a system unit. See “Federal Communications Commission (FCC) Statement” on page v.



Note: Use the instructions on the following pages to set the jumpers on the Multiprotocol Adapter.

Interrupt Level Jumper

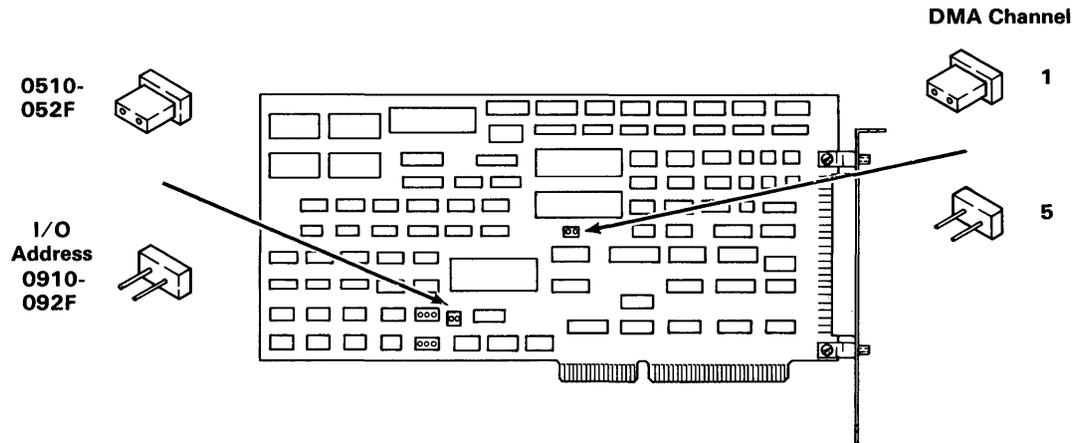
Use the following figure to set the interrupt level at 11 or 10. If you are using two Multiprotocol Adapters, ensure that each has a different interrupt level. For more information, refer to "Adapter Conflicts" on page 1-19.



I/O Address and DMA Channel Jumpers

The I/O Address and DMA Channel Jumpers have two settings each. If you are using two Multiprotocol Adapters, ensure that each adapter is set to a different interrupt level. For more information, refer to "Adapter Conflicts" on page 1-19.

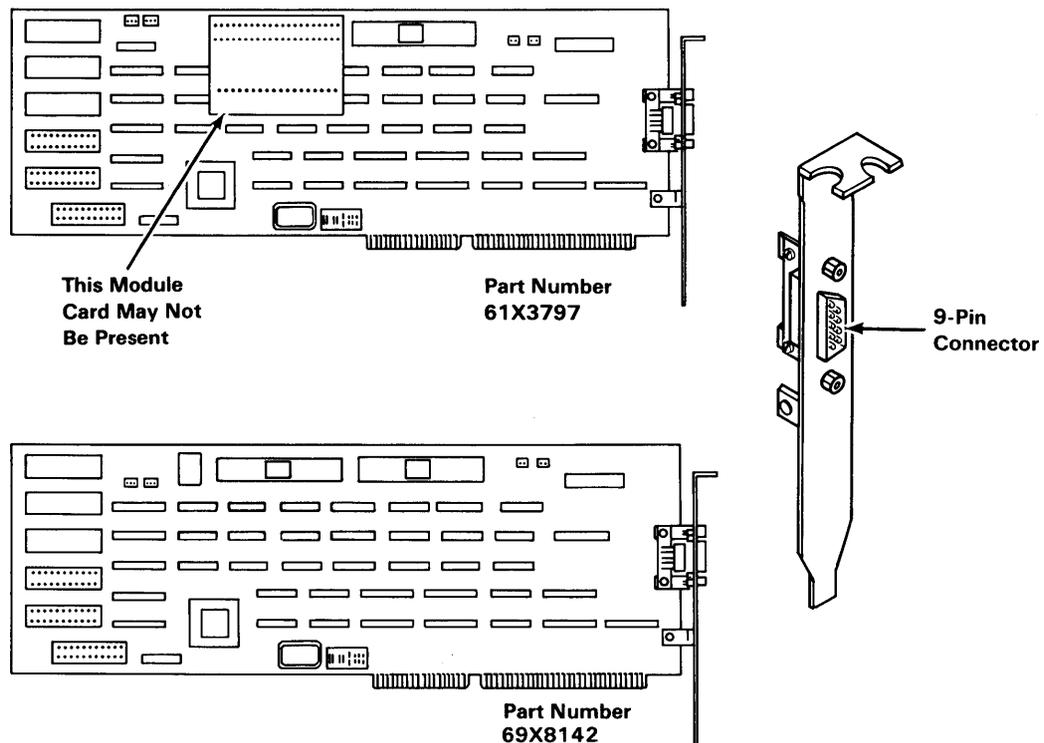
Set the jumpers as shown below.



Installing: You can install this adapter in slots 2, 4, 5, 7, or 8 in IBM 6150 and in slots 2, 3, 4, or 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

IBM Token-Ring Network RT PC Adapter

The IBM Token-Ring Network RT PC Adapter exists in two versions, distinguishable by part number and module placement. The number of IBM Token-Ring Network RT PC Adapters that can be installed in an IBM RT PC System Unit depends on the version or combination of versions used. See "Federal Communications Commission (FCC) Statement" on page v.



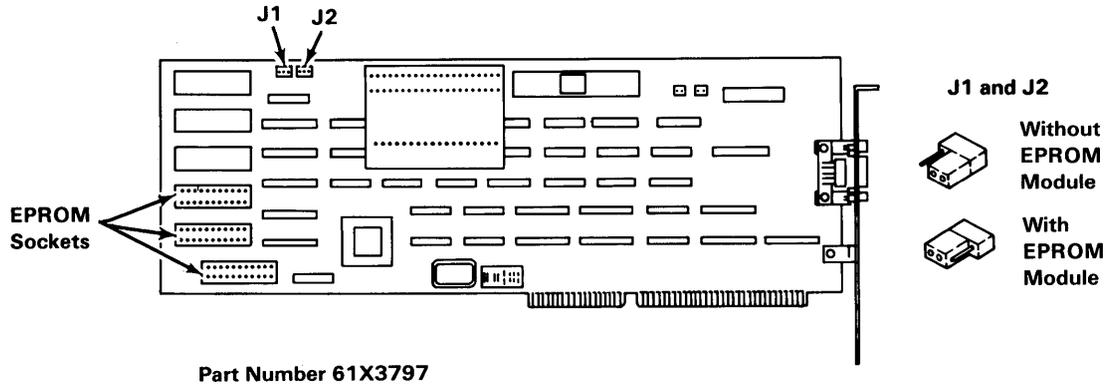
Use the instructions on the following pages to set the jumpers on both adapter versions.

IBM Token-Ring Network RT PC Adapter (Part Number 61X3797)

You may install up to two adapters of this version in an IBM RT PC System Unit.

EPROM Jumpers

The position of jumpers J1 and J2 is determined by the presence of EPROM modules.

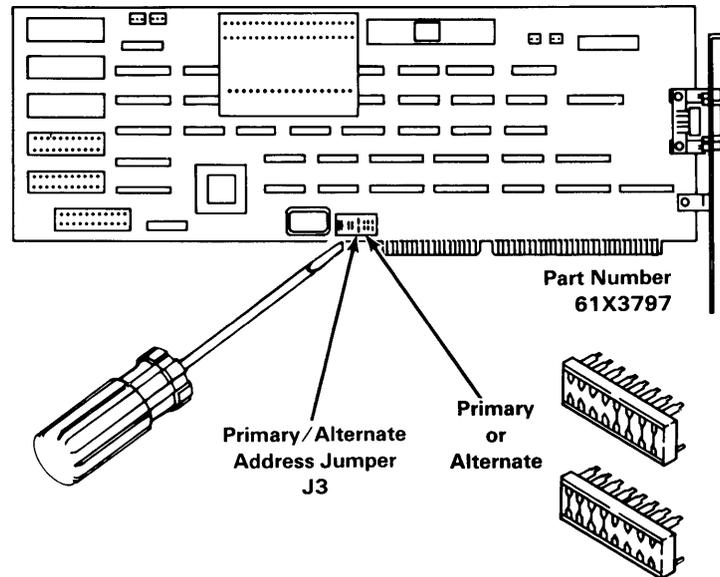


Primary/Alternate Address Jumper

The position of jumper module J3 sets the adapter I/O address as Primary (the default setting) or Alternate. Jumper J3 also sets the DMA level at 5 for Primary and 6 for Alternate. To change J3, do the following:

1. Carefully insert a small, flat-bladed screwdriver under the J3 jumper module, alternately lifting the ends to extract the module evenly.

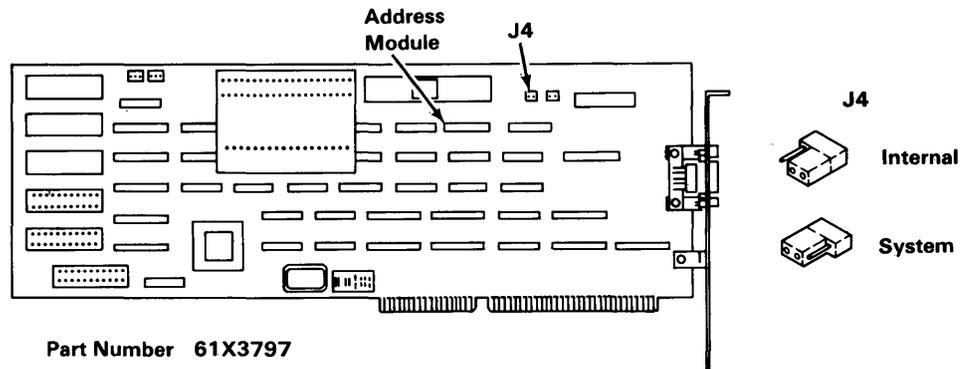
Warning: Do not bend the pins!



2. Turn the module 180° and reinstall.

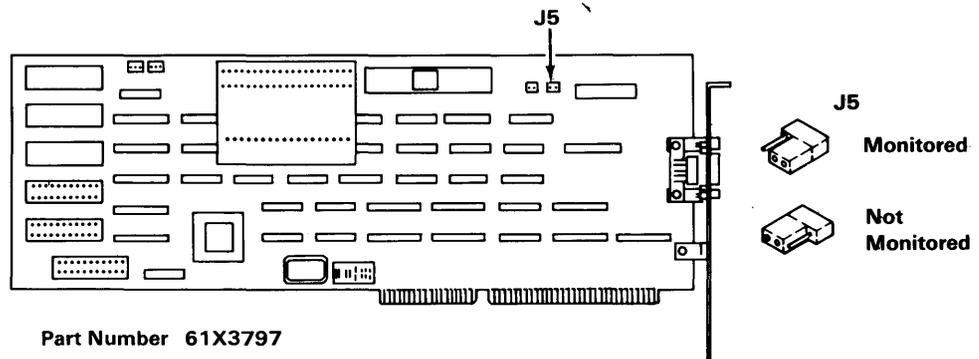
Adapter Address Jumper

The Adapter Address Jumper J4 is used to indicate that an Address Module is present and should be set to the Internal position.



Processor Activity Timer Jumper

The setting of the Processor Activity Timer Jumper J5 determines if processor activity is monitored or not monitored. Jumper J5 should be set to the Monitored position.



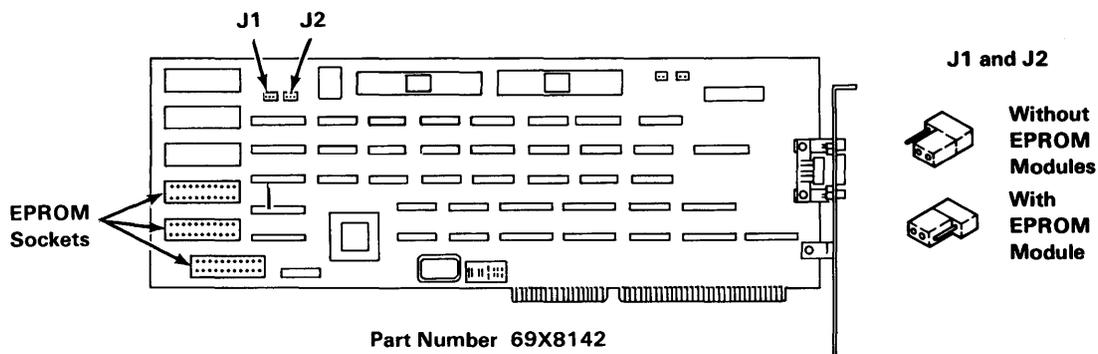
Installing: You may install this adapter in slots 2, 4, 5, 7, and 8 in Model 25 and in slots 2 through 5 in Model 10, whichever is available. See the system unit diagram for slot locations.

IBM Token-Ring Network RT PC Adapter (Part Number 69X8142)

You may install up to four adapters of this version in an IBM RT PC System Unit, depending on whether this version and adapter (Part Number 61X3797) are combined.

EPROM Jumpers

The position of jumpers J1 and J2 is determined by the presence of EPROM modules.

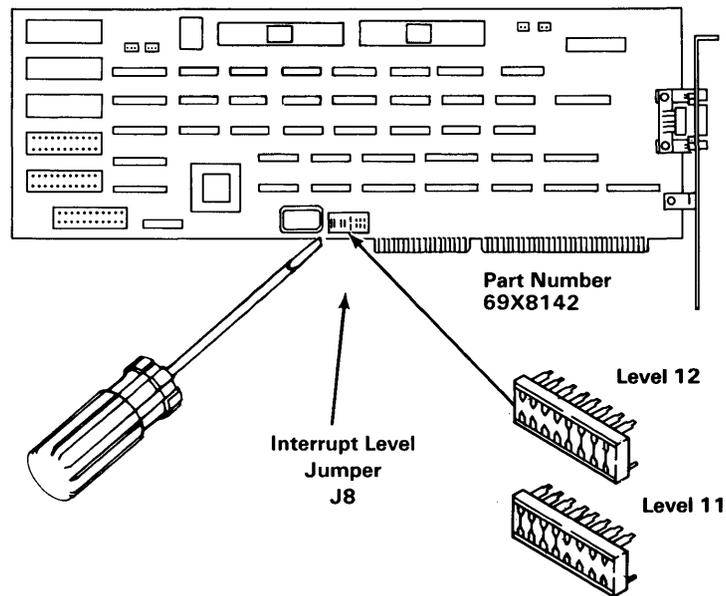


Interrupt Level Select

The position of jumper module J8 determines the interrupt level; level 12 is the default setting. To change J8, do the following:

1. Carefully insert a small, flat-bladed screwdriver under the J8 jumper module, alternately lifting the ends to extract the module evenly.

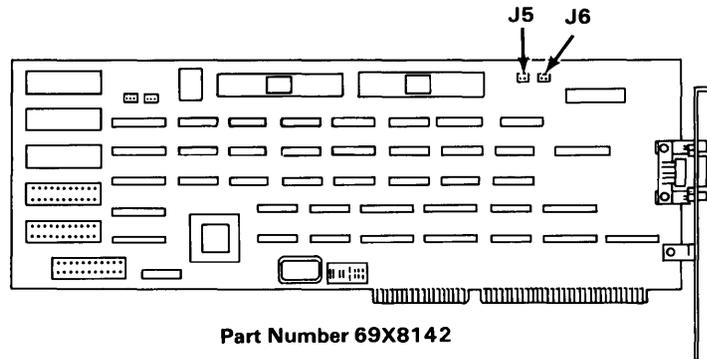
Warning: Do not bend the pins!



2. Turn the module 180° and reinstall.

Selecting the I/O Address

Jumpers J5 and J6 select the I/O address on the adapter (Part Number 69X8142).



Use the table and instructions on the following pages to set jumpers J5 and J6.

- If *only* the adapter (Part Number 69X8142) is being used, select one J5-J6 combination per adapter from the following table.
- If one adapter version (Part Number 61X3797) is used with one or more adapter versions (Part Number 69X8142), only three of the four J5-J6 combinations are available, depending on the setting of J3 on adapter (Part Number 61X3797):
 - When the adapter (Part Number 61X3797) Jumper Module J3 is set for Primary, select one J5-J6 combination per adapter (Part Number 69X8142) from the last three rows of the following table.
 - When the adapter (Part Number 61X3797) Jumper Module J3 is set for Alternate, select one J5-J6 combination per adapter (Part Number 69X8142) from the first, third, or fourth rows of the following table.
- If two adapter (Part Number 61X3797) versions are used with one or more adapter (Part Number 69X8142) versions, only the last two rows in the J5-J6 combination table are available for use with the adapter (Part Number 69X8142) version.

Address	J5	J6
01C0 - 01CF		
0140 - 014F		
11C0 - 11CF		
11D0 - 11DF		

Installing: You may install this adapter in slots 2, 4, 5, 7, and 8 in Model 25 and in slots 2 through 5 in Model 10, whichever is available. See the system unit diagram for the correct slot.

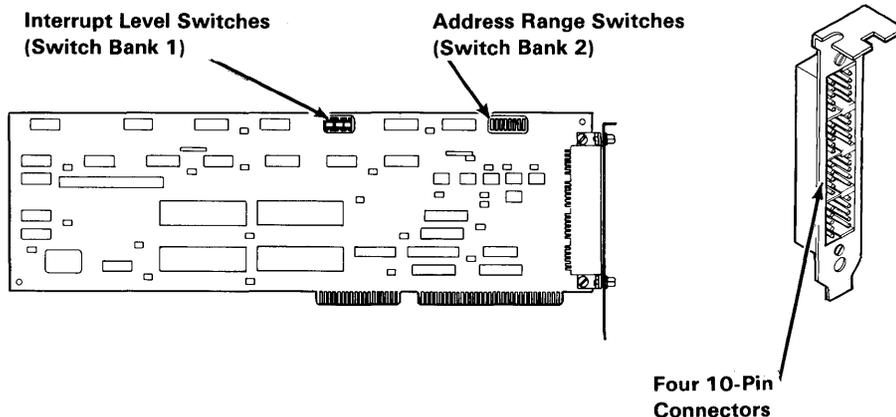
An IBM Token-Ring Network RT PC Adapter with the address range 11CO - 11CF may *not* be installed in slot 8 of Model 25 or in slot 5 of Model 10.

4-Port Asynchronous Adapters

You may install any combination of RS232C and RS422A Asynchronous 4-Port Adapters together with one RT PC 5080 Peripheral Adapter, for a total of four in IBM 6150 and three in IBM 6151.

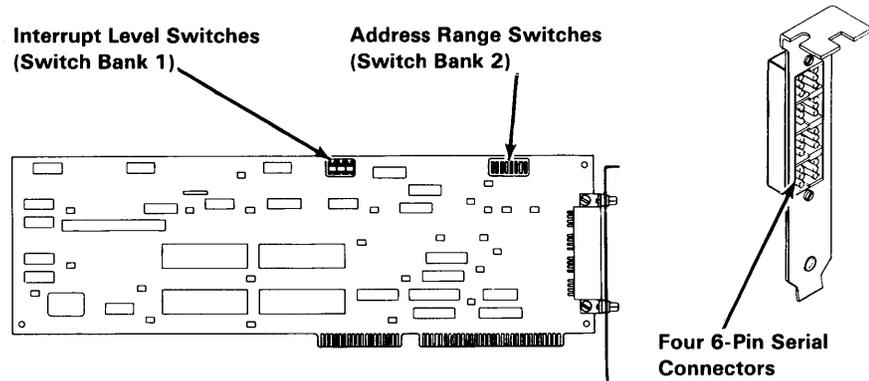
Note: Buffered versions of the RS232C and RS422A 4-Port Asynchronous Adapters can be identified by a plus symbol (+) stamped on the end of the adapter near the cable connector. Both buffered and non-buffered adapters may be installed in the same system.

With the IBM RT PC 4-Port Asynchronous RS232C Adapter and the correct cables, you can connect a system unit to printers, plotters, terminals, or modems located up to 15.2 m (50 ft) from the system unit.



With the IBM RT PC 4-Port Asynchronous RS422A Adapter and the correct cables, you can connect a system unit to ASCII terminals located up to 1212 meters (3963 feet) from the system unit.

Note: If you use cables longer than 122 meters (399 feet), you must provide surge protection. Also, do not install these cables outdoors.



Interrupt Level Switches

Use the following diagram to set the interrupt level on all the 4-port adapters. Nonbuffered 4-Port Asynchronous adapters should be grouped on one interrupt level, and Buffered 4-Port Asynchronous Adapters should be grouped on another, preferably higher, interrupt level.

Interrupt Level 10 is recommended when using the 4-Port Asynchronous Adapter together with the SCSI Adapter. If the 4-Port Asynchronous Adapter is set for Interrupt Level 11, certain functions in the SCSI Adapter may be affected. See “Adapter Conflicts” on page 1-19.

Switch Bank 1

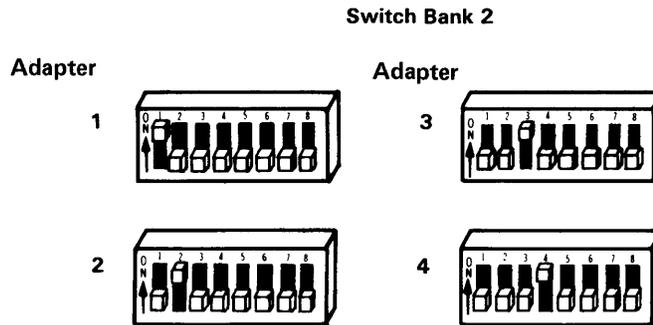


Interrupt Level 9 Interrupt Level 10 Interrupt Level 11

Address Range Switches

The address switches are set for operation of one adapter in a system. If you install more than one adapter, you must set the address switches. Likewise, if you are adding adapters to a system that already has one or more asynchronous adapters installed, you must remove the installed adapters and set the address switches as shown below.

Use an opened paper clip or a ball-point pen to set the address switches.



Installing: You can install either 4-port adapter in adapter slot 2, 4, 5, 7, or 8 in IBM 6150 and in slot 2, 3, 4, or 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

Section 7. Display Adapter Options

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About This Section

The following pages show how to install the adapters to which you connect the display devices. You can install two display adapters in the system unit, but the adapters must be different types.

Installing Display Options

CAUTION

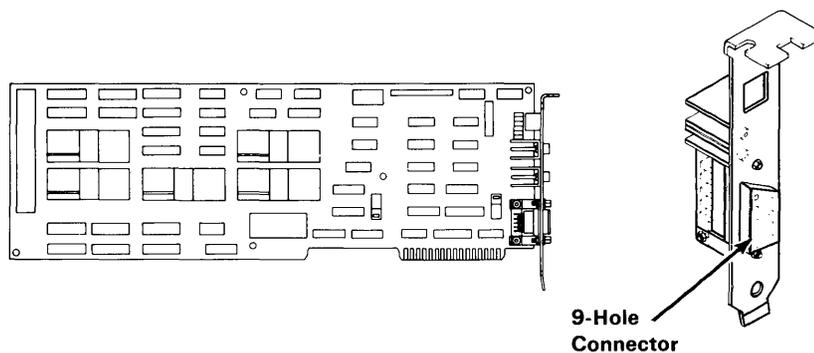
Turn off the power on the system unit and unplug the power cable from the electrical outlet.

If you have not removed the covers, see “Removing the Covers From the System Units” on page 1-4.

Refer to “General Instructions” on page 3-4 when necessary for information on installing adapters.

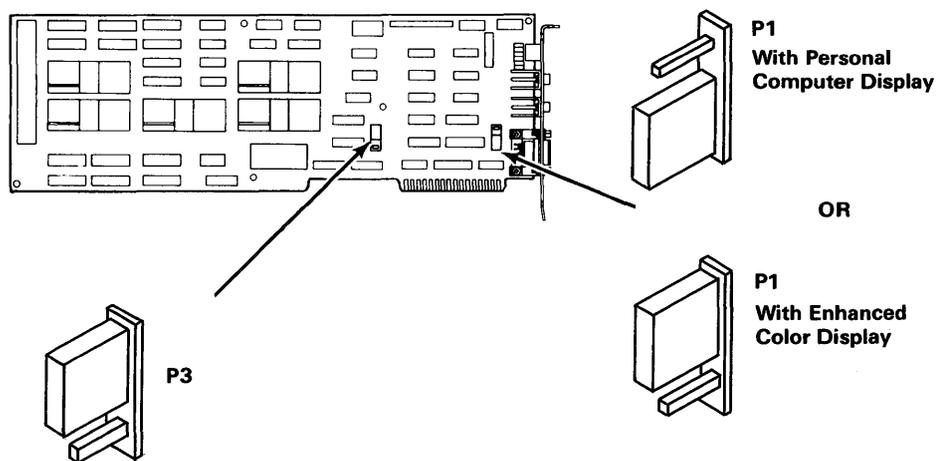
IBM PC Enhanced Graphics Adapter

You can install one IBM PC Enhanced Graphics Adapter in the system unit. This adapter can connect either the IBM Personal Computer Enhanced Color Display or the IBM Personal Computer Display to the system unit. See "Federal Communications Commission (FCC) Statement" on page v.



Jumper Settings

Use the following artwork to set the jumpers.



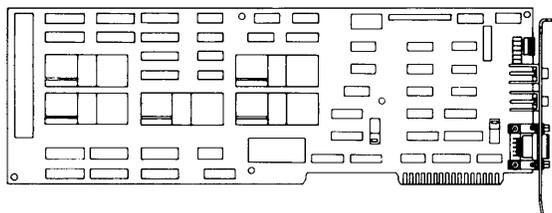
Use the charts on the following pages to correctly set the switches for the display attached to the Enhanced Graphics Adapter.

Switch Settings

Use this table when *one* of the following conditions is present:

- The AT Coprocessor Adapter *is not* installed.
- The display attached to the Enhanced Graphics Adapter *is not* assigned to the AT Coprocessor Adapter.
- The display attached to the Enhanced Graphics Adapter *is* assigned to the AT Coprocessor Adapter in *shared* mode.

Type of Display Attached to the Enhanced Graphics Adapter	Sw1	Sw2	Sw3	Sw4
IBM Personal Computer Enhanced Color Display	Off	On	On	Off
IBM Personal Computer Display	Off	Off	On	Off



Use this table to set the switches if any of the following conditions are present:

- The IBM Personal Computer Display (5151) is attached to the Enhanced Graphics Adapter.
- The IBM Personal Computer Display (5151) is assigned to the AT Coprocessor Adapter in *dedicated* mode.
- Another display is also installed and assigned to the AT Coprocessor Adapter in dedicated mode.

IBM 5151 Display Assignment	Second Display Mode of Operation	Sw1	Sw2	Sw3	Sw4
Primary	80 X 25 Color	Off	Off	On	Off
Primary	40 X 25 Color	On	Off	On	Off
Secondary	80 X 25 Color	Off	On	Off	On
Secondary	40 X 25 Color	On	On	Off	On

Use this table to set the mode switches when any of the following conditions are present:

- The IBM Personal Computer Enhanced Color Display (5154) is attached to the Enhanced Graphics Adapter.
- The IBM Personal Computer Enhanced Color Display (5154) is assigned to the AT Coprocessor Adapter in *dedicated* mode.
- Another display is also installed and assigned to the AT Coprocessor Adapter as a second display.

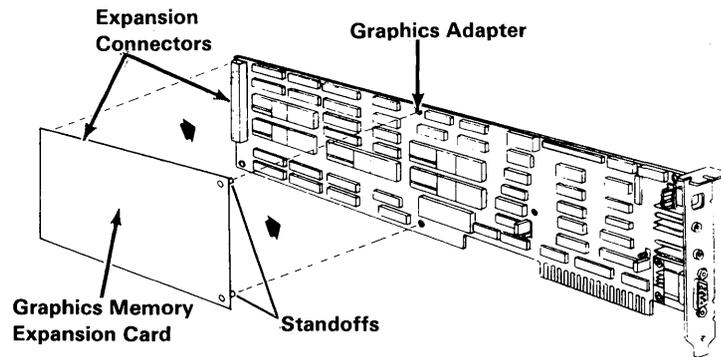
IBM 5154 Display Assignment	IBM 5154 Display Operating Mode or Emulation Mode	Sw1	Sw2	Sw3	Sw4
Primary	80 X 25 High Resolution	Off	On	On	Off
Primary	80 X 25 Enhanced Color	On	On	On	Off
Secondary	80 X 25 High Resolution	Off	Off	On	On
Secondary	80 X 25 Enhanced Color	On	Off	On	On

If you need to install the expansion card, go to “IBM PC Graphics Memory Expansion Card” on page 7-10. If you need to install the expansion kit, go to “IBM PC Graphics Memory Expansion Kit” on page 7-11. To install the adapter, go to page 7-12.

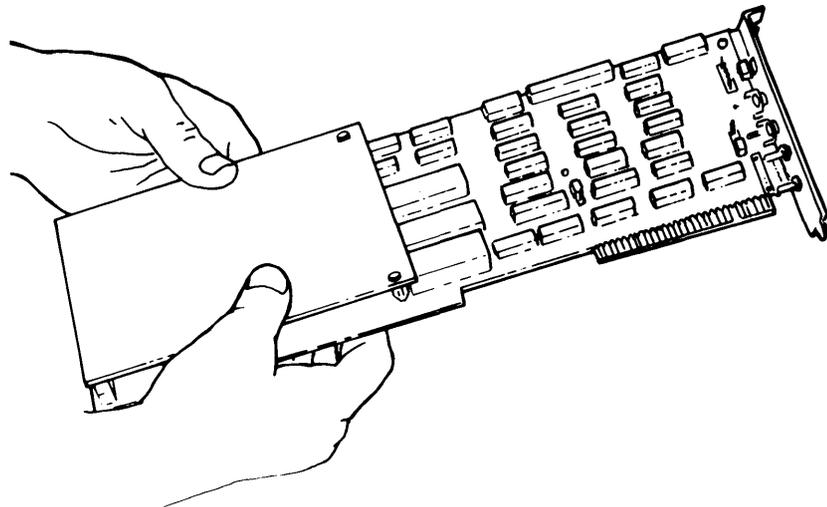
IBM PC Graphics Memory Expansion Card

Do the following two steps to install the IBM PC Graphics Memory Expansion Card, which will give the color adapter a total of 128K bytes of memory. If you need to install modules on the expansion card, go to "IBM PC Graphics Memory Expansion Kit" on page 7-11, install the modules, and then return to this page.

1. Align the expansion card with the adapter.



2. Press the card and adapter together.



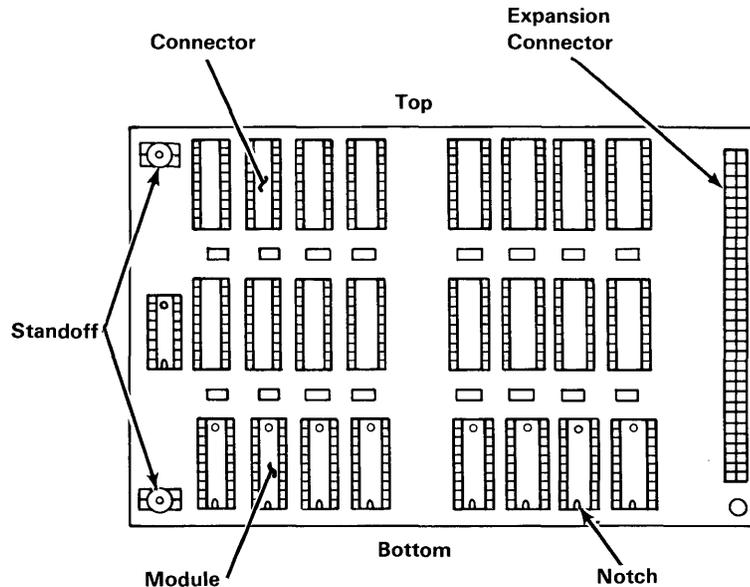
IBM PC Graphics Memory Expansion Kit

Do the following three steps to install the IBM PC Graphics Memory Expansion Kit. You can install this option on the IBM PC Graphics Memory Expansion Card to give the adapter a total of 256K bytes of memory.

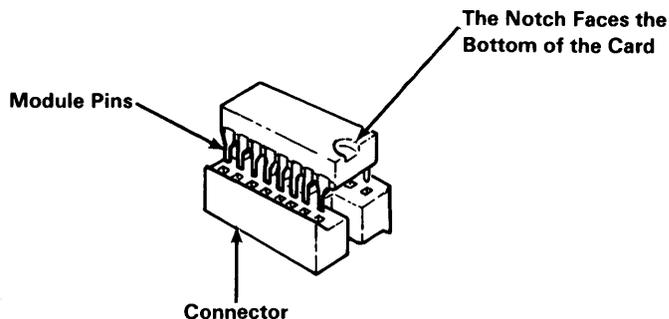
Warning: You will damage the module or card if you install the modules incorrectly. Do not bend the pins!

Do the following:

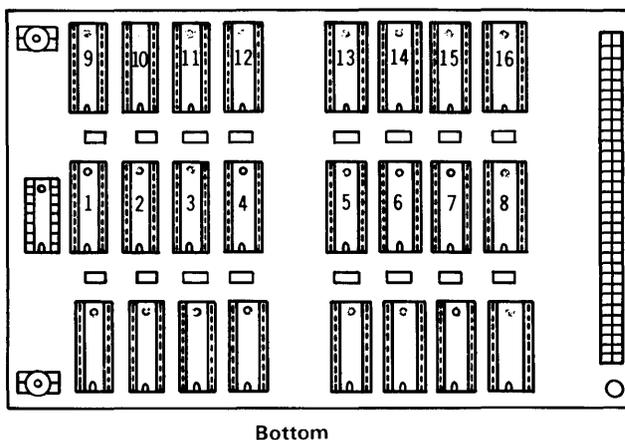
1. Put the expansion card on a flat surface with the components facing up, as shown in the following drawing:



2. Install each module with the notch facing the bottom edge of the card, as shown in the following drawing:



3. Align the pins of each module with the connector on the card and press each of the 16 modules in place.



Go to "IBM PC Graphics Memory Expansion Card" on page 7-10 to install the expansion card.

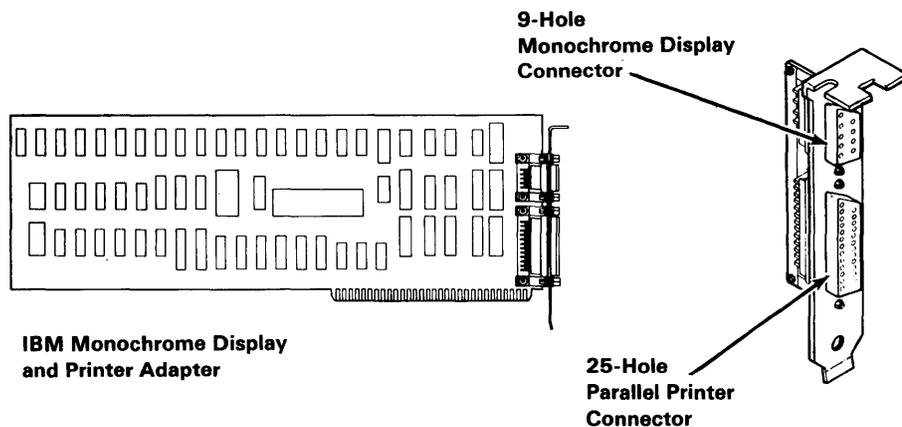
Warning: You must install this adapter in adapter slot 3 or 6 in IBM 6150 and in slot 1 in IBM 6151.

Installing: See the system unit diagram for the correct adapter slot.

IBM Monochrome Display and Printer Adapter

You can install one IBM Monochrome Display and Printer Adapter in a system unit. See “Federal Communications Commission (FCC) Statement” on page v.

Do not install any monochrome adapter with the number 1804065, 1804073, or 1501667 printed on it. This system does not support these three adapters.

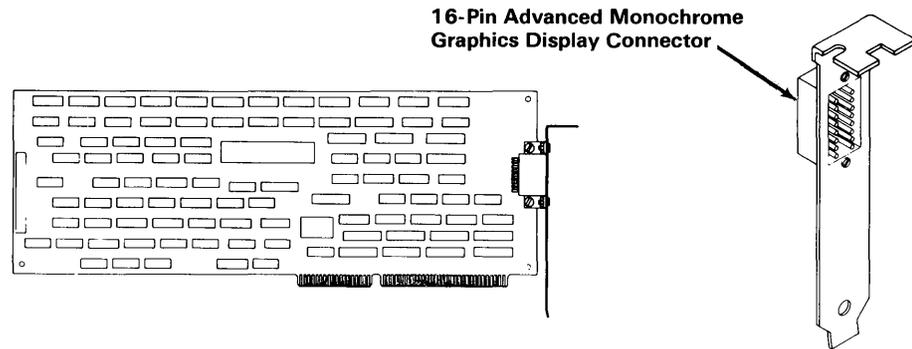


Warning: You must install this adapter in adapter slot 3 in IBM 6150 and in slot 1 in IBM 6151.

Installing: See the system unit diagram for the correct adapter slot.

IBM RT PC Advanced Monochrome Graphics Display Adapter

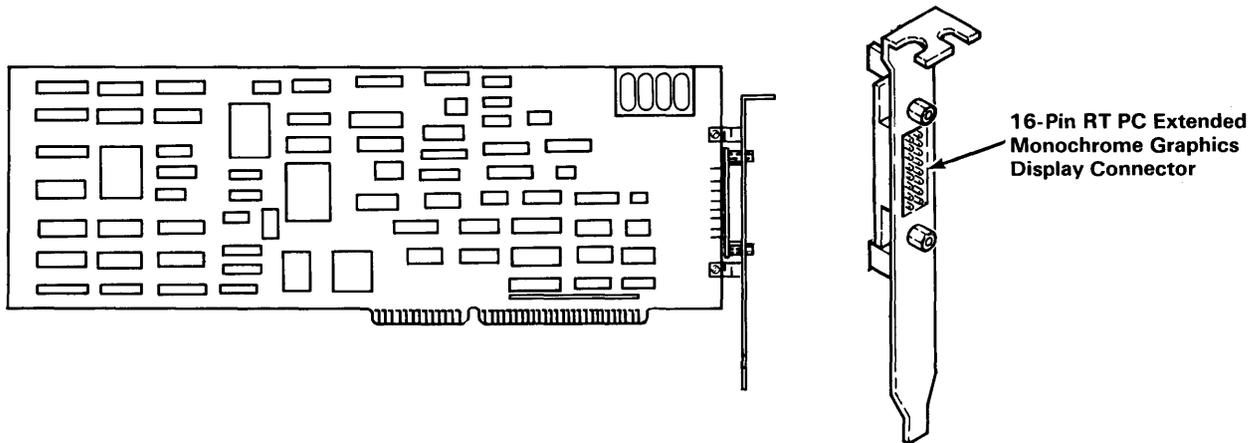
You can install one IBM RT PC Advanced Monochrome Graphics Display Adapter in a system unit.



Installing: You can install this adapter in adapter slot 2, 4, 5, 7, or 8 in IBM 6150 and in slot 2, 3, 4, or 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

IBM RT PC Extended Monochrome Graphics Display Adapter

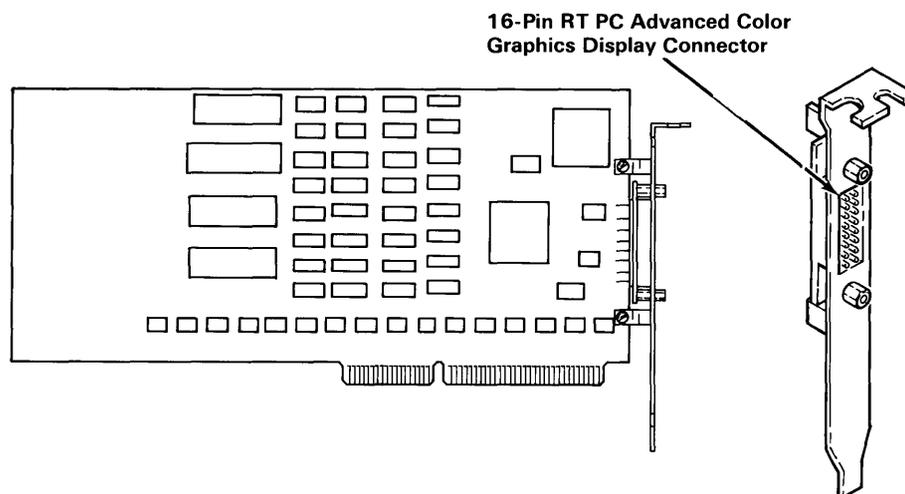
You can install one IBM Advanced Color Graphics Display Adapter in a system unit.



Installing: You can install this adapter in adapter slot 2, 4, 5, or 7 in IBM 6150 and in slot 2, 3, or 4, in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

IBM RT PC Advanced Color Graphics Display Adapter

You can install one RT PC Advanced Color Graphics Display Adapter in a system unit.

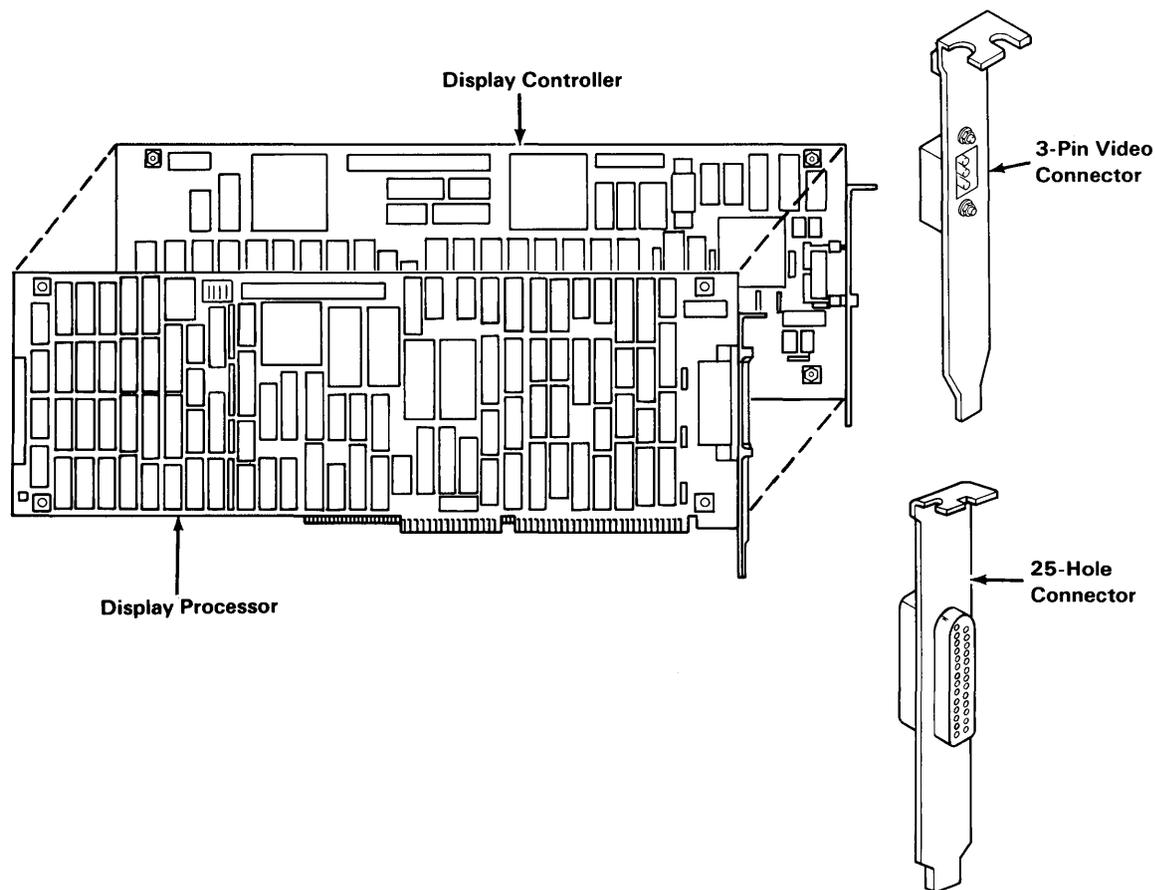


Installing: You can install this adapter in adapter slot 2, 4, 5, 7, or 8 in IBM 6150 and in slot 2, 3, 4, or 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

IBM Megapel Display Adapter

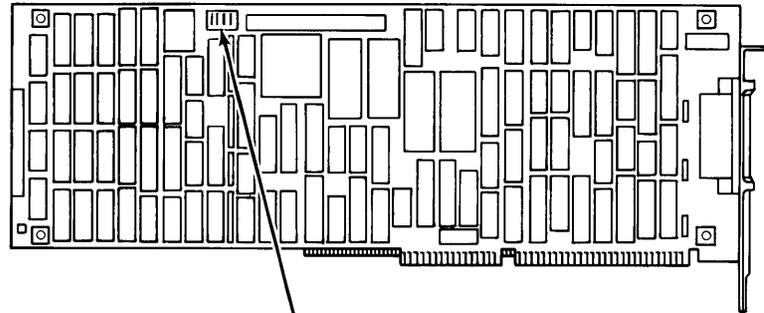
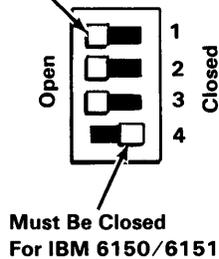
You may install one IBM Megapel Display Adapter in an IBM 6150 or 6151 system unit. The Megapel Adapter consists of the Display Processor and the Display Controller, which are mechanically and electronically linked. The mechanical linking requires two adjacent long adapter slots. See "Federal Communications Commission (FCC) Statement" on page v.

The next page shows how to configure the Display Processor.



**Switch Bank 1
(Normal Configuration)**

**Must Be Open
For IBM 6150/6151**



Switch Bank 1

The illustration above shows the normal Switch Bank 1 configuration. Use the following table to set Switch Bank 1 if your configuration requirements differ.

Note: If you are using the IBM Monochrome Display and Printer Adapter in conjunction with the Megapel adapter, the printer port on the Megapel adapter must be disabled or a conflict will exist on Interrupt Level 7. Refer to “Adapter Conflicts” on page 1-19 and to the Interrupt and Usage Table on page 1-21.

Switch	Function	Open	Closed
1	Reserved; must be Open		
2	Printer Port	Disable	Enable
3	Color Graphics Emulation	Disable	Enable
4	Reserved; must be Closed		

Installing: The Megapel Adapter requires two adjacent, long adapter slots. *Only* slots 4 and 5 in the IBM 6150 and slots 2 and 3 in the IBM 6151 may be used.

See the system unit diagram to locate the adapter slots.

Section 8. Additional Options

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About This Section

This section contains other adapters that can be installed in the IBM RT PC System Units. Slot positions and jumper settings are provided where necessary.

Installing Additional Options

CAUTION

Turn off the power the power on the system unit and unplug the power cable from the electrical outlet.

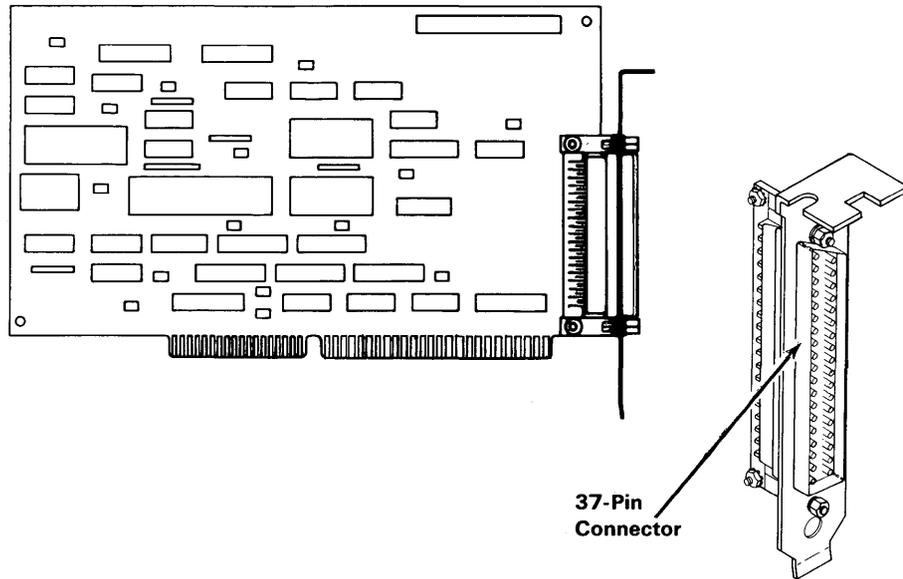
If you have not removed the covers, see “Removing the Covers From the System Units” on page 1-4.

Refer to “General Instructions” on page 3-4 when necessary for information on installing adapters.

IBM RT PC Streaming Tape Drive Adapter

You can install one RT PC Streaming Tape Drive Adapter in a system unit.

Warning: To comply with FCC regulations on Electro Magnetic Interference for Class B computing equipment, the drive cable must be shielded and properly grounded. Use of substitute cabling not properly shielded and grounded may result in violation of the FCC regulation.

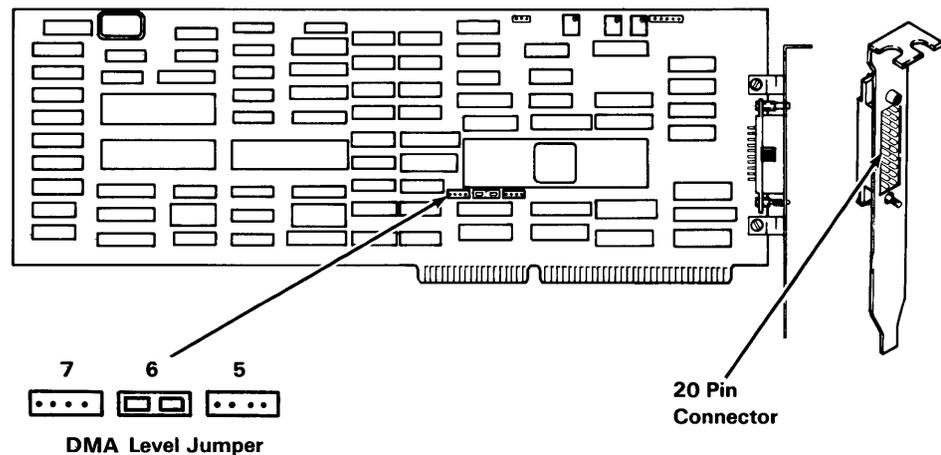


Installing: You can install this adapter in slot 2, 4, 5, 7, or 8 in IBM 6150 and in slots 2 through 5 in IBM 6151, whichever is available. See the system unit diagram for the correct adapter slot.

IBM RT PC 5080 Attachment Adapter

You can install one RT PC 5080 Attachment Adapter in an IBM 6150.
You cannot install this adapter in an IBM 6151 System Unit.

Note: Ensure that the DMA Level Jumper is set for level 6 as shown. See
“Federal Communications Commission (FCC) Statement” on page v.



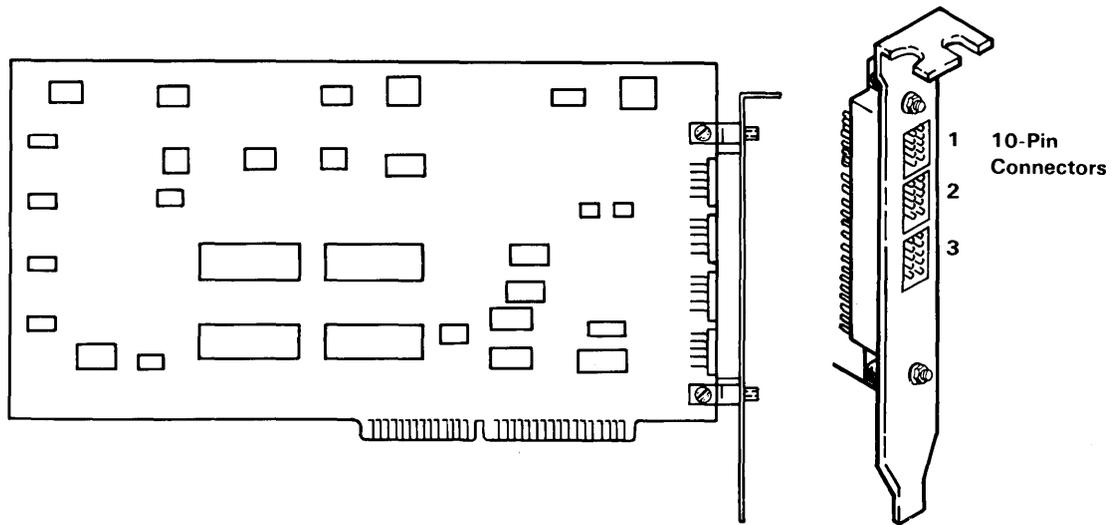
Installing

You may install this adapter in slots 2, 4, 5, 7, or 8 in an IBM 6150. See the system unit diagram to locate the adapter slots.

IBM RT PC 5080 Peripheral Attachment Adapter

You may install one RT PC 5080 Peripheral Attachment Adapter per system unit.

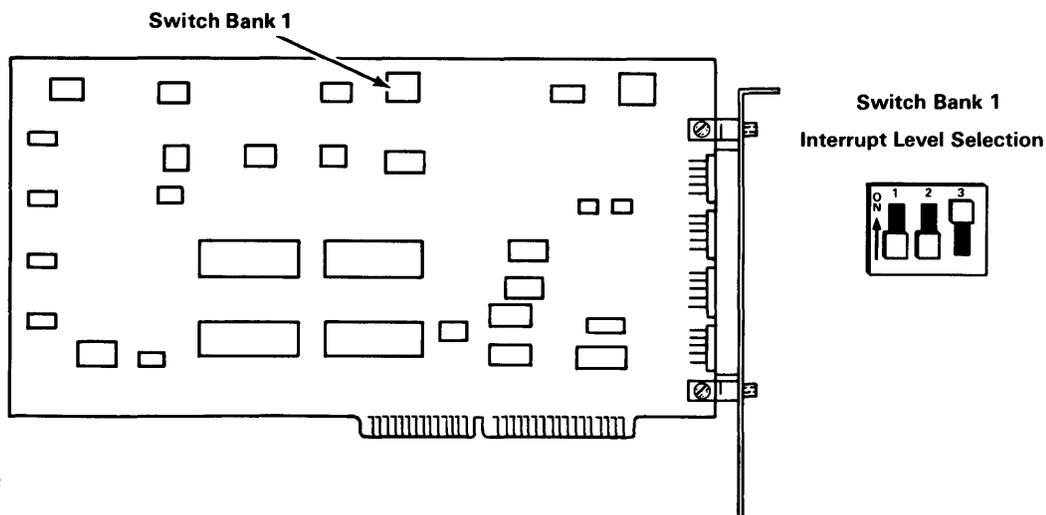
Note: You may install any combination of the two types of asynchronous 4-port adapters and the RT PC 5080 Peripheral Attachment adapter, for a total of four adapters in the IBM 6150 and three in IBM 6151 system units.



Note: Use the instructions on the following pages to set the switches.

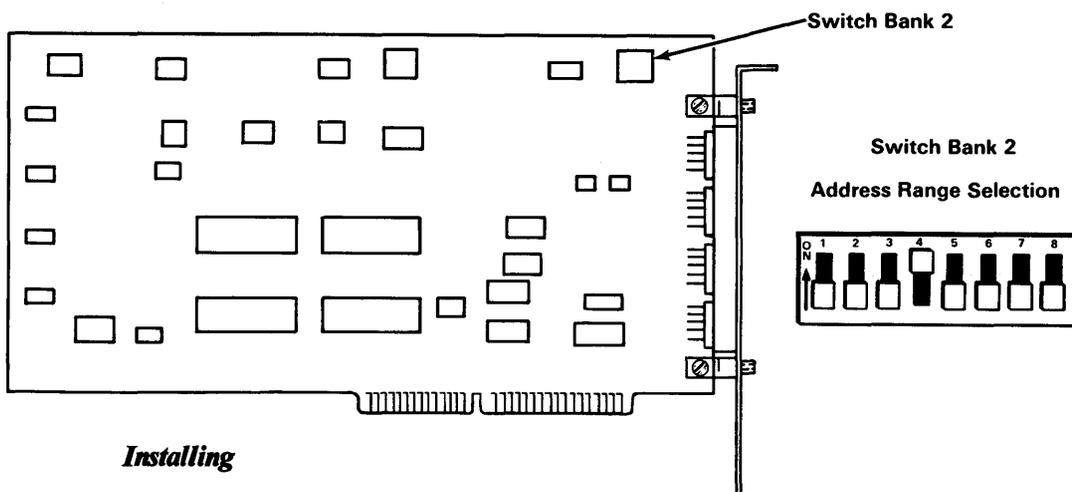
Interrupt Level

Set the interrupt level switches as shown:



Address Range

Set the address range switches as shown:



Installing

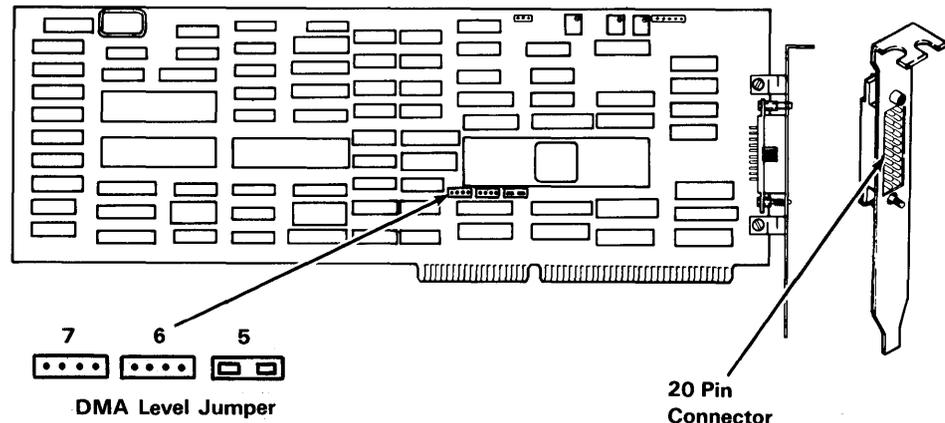
You may install this adapter in slots 2, 4, 5, 7, or 8 in the IBM 6150 and in slots 2 through 5 in the IBM 6151. See the system unit diagram to locate the adapter slots.

IBM S/370 Host Interface Adapter

You can install one IBM S/370 Host Interface Adapter in an IBM 6150. You cannot install this adapter in an IBM 6151 System Unit. See “Federal Communications Commission (FCC) Statement” on page v.

Set the DMA Level Jumpers for level 5 as shown.

Warning: If the IBM RT PC 5080 Attachment Adapter and IBM S/370 Host Interface Adapter are used together, ensure that their DMA channel settings do not conflict with other cards in the IBM 6150. Operating the IBM RT PC 5080 Attachment Adapter and S/370 Host Interface Adapter at the same DMA level via software enabling *is not recommended*.

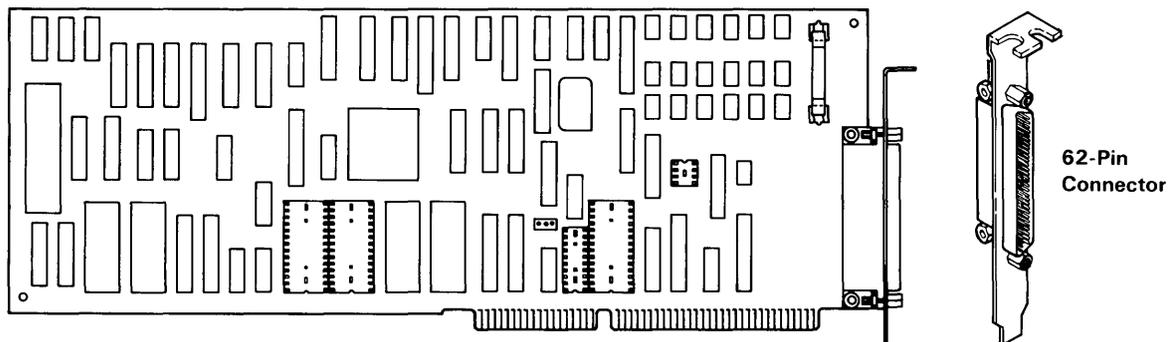


Installing: You may install this adapter in slots 2, 4, 5, 7, or 8 in an IBM 6150. See the system unit diagram to locate the adapter slots.

IBM RT PC Small Computer System Interface (SCSI) Adapter

References to the IBM RT PC Small Computer System Interface Adapter are abbreviated as RT PC SCSI Adapter in this publication.

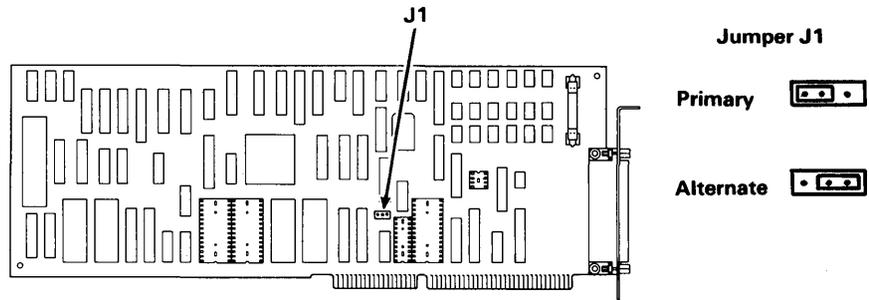
You may install up to two IBM RT PC SCSI Adapters in an IBM RT PC System Unit. See "Federal Communications Commission (FCC) Statement" on page v.



Installing: You may install this adapter in slots 2 through 8 in the IBM 6150 and in slots 2 through 5 in the IBM 6151. See the system unit diagram in Appendix A to locate the adapter slots.

Note: Use the instructions on the following page to set the jumper on the IBM RT PC SCSI Adapter.

Setting the Address Jumper (J1)



The following table shows the address ranges provided by jumper J1. If two IBM RT PC SCSI Adapters are used, one must be configured in the Primary J1 position and the other in the Alternate J1 position. A single adapter may be configured for either address range.

Note: Ensure that address ranges do not conflict with other adapter options. Refer to “Conflicting Memory Addresses” on page 1-19 for more information.

J1 Position	Address Range
Primary	0D50 - 0D5F
Alternate	0950 - 095F

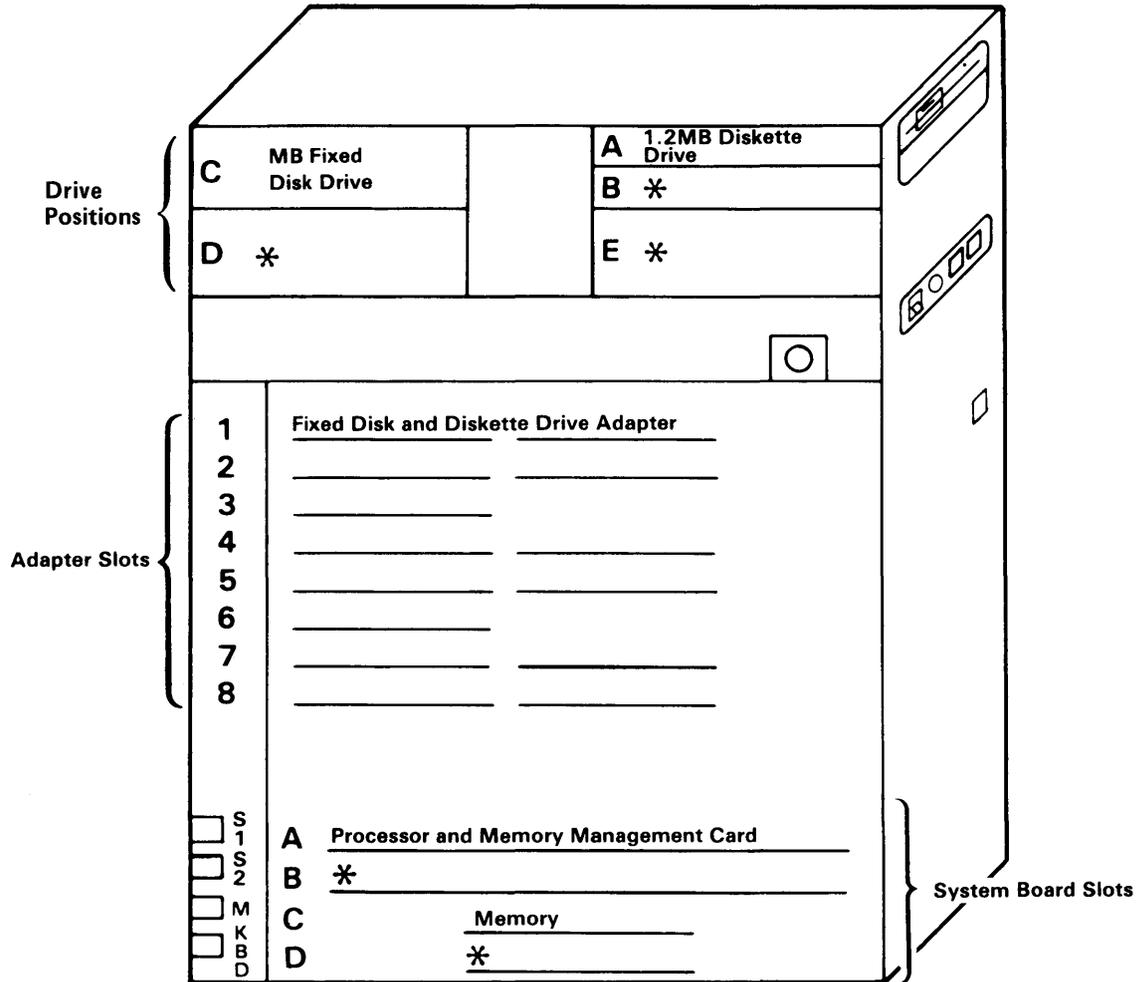
Interrupt Level

The adapter uses shared interrupt levels 11 or 12 which are selected by applicable software.

Note: If you are using the SCSI Adapter together with the 4-Port Asynchronous Adapter, ensure that both are not using Interrupt Level 11. If both of these adapters are using Interrupt Level 11, certain ASCII functions in the SCSI may be blocked. Interrupt Level 10 is recommended for the 4-Port Asynchronous Adapter.

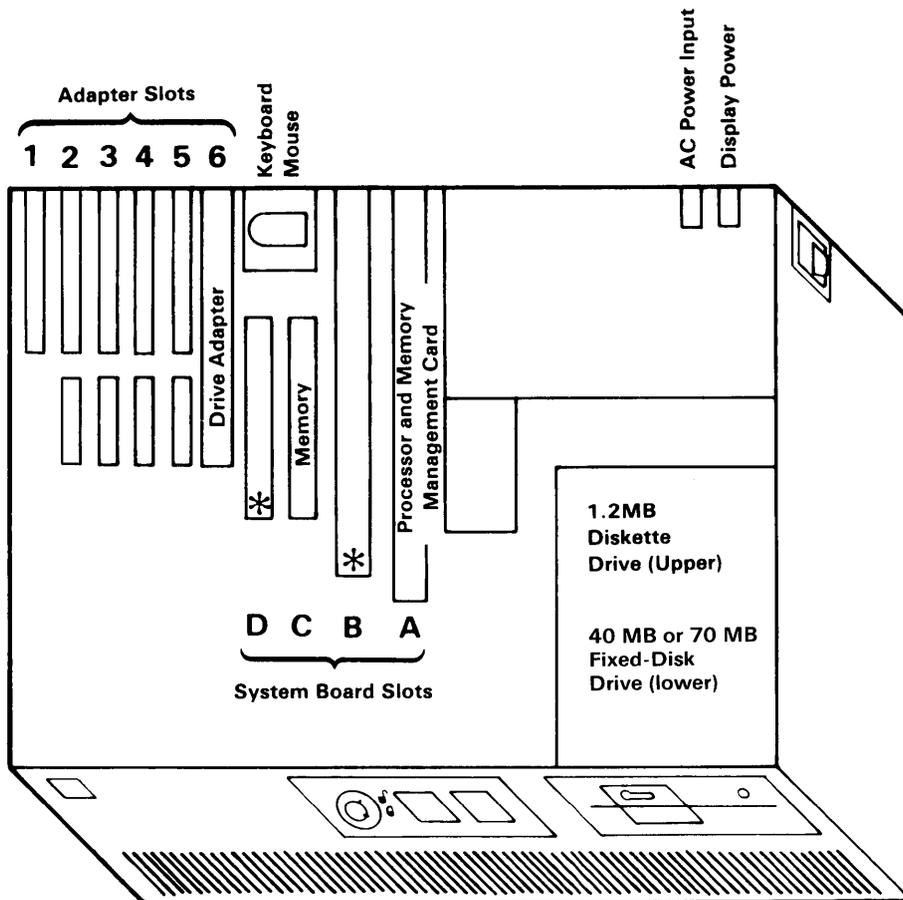
Appendix A. System Unit Diagram Worksheets

The following diagrams show the adapter slots and drive positions. Unfold the appropriate diagram and write the names of the adapters and drives in the locations where you will install them.



* Reserved for a specific option.

Figure A-1. IBM 6150 System Units Diagram



* Reserved for a specific option.

Figure A-2. IBM 6151 System Units Diagram

Glossary

adapter. A printed circuit card that changes the operation of a computer.

address. (1) A name, label, or number identifying a location in storage, a device in a network, or any other data source. (2) A number that identifies the location of data in memory.

all points addressable (APA) display. A display that allows each pel (picture element) to be individually addressed. An APA display allows for images other than ASCII characters to be displayed.

American National Standard Code for Information Exchange (ASCII). The code developed by ANSI for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII character set consists of 7-bit control characters and symbolic characters.

APA. All points addressable.

ASCII. See *American National Standard Code for Information Exchange*.

asynchronous transmission. In data communications, a method of transmission in which the bits included in a character or block of characters occur during a specific time interval. However, the start of each character

or block of characters can occur at any time during this interval.

byte. The amount of storage required to represent one character; a byte is 8 bits.

color display. A display device capable of displaying more than two colors and the shades produced via the two colors, as opposed to a monochrome display.

component. The modules, diodes, capacitors, resistors, jumpers, and other electronics parts on a printed circuit card.

computer. A functional unit that can do mathematical computations and logical operations without human intervention during the actual processing.

connector. A part of the system unit or remote controller to which cables for display stations, printers, and other devices are attached. The word connector is used instead of jack and plug in this book.

decimal. Pertaining to a system of numbers to the base ten; decimal digits range from 0 through 9.

diagram. A drawing that explains how something works or is arranged, rather than showing its appearance.

disk. A flat, circular plate with magnetic surfaces on which information can be stored.

disk drive. See *fixed-disk drive*.

diskette. A thin, flexible magnetic plate that is permanently sealed in a protective cover. A diskette is used to store information copied from a fixed disk.

diskette drive. The mechanism used to read and write information on diskettes.

display screen. The part of the display device that displays information visually.

EIA. Electronic Industries Association.

fixed-disk drive. The mechanism used to read and write information on a fixed disk.

graphics. A type of data created from fundamental drawing units such as lines, geometric shapes, curves, and so on.

hardware. The equipment, as opposed to the programming or software, of a system.

I/O. See *input/output*.

input/output (I/O). Devices in a computing system that enter data into the system, receive data from the system, or both.

jack. A device to which a wire or wires of an electrical circuit can be attached. The jack is designed for insertion of a plug. See *connector*.

jumper. A special length of wire connecting two pins of an adapter or printed circuit card.

K byte (Kb). 1024 bytes.

keylock feature. A security feature in which a lock and key can be used to restrict use of a system or display station.

kg. kilogram; 1000 grams.

kilogram. The fundamental unit of mass in the International System; about 2.2046 pounds.

load. To place a diskette into a diskette drive.

m. See *meter*.

M. Mega; 1 000 000. In referring to computer memory, 1 048 576 bytes.

menu. A displayed list of items from which an operator can select tasks.

meter. A measurement of distance equal to 39.37 inches.

mm. Millimeter. A metric unit of measure equivalent to 0.0394 inches.

mouse. A small user-input device externally attached to the system unit.

modem. See *modulator-demodulator*.

modulator-demodulator (modem). A device that converts data from the computer to a signal that can be transmitted on a communications line, and converts the signal received to data for the computer.

module. See *component*.

monochrome display. A display device that has only one color.

parallel transmission. In data communication, the simultaneous transmission of a certain number of signal elements (bits) constituting the same telegraph or data signal over a data circuit. Contrast with *serial transmission*.

plotter. A printing device externally attached with cables to the system unit, used to print two-dimensional graphs and charts.

plug. A device that connects the wires of an electrical circuit to an electrical source. The plug is designed to be inserted into a jack. See *connector*.

port. (1) A part of the system unit or remote controller to which cables for external devices (display stations, terminals, printers) are attached. (2) An access point for data entry or exit.

printer. A device externally attached to the system unit, used to print system output on paper.

problem determination. The process of identifying why the system is not working. Often this process identifies programs, equipment, data communications facilities, or user errors as the source of the problem.

reinstall. To put back the part that was removed.

resistor. An electronic circuit element used to hinder the flow of electric current.

RS-232C. A standard set by the EIA for communication between computers and externally attached equipment.

RS-422A. A standard set by the EIA for communication between computers and externally attached equipment.

serial transmission. In data communication, sequential transmission at successive intervals of signal elements (bits) constituting the same telegraph or data signal over a data circuit. Contrast with *parallel transmission*.

setup. (1) The process or act of preparing and adjusting a machine or device for its assigned work. (2) The way in which the system unit and the external devices are arranged.

system. The computer and its associated devices and programs.

system configuration. A process specifying the machines, devices, and programs forming a particular data processing system.

system unit. The part of the system that contains the processing unit, the fixed-disk drives and disk, and the diskette drives.

terminal. In data communications, a device, usually equipped with a keyboard and a display, capable of sending and receiving information over communications lines. See *work station*.

work station. A device at which an individual transmits information to or receives information from a computer while doing a task. An example of a work station is a display station, terminal, or printer.

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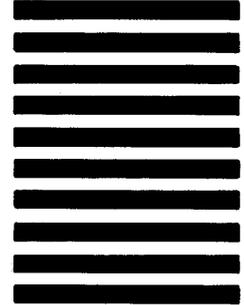


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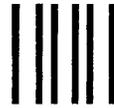
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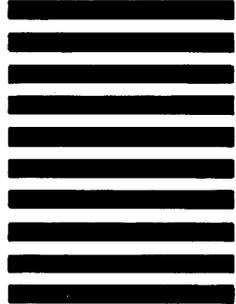


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