Installing Options in Your IntelliStation M Pro

Professional Workstation (Type 6889)

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Professional Workstation (Type 6889)

IBM

Note

Before using this information and the product it supports, be sure to read the general information under Appendix D, “Notices” on page 86.

Read Me First
This publication is available in Adobe .PDF format on the *Ready-to-Configure Utility Program CD* that comes with your computer as well as on the World Wide Web at:

`http://www3.pc.ibm.com/support?page=IBM+IntelliStation`

Second Edition (September 1998)

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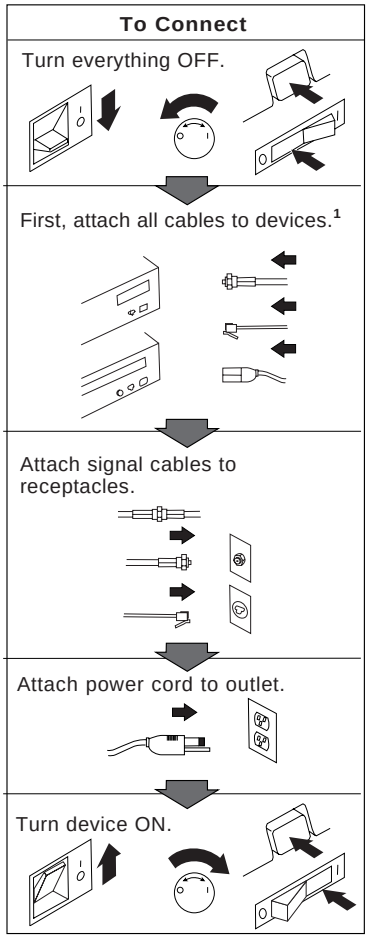
Contents

Safety Information

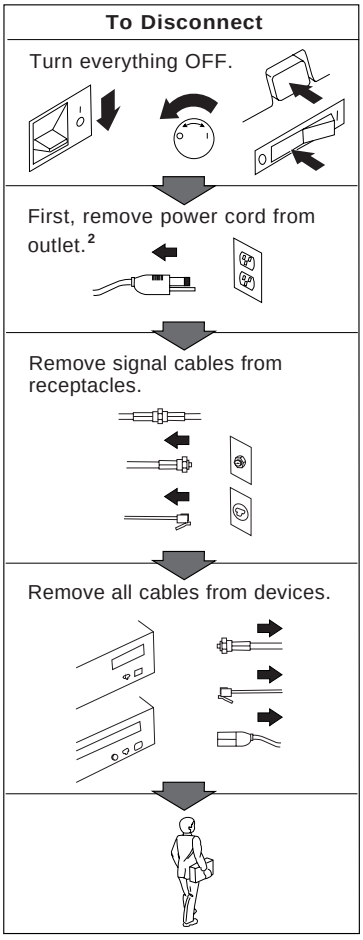
DANGER
To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



[1] In the U.K., by law, the telephone cable must be connected after the power cord.



[2] In the U.K., by law, the power cord must be disconnected after the telephone line cable.

Lithium Battery Notice

CAUTION:
Danger of explosion if battery is incorrectly replaced.

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

Throw or immerse into water
Heat to more than 100°C (212°F)
Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

ATTENTION
Danger d'explosion en cas de remplacement incorrect de la batterie.

Remplacer uniquement par une batterie IBM de type 33F8354 ou d'un type équivalent recommandé par le fabricant. La batterie contient du lithium et peut exploser en cas de mauvaise utilisation, de mauvaise manipulation ou de mise au rebut inappropriée.

Ne pas :

Lancer ou plonger dans l'eau
Chauffer à plus de 100°C (212°F)
Réparer ou désassembler

Mettre au rebut les batteries usagées conformément aux règlements locaux.

Laser Compliance Statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.

CAUTION:
Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Removing the covers of the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not remove the CD-ROM drive covers.**

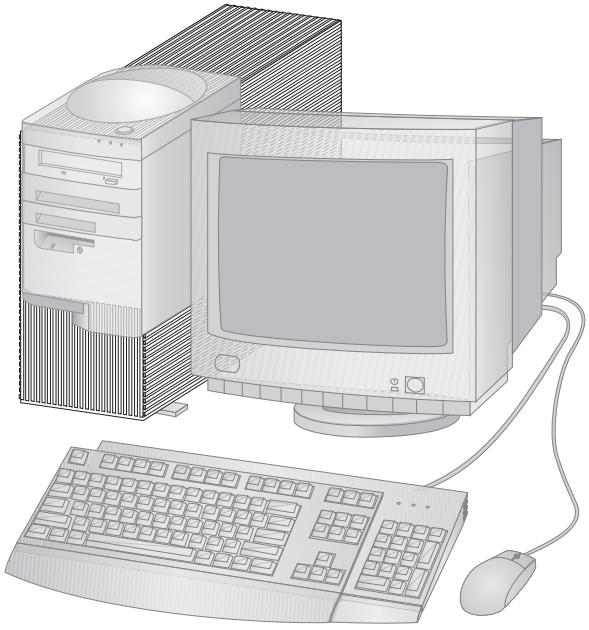
Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

DANGER

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

About This Book

Thank you for selecting an IBM IntelliStation M Pro.



This book provides instructions for installing, removing, and replacing most options. Also, this book contains information to help you decide which options to add to your computer.

Note
The illustrations in this publication might be slightly different from your hardware.

How This Book Is Organized

This book contains the following sections and appendixes:

Chapter 1, “Overview” on page 1 provides an introduction to the options and features for your computer. Safety precautions and handling techniques are discussed along with the required tools you will need to install and remove options.

Chapter 2, “Preparing to Install and Remove Options” provides instructions for removing the cover and cables for your computer and for locating the components you want to work with.

Chapter 3, “Working with Options on the System Board” provides instructions for locating, accessing, and working with options on the system board.

Chapter 4, “Working with Adapters” provides instructions for installing and removing adapters.

Chapter 5, “Working with Internal Drives” provides instructions for installing and removing drives.

Chapter 6, “Working with Security Options” describes features such as the security U-bolt and erasing lost or forgotten passwords. Information on diskette-write protection is also provided.

Chapter 7, “Completing the Installation” provides instructions for reassembling your computer after you have finished installing options. Information about using the Configuration/Setup Utility program is also provided.

Appendix A, “Tips for Installing SCSI Devices” provides information about the SCSI controller, SCSI cables, and SCSI devices.

Appendix B, “Changing the Battery” explains how to change your computer backup battery and the precautions you should take when handling and disposing of the battery.

Appendix C, “Interrupt and DMA Resources” contains the default interrupt and direct memory access (DMA) resources for your computer.

Appendix D, “Notices” contains IBM notices and trademark information.

Related Information

The following documentation and README files, together with this book, contain information about your computer.

IntelliStation M Pro User Guide
This publication contains the following:

- Instructions for setting up your computer
- Instructions for configuring, operating, and maintaining your computer
- Information on diagnosing and solving computer problems and how to get help and service
- Warranty information

Understanding Your IntelliStation M Pro
This online publication (provided on the RTC-CD that comes with your computer) includes general information about using personal computers and in-depth information about the specific features of your computer.

About Your Software
This publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.

Graphics adapter README file
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the graphics adapter installed in your computer.

IBM Audio Feature README file
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the integrated Crystal 4235 audio controller.

Ethernet README file
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the integrated Ethernet controller with Wake on LAN.

Adaptec SCSI Documentation
This online documentation is provided on the *Ready-to-Configure Utility Program CD* that comes with your computer. It contains information on configuring the SCSI controller and instructions for installing and configuring SCSI devices.

Your Ready-to-Configure Utility Program CD
This publication contains information about the *Ready-to-Configure Utility Program CD* that comes with your computer. The publication also contains instructions for starting the CD.

The following publications contain more information about your computer.

Hardware Maintenance Manual
This publication contains information for trained service technicians. It can be found on the World Wide Web at:

`http://www3.pc.ibm.com/support?page=IBM+IntelliStation`

It can also be ordered from IBM. To purchase a copy refer to the section on "Ordering Publications" in the "Getting Help, Service, and Information" chapter in *IntelliStation M Pro User Guide.*

Technical Information Manual
This publication contains information for individuals who want to know more about the technical aspects of their computer. It can be found on the World Wide Web at:

`http://www3.pc.ibm.com/support?page=IBM+IntelliStation`

Chapter 1. Overview

Important: This publication is available in Adobe .PDF format on the *Ready-to-Configure Utility Program CD* that comes with your computer as well as on the World Wide Web at:

`http://www3.pc.ibm.com/support?page=IBM+IntelliStation`

Adding hardware options to your computer is an easy way to increase its capabilities. Instructions for removing, installing, and replacing options and features are included in this book. When adding an option, use these instructions along with the instructions that come with the option. If you have installed options before, you might be able to perform some activities without detailed instructions.

This section provides a brief introduction to the options and features that are discussed in this book. It also includes important information about required tools, electrical safety, and static-sensitive devices.

Important: Before you install or remove any option, read the safety procedures and component-handling guidelines in this section. These precautions and guidelines will help you work safely.

Refer to *IntelliStation M Pro User Guide* for general information on the use, operation, and maintenance of your computer. *IntelliStation M Pro User Guide* also contains information to help you solve problems and get repair service or other technical assistance.

Available Options and Features

The following are some of the available options and features that are discussed in this book:

System board components

- System memory, called dual in-line memory modules (DIMMs)
- Microprocessor upgrades
- Switches for diskette-write protection and microprocessor speed
- Jumper for erasing lost or forgotten passwords
- Battery

Adapters

- Accelerated Graphics Port (AGP) adapters
- Industry standard architecture (ISA) adapters
- Peripheral component interconnect (PCI) adapters

Internal drives

Asset Security

- Asset ID
- Cover lock
- Security U-bolt

The following are some other available options and features for your computer. For more information, refer to the documentation that comes with the optional hardware.

The SCSI controller in your computer also supports the RAIDport Adapter connection with an extension to expansion slot 2. RAID (redundant array of independent disks) is a collection of disk drives that collectively act as a single storage system that provides increased performance and can tolerate the failure of a drive without losing data.

To help with power management, you can add a modem and have your computer start when a ring is detected by the modem. Using an internal modem, you can use the Configuration/Setup Utility program to enable Modem Ring Detect, or using an external modem, you can enable Serial Port Ring Detect. For more information, see *IntelliStation M Pro User Guide.*

For the latest information about available options:

Look on the following World Wide Web pages:

`http://www.pc.ibm.com/us/options/`
`http://www3.pc.ibm.com/support?page=IBM+IntelliStation`

Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or IBM marketing representative.

Within Canada, call 1-800-565-3344 or 1-800-465-7999.

Outside the United States and Canada, contact your IBM reseller or IBM marketing representative.

Tools Required

To install or remove options in your computer, you will need a flat-head screwdriver. Any additional tools needed depend on the specific option and are noted in the instructions that come with the option.

Electrical Safety

CAUTION:
Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.

For your safety, always do the following *before* removing the cover:

1. Shut down all programs as described in your operating-system documentation.
2. Turn the computer and any attached devices off, such as printers, monitors, and external drives.

   Note:
   Computer users in the United Kingdom who have a modem or fax machine attached to their computer must disconnect the telephone line from the computer *before* unplugging any power cords (also known as power cables). When the computer is reassembled, users must reconnect the telephone line *after* plugging in the power cords.
3. Unplug all power cords from electrical outlets.
4. Disconnect all communication cables from external receptacles.
5. Disconnect all cables and power cords from the back of the computer.

   Note:
   Do not reconnect any cables or power cords until you reassemble the computer and put the cover back on.

CAUTION:
Never remove the cover on the power supply. If you have a problem with the power supply, have your computer serviced.

Handling Static-Sensitive Devices

Have you ever walked across a carpeted floor, then touched an object and received a small electrical shock? That's static electricity, and although harmless to you, it can seriously damage computer components and options.

Important:
When you add an option, do *not* open the static-protective package containing the option until you are instructed to do so.

When you handle options and other computer components, take these precautions to avoid static electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory-modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

Chapter 2. Preparing to Install and Remove Options

This section provides instructions for accessing and locating the options you want to install or remove.

Note: This publication is available in Adobe .PDF format on the *Ready-to-Configure Utility Program CD* that comes with your computer as well as on the World Wide Web at:

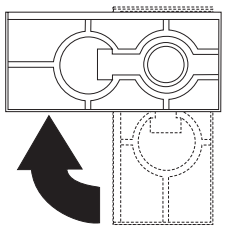
`http://www3.pc.ibm.com/support?page=IBM+IntelliStation`

Using the Stabilizing Feet

The four feet attached to the bottom cover rotate 90 degrees to provide additional stability for your computer.

When you need to access the inside of the computer, you might find it easier to lay the computer on its side. If you do so, you should rotate the feet in towards the computer, so they do not break off due to the weight of the computer.

When you are finished installing the option(s) and have reattached the side cover, turn the four stabilizing feet a quarter turn out from the computer and set it carefully back on its feet.



Disconnecting Cables and Removing the Cover

DANGER

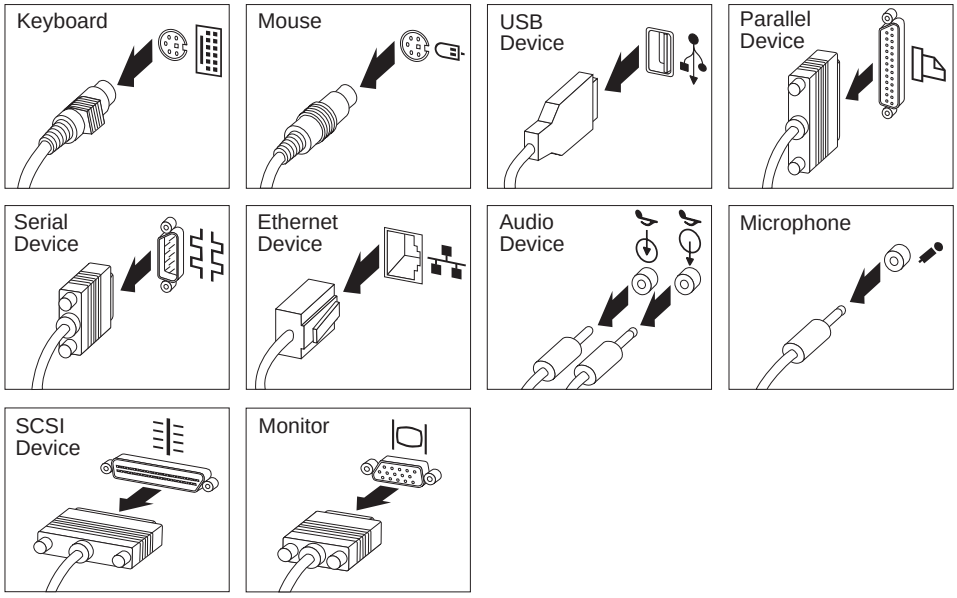
> **To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Remove any media (diskettes, compact discs, or tapes) from the drives, and then turn off all attached devices and the computer.

1. Touch the rear of the bare metal frame to dissipate any static electricity from your body.
2. Unplug all power cords from electrical outlets.
3. If you have a modem or fax machine attached to your computer, disconnect the telephone line from the wall outlet and the computer.

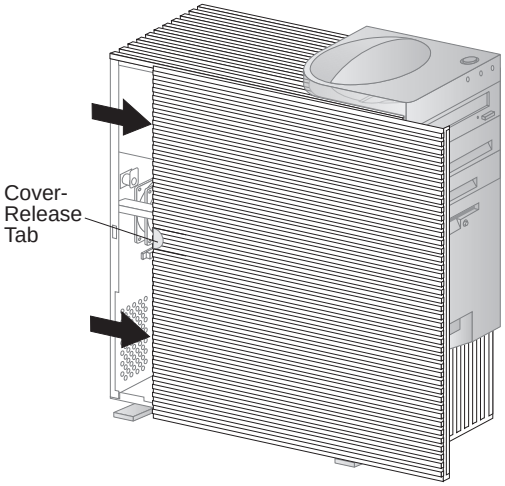
4 Disconnect all cables attached to the computer; this includes power cords, input/output (I/O) cables, and any other cables connected to the computer.



5 If necessary, unlock the computer cover.

6 Pull out on the cover release tab at the rear of the side cover.

7 Slide the cover toward the front of the computer and lift it off.



Locating Components

The following information helps you locate components and serves as a reference when you need to install options or connect input/output devices.

Your computer comes with the following adapters and devices preinstalled:

- A graphics adapter
- A CD-ROM drive in drive bay 1
- A diskette drive in drive bay 4
- A hard disk drive in drive bay 5

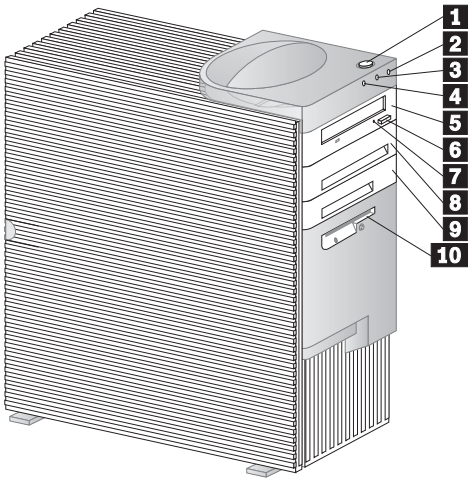
For more information on drive bays, see "Internal Drives" on page 46.

The following illustrations will help you locate the various components in your computer. For information on removing the cover, see Chapter 2, "Preparing to Install and Remove Options" on page 6.

External View

The following illustration shows the external view of your computer as seen from the front.

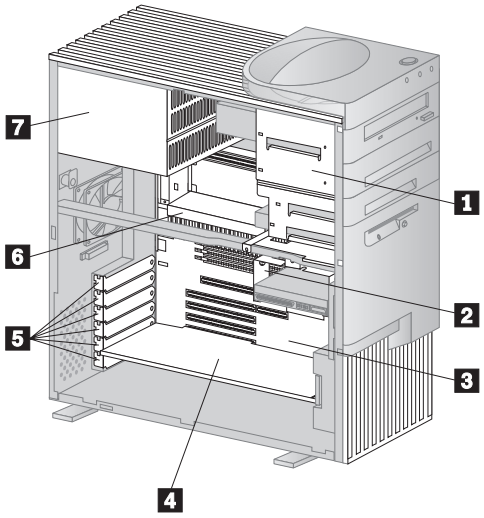
1 Power switch
2 Power-on light
3 Hard disk drive light
4 Client LAN light
5 Bay 1, CD-ROM drive
6 CD-ROM eject button
7 CD-ROM emergency eject
8 Bay 2
9 Bay 3
1 Bay 4, 3.5" diskette drive



Internal View

The following illustration shows the internal view of your computer as seen from the front. For information on removing the cover, see Chapter 2, “Preparing to Install and Remove Options” on page 6.

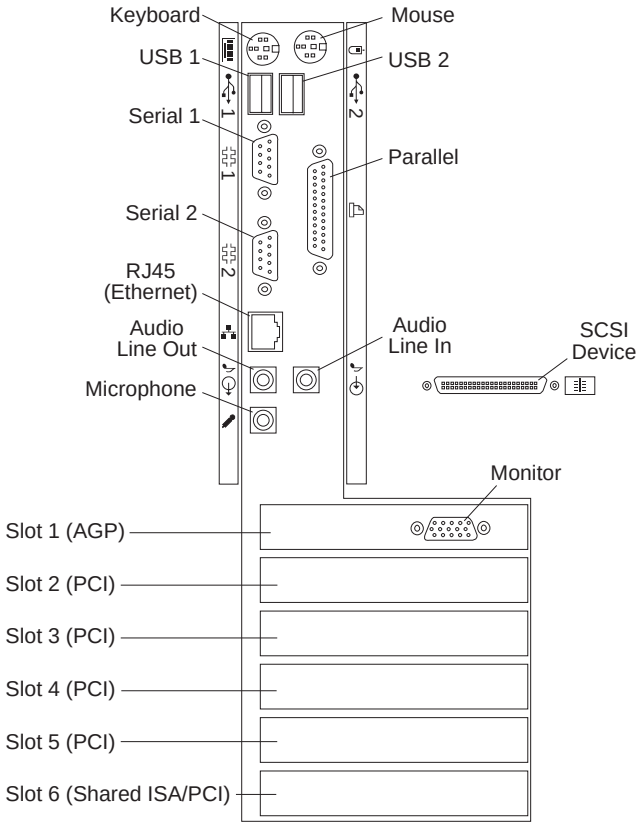
1 Upper drive bracket (bays 1-4)
2 Lower drive bracket (bays 5-6)
3 System board
4 Expansion adapter
5 Expansion slots
6 Microprocessor
7 Power supply



Input/Output Connectors

Input/output (I/O) connectors provide ports for transferring information into and out of your computer. You can connect a variety of I/O devices to your computer, including a monitor, keyboard, mouse, and printer. For more information on the ports and their specific technologies, see *Understanding Your IntelliStation M Pro*[1].

At the rear of your computer is a panel that provides access to I/O connectors. Adapters installed in expansion slots might also provide I/O connectors.



Note:
The monitor connector might be in a different slot, depending on the computer model.

[1] For more information, see "Related Information" on page xi.

Chapter 3. Working with Options on the System Board

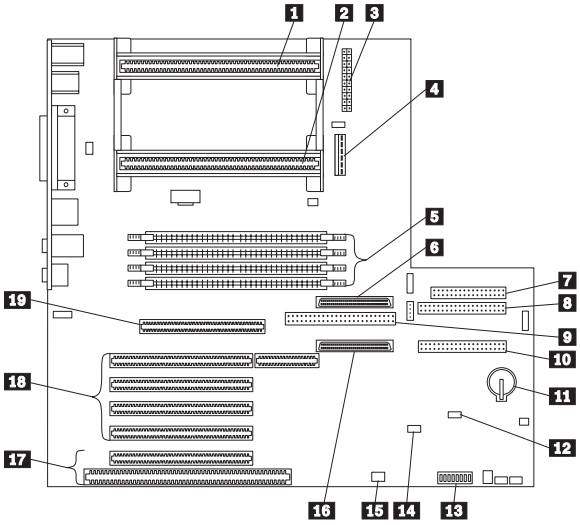
This section provides information about system board options and helps you to identify components on the system board. It also provides instructions for installing, removing, and replacing system board options, specifically system memory and microprocessors. For information on adding and removing expansion adapters, see Chapter 4, “Working with Adapters” on page 35.

Identifying Parts on the System Board

The system board, also called the *planar* or *motherboard*, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later.

If you plan to install, remove, or replace hardware in your computer, you will need to know the layout of the system board. The following illustration shows the layout of the system board in your computer. The numbered pointers show the components that are discussed in this book.

1 Secondary microprocessor socket
2 Primary microprocessor socket
3 Power connector
4 5 V auxiliary power connector
5 DIMM sockets
6 Channel B SCSI Connector (68 pin)
7 Diskette drive connector
8 Primary IDE connector
9 Channel B SCSI Connector (50 pin)
1 Secondary IDE connector
11 Battery
12 CMOS clear (password) jumper
13 Rocker switches
14 Wake on LAN Connector
15 Wake on Modem Connector
16 Channel A SCSI Connector (68 pin)
17 Shared ISA/PCI slot connector
18 PCI slot connectors
19 AGP slot connector



Note:
An illustration of the system board and additional information is provided on a label located inside the computer.

Accessing the System Board

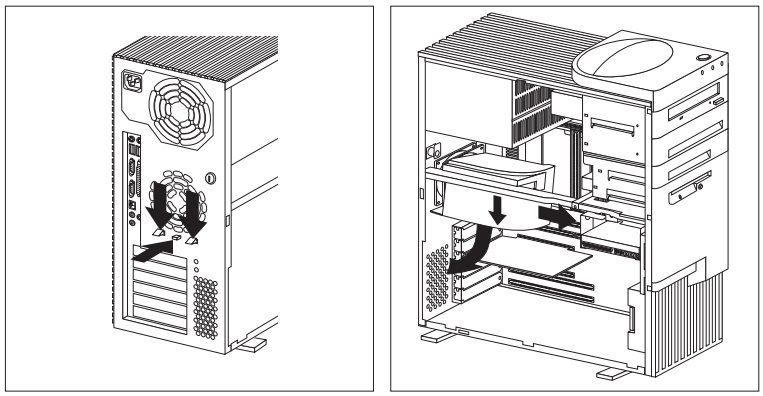
Note:
For information on removing the computer cover, see Chapter 2, “Preparing to Install and Remove Options” on page 6.

To access the system board, it helps to place the computer on its side on a table. You might need to remove adapters, the air baffle, or cables that impede your access to components on the system board. When disconnecting cables, it is important to note where they attach, so you can correctly reattach them later.

Removing and Replacing the Air Baffle

1 There might be cables attached to the bottom of the air baffle. If so, unattach these cables so that the air baffle can be moved.

2 Locate the two small latches on the air baffle that protrude through the holes on the rear of the computer and the large latch that snaps into the metal bar.



3 Press all the latches down at the same time until they unlock and slide the air baffle toward the front of the computer.

4 Tilt the air baffle as shown, and slide it out, under the metal bar and away from the microprocessor.

5 Remove the air baffle from the computer.

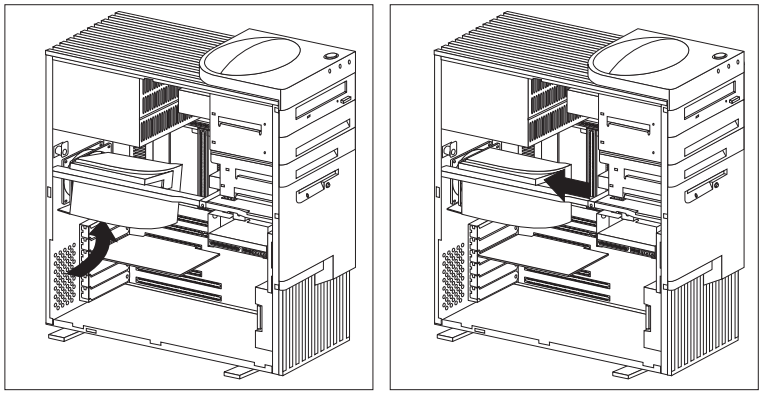
To Replace the Air Baffle

1 Locate the air baffle as shown below, and attach it to the metal bar.

2 Rotate the air baffle toward the microprocessor until it is in position to slide to the rear along the metal bar.

3 Align the two small latches on the air baffle so that they protrude through the holes on the rear of the computer. Press the latches down while pushing the baffle to the rear until it snaps into position. Make sure the large latch is latched into the metal bar.

4 Reattach any cables that were unattached from the baffle.



Working with System Memory

You can add memory to your computer to increase system performance. Your computer has four connectors for installing system-memory modules (DIMMs) up to a maximum of 1 GB.

Memory DIMM Options

Important: Be sure to observe the following guidelines when adding memory DIMM options to your computer.

The IntelliStation M Pro does not support EDO memory.

Only 168-pin, 100 MHz, 3.3v industry standard memory DIMMs are supported.

There are two types of memory DIMMs available for the IntelliStation M Pro computer: *Registered Memory* technology and *Unregistered Memory* technology.

Registered Memory DIMMs are not compatible with Unregistered Memory DIMMs.

The 256 MB ECC Memory DIMM is *Registered Memory* technology.

Only the 256 MB ECC Registered Memory DIMM (IBM OBI Part Number 01K1132) is supported on the IntelliStation M Pro computer.

The 32 MB, 64 MB, and 128 MB DIMMs are *Unregistered Memory* technology.

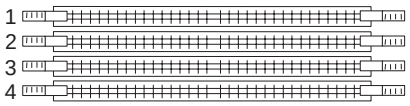
When adding additional memory DIMMs, be sure that all installed memory DIMMs are of the same type. For example:

– All installed DIMMs are Registered Memory

- or -

– All installed DIMMs are Unregistered Memory

Note:
To locate the memory connectors inside your computer, see “Identifying Parts on the System Board” on page 15.



Memory Configuration

When you are adding or removing memory, any sequence of DIMM sizes is allowed. A basic rule to follow is to fill each system memory connector sequentially, starting at *DIMM socket 1*.

The following table shows suggested memory configurations for your computer; this table and additional information can be found on a label located inside your computer. Again, alternate configurations are possible.

Note:
Values in the following table are represented in megabytes (MB).

DIMM Combinations

Total Memory (MB)	DIMM 1 (MB)	DIMM 2 (MB)	DIMM 3 (MB)	DIMM 4 (MB)
32	32			
64	64			
64	32	32		
96	64	32		
96	32	32	32	
128	128			
128	64	64		
128	64	32	32	
192	64	64	64	
256	256			
256	128	128		
256	128	64	64	
512	128	128	128	128
512	256	256		
768	256	256	256	
1 24 (1 GB)	256	256	256	256

Installing a DIMM

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Read the instructions that come with the new system memory.
Turn the computer and all other connected devices off.
Disconnect all cables attached to the computer and remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).
Read "Accessing the System Board" on page 17.

Note:
For information on memory configuration, see "Memory Configuration" on page 20.

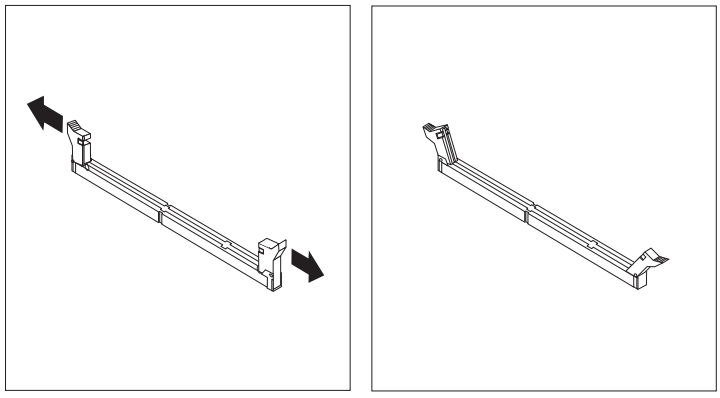
1 See "Identifying Parts on the System Board" on page 15 to locate the memory connectors on the system board.

2 If an adapter, the air baffle, or cables restrict your access to the memory connectors, you might have to remove them.

To remove an adapter, see "Removing Adapters" on page 42.

To remove the air baffle, see "Removing and Replacing the Air Baffle" on page 17.

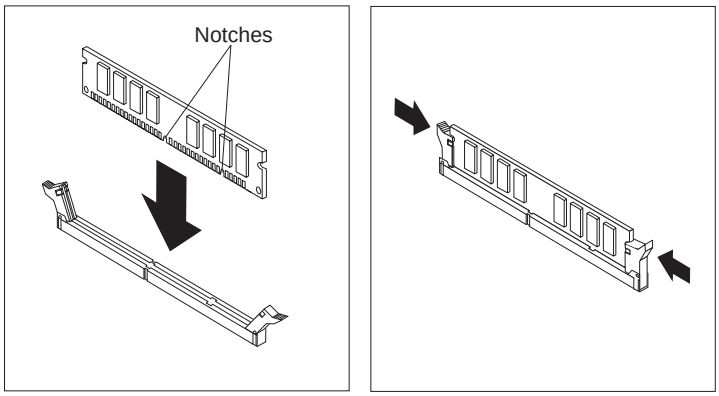
3 Be sure the retaining clips are in the open position, as shown in the right-hand illustration below. If the retaining clips are perpendicular with the connector, push outward on them until they click open.



4 Touch the static-protective package containing the DIMM to any *unpainted* metal surface in the computer, and then remove the DIMM.

5 Position the DIMM above the connector so that the two notches on the bottom edge of the DIMM align properly with the connector.

6 Firmly push the DIMM straight into the connector until the retaining clips pop closed and snugly fit around both ends of the DIMM.



7 To replace the air baffle, see “Removing and Replacing the Air Baffle” on page 17.

8 To install another DIMM, repeat the steps above.

9 Go to the device-record form in *IntelliStation M Pro User Guide* and record the appropriate information.

What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Removing a DIMM

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn the computer and all other connected devices off.
Disconnect all cables attached to the computer and remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).
Read "Accessing the System Board" on page 17.

1 Locate the DIMM you want to remove on the system board. To locate the desired DIMM, see "Identifying Parts on the System Board" on page 15.

2 If an adapter, the air baffle, or cables restrict your access to the memory connectors, you might have to remove them.

To remove an adapter, see "Removing Adapters" on page 42.

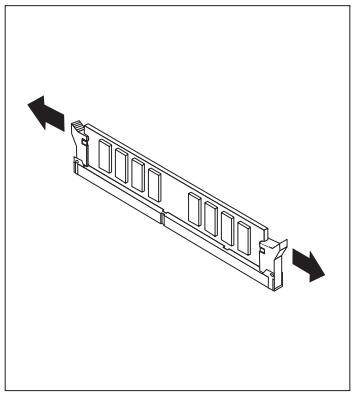
To remove the air baffle, see "Removing and Replacing the Air Baffle" on page 17.

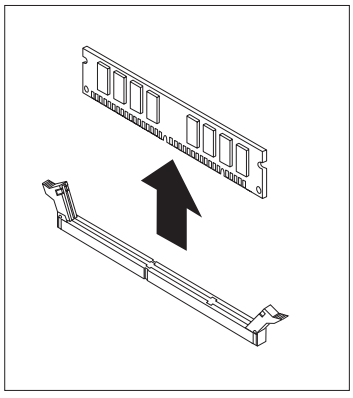
3 At both ends of the DIMM connector, push outward on the retaining clips until the DIMM is loosened.

Note:
Be careful not to push too hard on the retaining clips because the DIMM might eject abruptly from the connector.

4 Lift the DIMM out of the connector.

5 To replace the air baffle, see "Removing and Replacing the Air Baffle" on page 17.





6 Store the DIMM in a static-protective package.

What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Installing a Second Microprocessor

Important:

Use this procedure to install a second microprocessor.
Be sure to perform a backup of the hard disk before you add a second microprocessor.
If you do not perform the following steps in the proper order, your computer might be unusable after you have installed a second microprocessor.
Before installing a second Intel Pentium II microprocessor, you must run the ADDCPU.EXE utility program. You do not have to reinstall Microsoft Windows NT Workstation 4.0.
Refer to "Updating System Programs" in *IntelliStation M Pro User Guide* to download and install the current *Flash BIOS Update* program for your computer.

1 Verify the *Ready-to-Configure Utility Program* CD supplied with your computer.

IntelliStation M Pro (Type 6889) — Version 1.1 or later

If you do not have the correct version of the CD, download the latest version of the ADDCPU.EXE file from the World Wide Web at www.us.pc.ibm.com/files.html.

When instructed to run ADDCPU.EXE, use either the downloaded file or run it from the *Ready-to-Configure Utility Program* CD. The ADDCPU.EXE utility program can be run from Windows NT Explorer, the Start menu, or a command window.

2 Determine if your computer has IBM-installed Windows NT by performing the following steps:

a. Using the right mouse button, click on **My Computer**.
b. Using the left mouse button, click on **Properties**.

If the following message is displayed on the screen, you have IBM-installed Windows NT:

```
Manufactured and supported by IBM
```

If your computer does not indicate `Manufactured and supported by IBM` use Procedure B.
If your computer does indicate `Manufactured and supported by IBM` continue with Step 3 to determine which Service Pack is installed.

3 Determine which Service Pack is installed on your computer by performing the following steps:

a. Using the left mouse button, double-click on **My Computer**.

b. Click on **Help**.
c. Click on **About Windows NT**.

If the following message is displayed on the screen, you have Service Pack 3 installed:

```
Version 4.  (Build 1381:  Service Pack 3)
```

If your computer does not indicate `Service Pack 3` use Procedure B.
If your computer does indicate `Service Pack 3` continue with Step 4 to determine if the C:I386 folder (directory) exists.

4 Determine if the C:\I386 folder (directory) exists by performing the following steps:

Using the left mouse button, double-click on **My Computer**.
Double-click on the C: drive. For example: **IBM_PRELOAD(C:)**
Look for the **I386** directory.

If the I386 directory does not exist, use Procedure B. Otherwise use Procedure A.

Procedure A

Use this procedure only if you DO HAVE IBM-installed Windows NT and have Service Pack 3 and have the C:\I386 directory.

1. Run ADDCPU.EXE and read the displayed instructions; then click on **OK**. You might receive a message about a Service Pack having been installed. Click on **Yes** to continue.
2. **Attention:** In this step, be sure to select the path correctly. If you select the wrong path, your computer might be unusable after it is restarted.

   From the Location of the Windows NT Files window, under **Drives:**, click on the C: drive. For example, **C:IBM_PRELOAD** then under **Directories:**, double-click on **I386**. Click on **OK**.
3. When ADDCPU.EXE has completed (ADDCPU.EXE finishes silently if there are no errors) shut down Windows NT, turn off the computer, and install the second microprocessor. See “Second Microprocessor Installation” on page 29.
4. Turn on the computer. The Configuration/Setup Utility program runs automatically after the computer is restarted. You will receive a 162 error message, but this is normal. Exit the configuration program to continue. When Windows NT starts, it automatically recognizes and uses the second microprocessor.

Procedure B

Use this procedure if you DO NOT HAVE IBM-installed Windows NT, DO NOT HAVE Service Pack 3, or DO NOT HAVE the C:\I386 directory.

1. If you have not already done so, determine which Service Pack is installed on your computer by performing the following steps:

   a. Using the left mouse button, double-click on **My Computer**.
   b. Click on **Help**.
   c. Click on **About Windows NT**.

   In the following message displayed on the screen, note which Service Pack is installed:

   Version 4.0 (Build 1381: Service Pack ?)

   If the message states **Service Pack 1** skip Step 2 and go directly to Step 3 Otherwise, continue with Step 2.

2. If you do not have the Service Pack CD that matches the Service Pack on your computer, download it from the World Wide Web at:

   www.microsoft.com/support/winnt

3. Run ADDCPU.EXE and read the displayed instructions; then click on **OK**. If you receive a warning message about a Service Pack having been installed, then click on **Yes** to continue.

4. Insert the *Microsoft Windows NT Workstation 4.0* CD into the CD-ROM drive.

   Attention: In this step, be sure to select the path correctly. If you select the wrong path, your computer might be unusable after it is restarted.

   From the Location of the Windows NT Files window, under **Drives:**, click on the CD-ROM which corresponds to the drive in which you inserted the *Microsoft Windows NT Workstation 4.0 CD*. Then, under **Directories:**, double-click on **I386**. Click on **OK**.

5. When ADDCPU.EXE has completed (ADDCPU.EXE finishes silently if there are no errors) *DO NOT shut down Windows NT or restart the computer yet*. If your computer has Service Pack 1 installed, skip Step 6 and go to Step 7. Otherwise, continue with Step 6.

6. Run UPDATE.EXE from your Service Pack CD or, if you downloaded a Service Pack from the World Wide Web, run its install program (for example: NT4SP3_I.EXE).
   Attention: If the following message appears, click on **No**. Selecting **Yes** might cause your computer to be unusable after it is restarted.

```
This file has been identified as an OEM installed file.
Would you like to overwrite the version of the file
on your system with the Service Pack version?
```

Follow the Service Pack installation instructions and wait for the Service Pack program to complete.

7. When the program has completed, shut down Windows NT, turn off the computer, and install the second microprocessor. See "Second Microprocessor Installation" on page 29.
8. Turn on the computer. The Configuration/Setup Utility program runs automatically after the computer is restarted. You will receive a 162 error message, but this is normal. Exit the configuration program to continue. When Windows NT starts, it automatically recognizes and uses the second microprocessor.

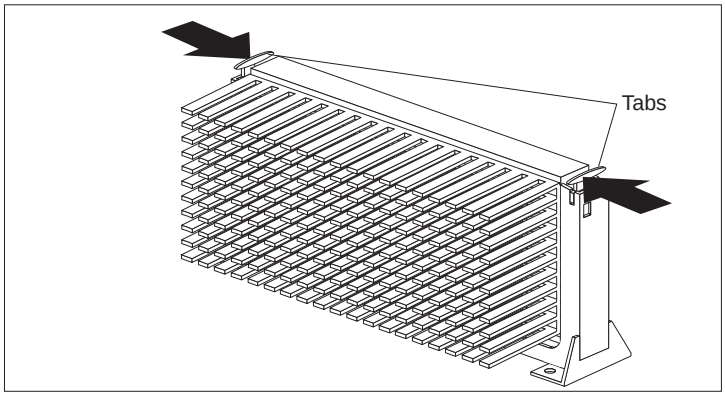
Second Microprocessor Installation

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Read the instructions that come with the new microprocessor.
Turn off the computer.
Disconnect all cables attached to the computer and remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).
Read "Accessing the System Board" on page 17.

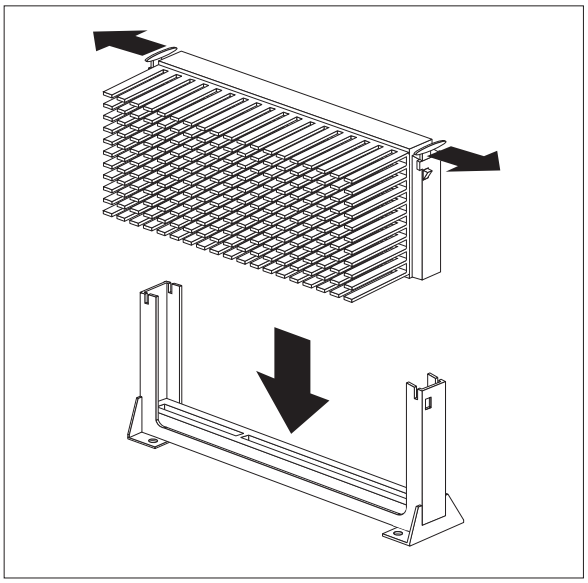
To add a second microprocessor:

1. Read the instructions that come with the new microprocessor.
2. See "Identifying Parts on the System Board" on page 15 to locate the secondary microprocessor socket.
3. Remove the air baffle. See "Removing and Replacing the Air Baffle" on page 17.
4. Remove the terminator card in the secondary microprocessor socket.
5. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface in the computer, and then remove the new microprocessor.
6. Place your index fingers on the small tabs on the top of the microprocessor. Push in toward the microprocessor until the tabs release.



7 Align the new microprocessor with the connector on the system board and slide it into the guides. Press the microprocessor down until it seats in the connector.

8 Pull outward on the retainer tabs.



9 Reinstall the air baffle. See “Removing and Replacing the Air Baffle” on page 17.

10 when you add a second microprocessor it runs at the same speed as the primary microprocessor. For information on the appropriate switch settings, see the label inside the computer cover, or contact your IBM reseller or IBM marketing representative.

11 The Configuration/Setup Utility program runs automatically after the computer is restarted. When Windows NT starts, it recognizes the second microprocessor.

What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Replacing a Microprocessor

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Obtain a flash diskette for updating the system BIOS. If you do not have a flash diskette, refer to *Updating the System BIOS* in *IntelliStation M Pro User Guide*.
Read the instructions that come with the new microprocessor.
Turn off the computer.
Disconnect all cables attached to the computer and remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).
Read "Accessing the System Board" on page 17.

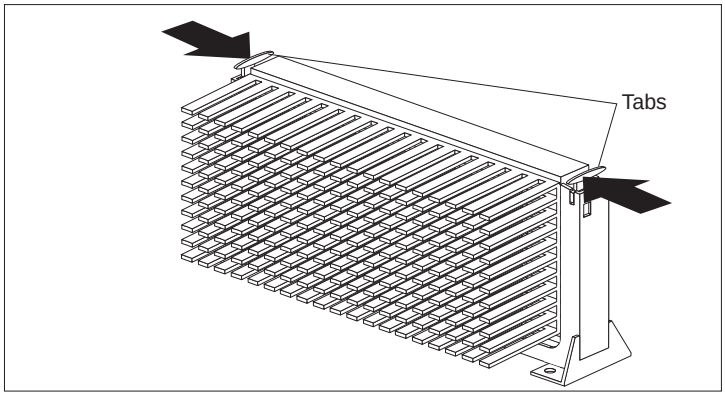
CAUTION:
The microprocessor and heat sink will be hot if the computer has been running. To avoid the possibility of a burn, let the microprocessor and heat sink cool for 10 minutes before continuing with the procedure.

The microprocessor in your computer comes with an attached heat sink. The microprocessor plugs into the system board and is stabilized with a plastic bracket attached to the system board. To remove the microprocessor:

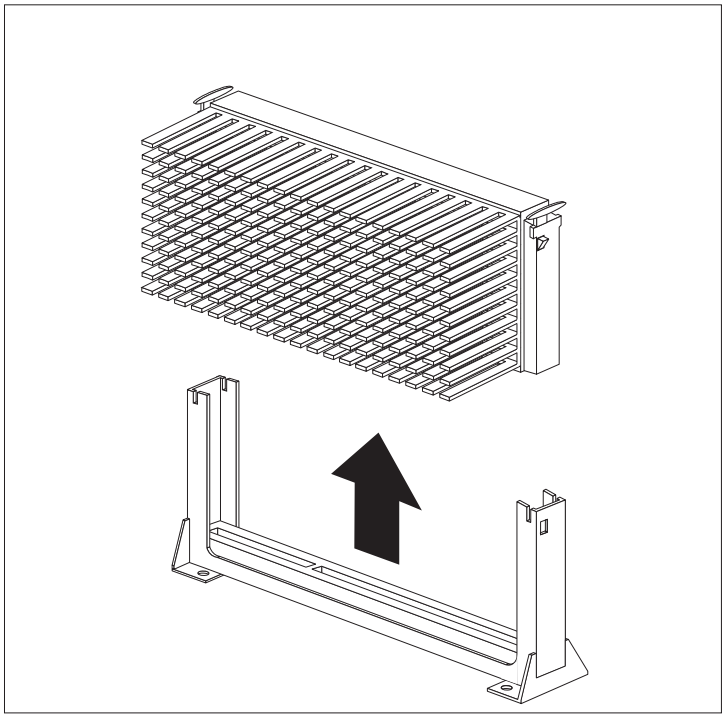
1 See "Identifying Parts on the System Board" on page 15 to locate the primary microprocessor socket.

2 Remove the air baffle. See "Removing and Replacing the Air Baffle" on page 17.

3 Place your index fingers on the small tabs on the top of the microprocessor. Push in toward the microprocessor until the tabs release.



4 Carefully place one hand on the computer frame and pull the microprocessor up and out of the connector with the other hand.



5 Store the old microprocessor in a static-protective package.

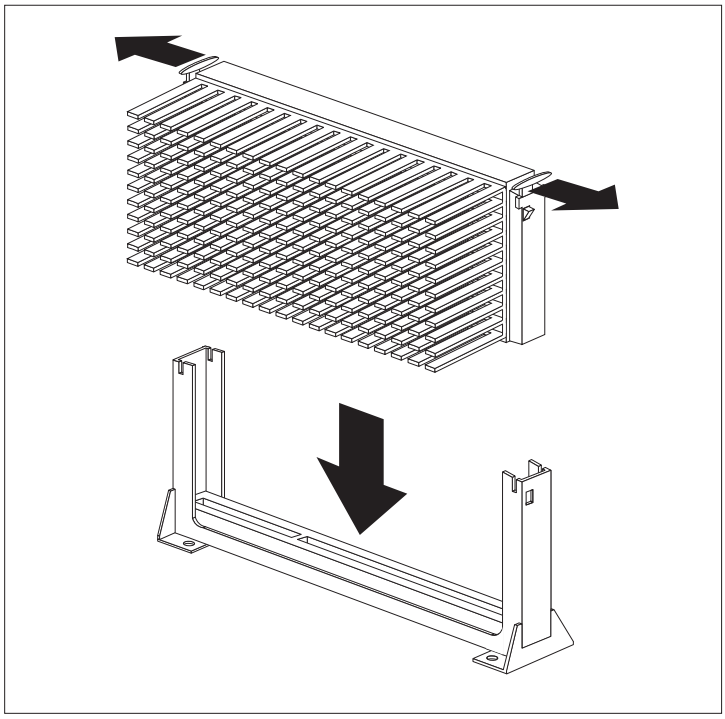
To replace the microprocessor:

1 Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface in the computer, and then remove the new microprocessor.

2 Press in on the retainer tabs until they click into place.

3 Align the new microprocessor with the connector on the system board and slide it into the guides. Press the microprocessor down until it seats in the connector.

4 Pull outward on the retainer tabs.



5 Reinstall the air baffle. See “Removing and Replacing the Air Baffle” on page 17.

6 When you replace the microprocessor with one that has a different speed, you must change the switch setting for microprocessor speed on your system board. Do not select a speed setting that is faster than the speed the microprocessor is designed for. Unpredictable results or hardware damage might occur.

For information on locating the switches, see the label inside the computer, or “Identifying Parts on the System Board” on page 15. For information on the appropriate switch settings, see the label or contact your IBM reseller or IBM marketing representative.

Note:
If a 167 POST error occurs when you start your computer, refer to *Updating the System BIOS* in *IntelliStation M Pro User Guide* and perform a flash update of the system programs.

What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Chapter 4. Working with Adapters

This section provides information and instructions for installing and removing adapters.

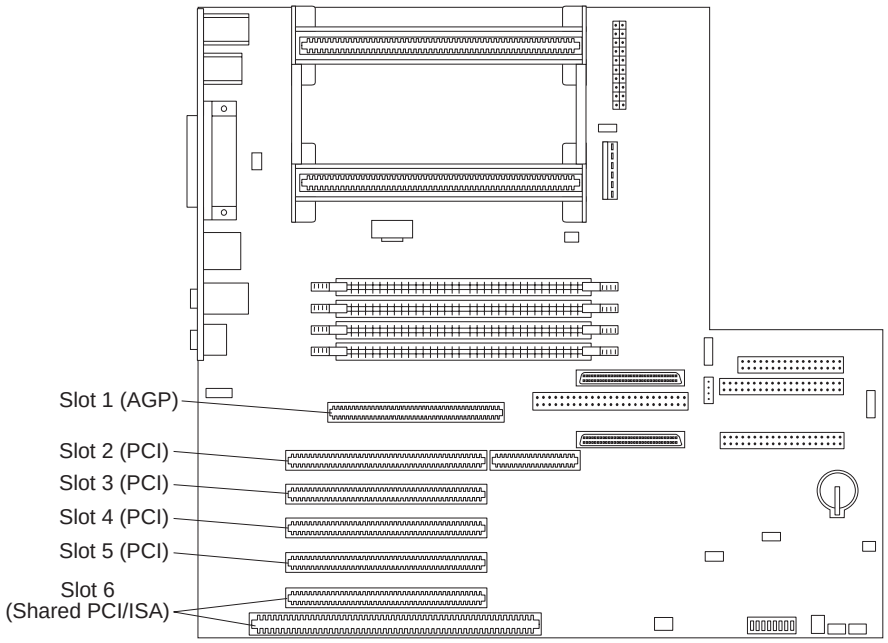
When you are installing or removing adapters, it is important to resolve any resource conflicts that might arise. For example, if you install an ISA legacy adapter, you might need to manually configure the adapter by setting a variety of switches on the adapter and by using the Configuration/Setup Utility program.

Many adapters now use *Plug and Play* technology which enables the computer to automatically configure the adapter, provided that the required resources are available. Refer to the instructions that come with your adapter to determine if it is Plug and Play. For more information, see “Adapter Configuration” on page 37.

Adapters

Your computer system board has expansion slots used to connect adapters to the industry standard architecture (ISA) and peripheral component interconnect (PCI) buses. In addition, slot 1 is designed for an Accelerated Graphics Port (AGP) adapter. Slot 2 is a PCI slot that also provides an extension to support an Adaptec ARO -1130 PCI RAIDport Card. In summary, there is one AGP slot, three PCI slots, one shared PCI/ISA slot, and one dedicated ISA slot. You can install only one adapter in the shared PCI/ISA slot.

The following illustration shows the location of expansion slots on the system board. Your computer comes with a preinstalled graphics adapter in one of the expansion slots.



Adapter Configuration

Along with the documentation that comes with your adapter, use the following information to help with adapter configuration.

Plug and Play Adapters

Plug and Play is a configuration method that makes expanding your computer easier. Support for Plug and Play is built into the system board of your computer.

If an adapter is Plug and Play, then there are no switches or jumpers that must be set on the adapter. A Plug and Play adapter comes with configuration specifications set in memory to provide installation information to the computer during startup. When you install or remove Plug and Play adapters, this information is interpreted by the *basic input/output system (BIOS),* which supports Plug and Play technology. If the required resources are available, then the BIOS software automatically configures the adapter around the resources already in use by other devices.

Adapters designed for PCI slots are Plug and Play devices; many ISA adapters are not Plug and Play devices. (ISA adapters that not Plug and Play are referred to as *legacy adapters*.)

Note:
See the *IntelliStation M Pro User Guide* for information on error messages resulting from resource conflicts.

Legacy Adapters

Adapters that are not Plug and Play are known as *legacy* adapters. If you install a legacy adapter, you must manually configure it by setting switches or jumpers on the adapter and by reserving it's resources using the Configuration/Setup Utility program.

In the Configuration/Setup Utility program, the ISA Legacy Resources screen shows the computer resources that are typically required by adapters:

Memory resources
I/O port resources
DMA resources
Interrupt resources

From the appropriate screens, you can select available resources for the adapter you are installing. Resources not being used by ISA legacy adapters are listed as [**Available**]. You must set the resources used by the newly installed ISA legacy adapter to [**ISA Resource]**. This notifies the Plug and Play software that these resources are in use.

Just as you change system resources for installed adapters, you must also change resources when you remove an ISA legacy adapter. If you remove a legacy adapter, change the resources it formerly used to [**Available**]. This allows the Plug and Play software to automatically use these resources for future configurations, or you can use these resources for future manual configurations.

Note:
Refer to the documentation that comes with the adapter for information on required system resources.

For information on configuring ISA legacy adapters, see “Configuring an ISA Legacy Adapter” on page 75 or refer to *IntelliStation M Pro User Guide.*

For information about error messages from resource conflicts, see the solving problems chapter in *IntelliStation M Pro User Guide.*

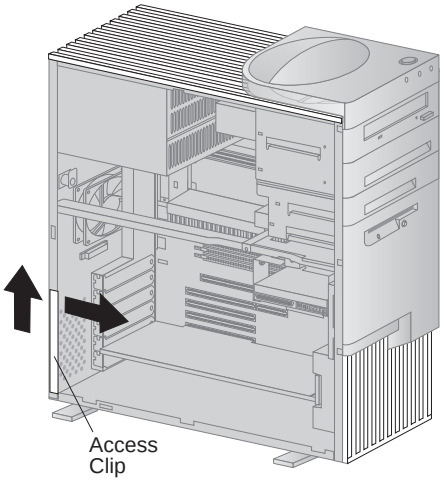
Installing Adapters

Before you begin:

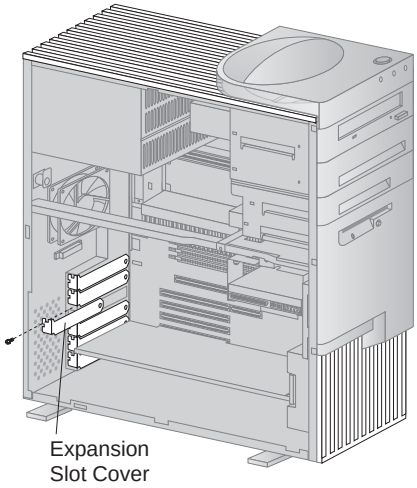
Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Read the instructions that come with the new adapter.
Turn the computer and all other connected devices off.
Disconnect all cables attached to the computer and remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).

1 Review the instructions that come with the adapter to determine if it must be installed in an AGP, ISA, or PCI expansion slot.

2 Remove the access clip on the rear frame by sliding it upward approximately 12 mm (0.5 in) then slide it to the right until it comes off.



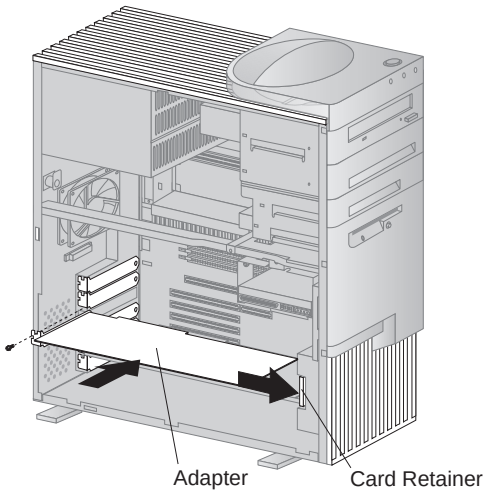
3 Remove the screw and cover for the appropriate expansion slot.



4 Touch the static-protective package containing the adapter to any *unpainted* metal surface in the computer, then remove the adapter from the package.

5 For full length adapters or adapters with extenders, you must push the card retainer toward the front of the computer until it latches into a position where you can insert the adapter into the guides. Then install the adapter into the appropriate slot on the system board. When the adapter is fully seated, release the retainer by pushing inward on the latch. Make sure the retainer holds the adapter securely in place.

Note:
AGP graphics adapters must be installed in the top expansion slot (slot 1).



6 Install the screw that secures the adapter in the expansion slot.

7 Replace the access clip by sliding it onto the rear frame until it latches into position.

8 Go to the device-record form in *IntelliStation M Pro User Guide*, and write the adapter name next to the slot into which you installed it.

Note:
Adapters require system resources. If you add an ISA legacy adapter, you must use the Configuration/Setup Utility program to set some previously [**Available**] resources to [**ISA Resource**]. For more information, see "Legacy Adapters" on page 38.

What to do next:

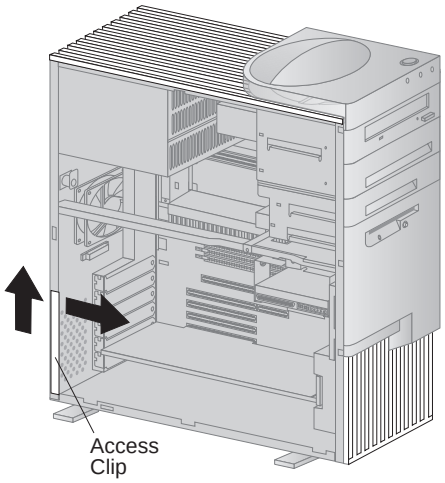
To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Removing Adapters

Before you begin:

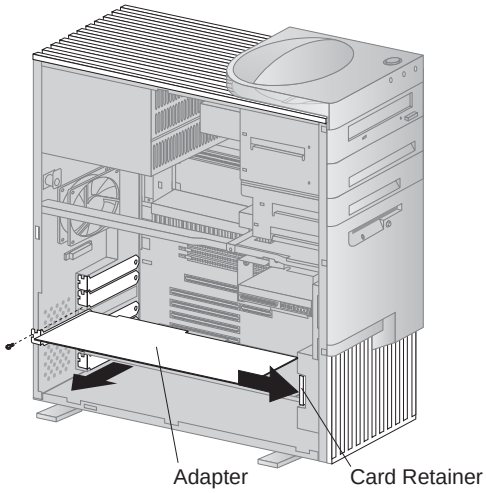
Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn the computer and all other connected devices off.
Disconnect all external cables and power cords, and then remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).

1 Remove the access clip on the rear frame by sliding it upward approximately 12mm (0.5 in) then slide it to the right until it comes off.



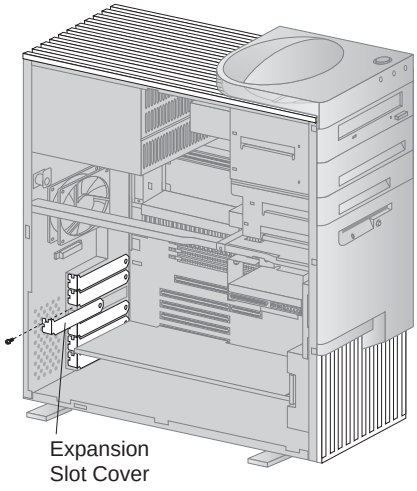
2 Locate the adapter and remove the screw.

3 For full length adapters or adapters with extenders, you must push the card retainer toward the front of the computer until it latches into a position where you can remove the adapter. After the adapter is removed, release the retainer by pushing inward on the latch. The following illustrations show an adapter being removed from an expansion slot.



4 Insert the adapter into a static-protective package.

5 If you are not installing another adapter in this slot, install an expansion-slot cover. The following illustrations show the expansion-slot cover being installed.



6 Replace the access clip by sliding it onto the rear frame until it latches into position.

7 Go to the device-record form in *IntelliStation M Pro User Guide* and delete the name of the adapter you removed.

Note:
Removing an adapter frees up system resources. If you remove an ISA legacy adapter, you must use the Configuration/Setup Utility program to set the previously used resources to [**Available**]. For more information, see "Legacy Adapters" on page 38.

What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Chapter 5. Working with Internal Drives

This section provides information and instructions for installing and removing internal drives.

When you are installing an internal drive, it is important to note what kind of drive you can install in each bay and the height restrictions imposed by each drive bay. Also, it is important to correctly connect the internal drive cables to the installed drive. For more information, see “Internal Drives” on page 46.

Internal Drives

Internal drives are devices that your computer uses to read and store data. You can add drives to your computer to increase storage capacity and to enable your computer to read other types of media. Some of the different drives available for your computer are:

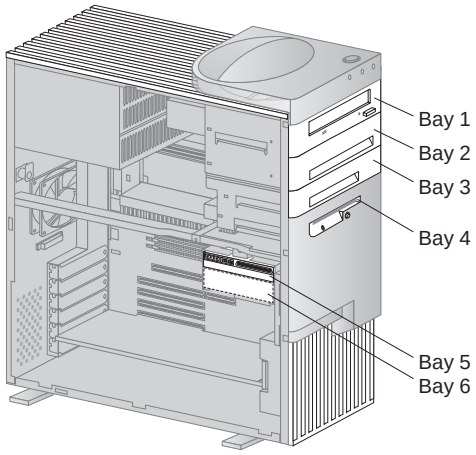
Diskette drives
Hard disk drives
Tape drives
CD-ROM drives

Internal drives are installed in *bays*. Within this book, the bays are referred to as bay 1, bay 2, and so on.

Your computer comes with the following IBM-installed drives:

A CD-ROM drive in bay 1.
A 3.5-inch diskette drive in bay 4.
A 3.5-inch hard disk drive in bay 5.

The following illustration shows the location of the drive bays in your computer.



Drive Specifications

The following table describes some of the drives you can install in each bay and their height requirements.

Bay	Drives
1 - Max Height=41.3mm (1.6 in.)	CD-ROM drive 3.5-inch or 5.25-inch diskette drive 3.5-inch or 5.25-inch tape backup drive 3.5-inch or 5.25-inch hard disk drive
2 - Max Height=41.3mm (1.6 in.)	CD-ROM drive 3.5-inch or 5.25-inch diskette drive 3.5-inch or 5.25-inch tape backup drive 3.5-inch or 5.25-inch hard disk drive
3 - Max Height=25.4mm (1.0 in.)	3.5-inch hard disk drive 3.5-inch diskette drive 3.5-inch tape backup drive
4 - Max Height=25.4mm (1.0 in.)	3.5-inch diskette drive
5 - Max Height=41.3mm (1.6 in.)	3.5-inch hard disk drive
6 - Max Height=25.4mm (1.6 in.)	3.5-inch hard disk drive

Notes:

1. Drives that are greater than 41.3 mm (1.6 in.) high cannot be installed.
2. Install removable media (diskettes, tapes, or CDs) drives in the accessible bays: bays 1, 2, 3, or 4.
3. If a 41.3 mm (1.6 in.) drive is installed in either bay 5 or bay 6, no drive can be installed in the other bay of the lower drive bracket.
4. To properly mount a 3.5-inch drive into bay 1 or 2 (5.25-inch bays), use a 3.5-inch conversion kit for a 5.25-inch bay. For more information, see your IBM reseller or IBM marketing representative.

Power and Signal Cables

Your computer uses cables to connect integrated drive electronics (IDE) and SCSI drives to the power supply and system board. The following cables are provided:

Four-wire *power cables* connect most drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.

Flat *signal cables* for connecting IDE and diskette drives to the system board; signal cables are sometimes called *ribbon cables*. There are two sizes of ribbon signal cables that come with your computer:

- The wider signal cable has three connectors. One of these connectors is attached to the CD-ROM drive, one is a spare, and the third attaches to the primary IDE connector on the system board.
- The narrower signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the system board.

If your computer is equipped with an internal SCSI hard disk drive, a ribbon cable is provided that connects the drive to the SCSI controller channel A, 68-pin connector on the system board. This cable also provides connectors for attaching additional internal SCSI devices. There is also a ribbon cable connecting the channel B, 68-pin connector on the system board to an external SCSI connector at the rear of the chassis. There is a 50-pin SCSI connector provided for connecting internal *legacy* SCSI devices. Your computer does not come with a cable attached to this connector.

For more information on connecting SCSI devices, see Appendix A, “Tips for Installing SCSI Devices” on page 79 and the *Adaptec SCSI Documentation* on the *Ready-to-Configure Utility Program CD* that comes with your computer.

Note:
To locate connectors on the system board, see “Identifying Parts on the System Board” on page 15.

The following are some important points to remember when connecting power and signal cables to internal drives:

The diskette drive, hard disk drive, and CD-ROM drive that are preinstalled in your computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.

When you install a drive, ensure that the drive connector at the end of the signal cable is always connected to a drive; also, ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.

If two IDE devices are used on a single cable, one must be designated as the primary or master device and the other a secondary or subordinate device; otherwise, some of the IDE devices might not be recognized by the system. The primary or secondary designation is determined by switch or jumper settings on each IDE device.

To optimize performance when installing more than two IDE hard disk drives, be sure to attach IDE hard disk drives with faster data transfer speeds (Mode 1 or higher) to the primary hard disk drive signal cable (hard disk drives 0 and 1).

To install more than two IDE hard disk drives, you must purchase an additional signal cable. The cable must meet the following specifications:

- Maximum length: 0.46 meters (18 inches)
- Wire size: 28 AWG
- Cable capacitive loading: 200 pF maximum

If you want to install more than one diskette drive, you must purchase a four-wire, Y-cable that provides two power connectors.

To attach an external drive, you must install an appropriate adapter in the computer.

For help in selecting drives, cables, and other options for your computer, do one of the following:

Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or your IBM marketing representative.

Within Canada, call 1-800-565-3344 or 1-800-465-7999.

Outside the United States and Canada, contact your IBM reseller or IBM marketing representative.

Accessing Drive Bays

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn off the computer and all other connected devices.
Disconnect all external cables and power cords, and then remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).

Notes:

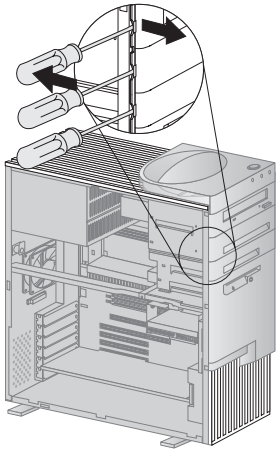
1. Drive bays 1, 4, and 5 come with drives preinstalled.
2. Drive bays 2 and 3 have a bay panel and static shield installed.
3. If you remove a drive which has removable media from a bay and you do not intend to install a new drive immediately, reinstall the static shield and bay panel for that bay.

To access drive bays 1 through 4, go to "Accessing Drive Bays 1 through 4" on page 51.

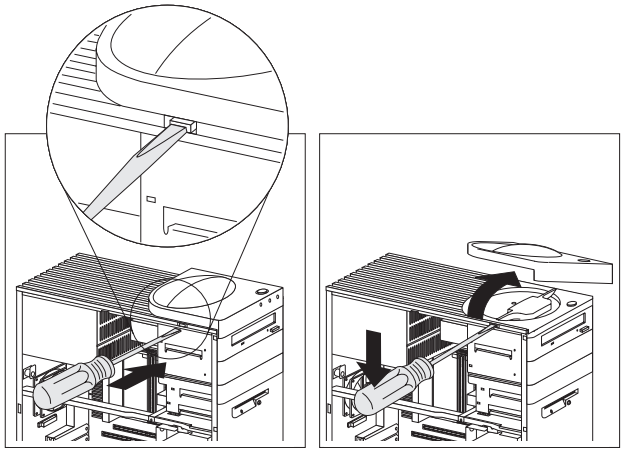
To access drive bays 5 and 6, go to "Accessing Drive Bays 5 and 6" on page 53.

Accessing Drive Bays 1 through 4

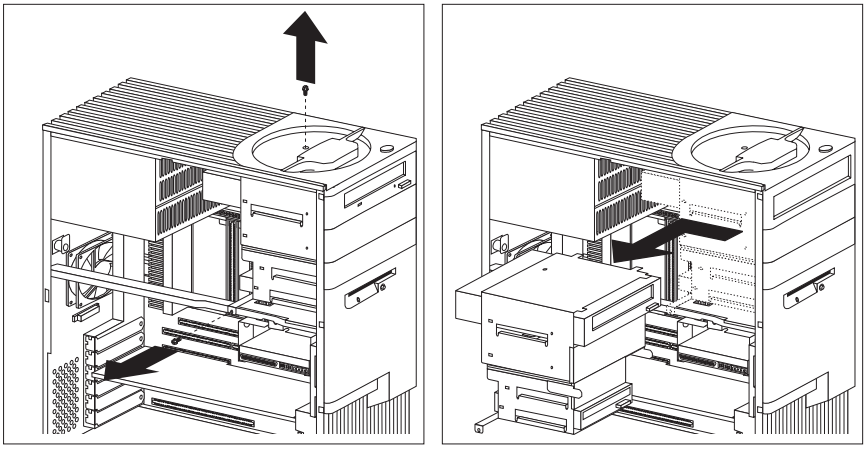
1 If the drive you are installing has removable media, remove the bay panel from the drive bay by using a flat-bladed screwdriver to pry the tab on the left edge of the panel as shown.



2 Remove the top cover by using a flat-bladed screwdriver to release the tab on the left edge as shown.



3 Remove the two screws that secure the top and the bottom of the upper drive bracket, then disconnect the power and signal cables attached to the drives in the upper drive bracket.



4 Slide the drive bracket to the rear approximately 25mm (1.0 in.) and then slide it sideways until it is out of the computer.

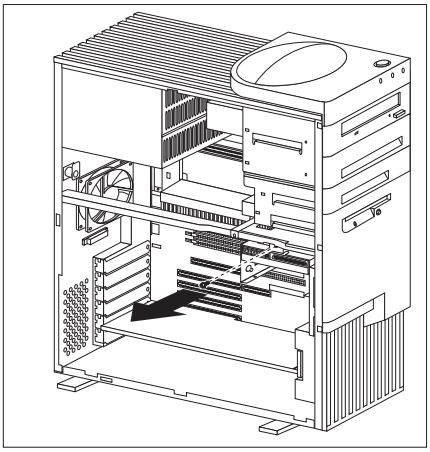
5 If the drive you are installing has removable media, remove the static shield from the drive bay where you are installing the drive.

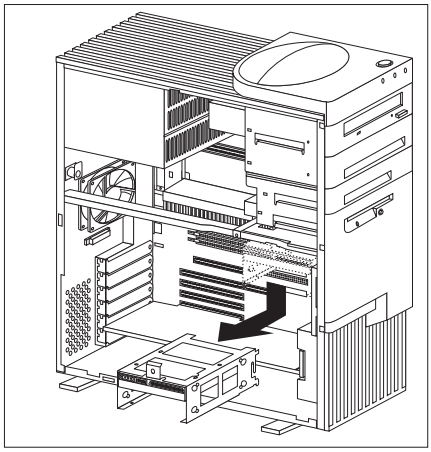
Accessing Drive Bays 5 and 6

1 Remove the screw that secures the lower drive bracket.

2 Rotate the drive bracket downward and slide it out.

3 If necessary, disconnect the power and signal cables attached to the drives in the lower drive bracket.





Installing a Drive in Bay 1, 2, 3, or 4

Before you begin:

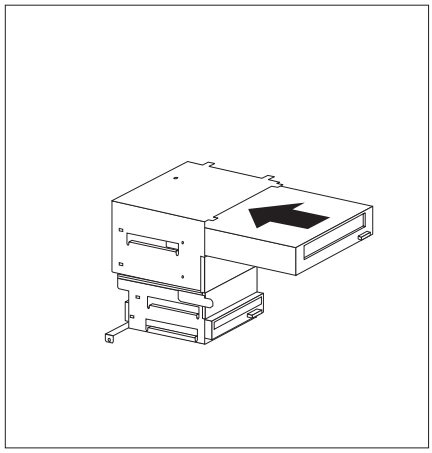
For information on installing SCSI drives, refer to Appendix A, "Tips for Installing SCSI Devices" on page 79 and the *Adaptec SCSI Documentation* provided on the *Ready-to-Configure Utility Program CD*.
Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn the computer and all other connected devices off.
Disconnect all external cables and power cords, and then remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).
Read the documentation that comes with the drive.
Read "Internal Drives" on page 46.
Bays 1 and 2 can hold up to a 5.25-inch drive, such as a CD-ROM, diskette, hard disk, or tape drive.
Bays 3 and 4 can hold up to a 3.5-inch drive, such as a diskette, hard disk, or tape drive.
Drives that are greater than 41.3 mm (1.6 in.) high cannot be used.
Drives that require removable media (diskettes, tapes, or CDs) must be installed in the accessible bays: 1, 2, 3, or 4.
To install a SCSI drive in a model that has IDE drives only, you must purchase an internal SCSI cable. See your IBM reseller or IBM marketing representative.
To install a 3.5-inch drive into drive bay 1 or 2(5.25-inch bays), you must install a conversion kit. For information on purchasing a 3.5-inch conversion kit for a 5.25-inch bay, see your IBM reseller or IBM marketing representative.

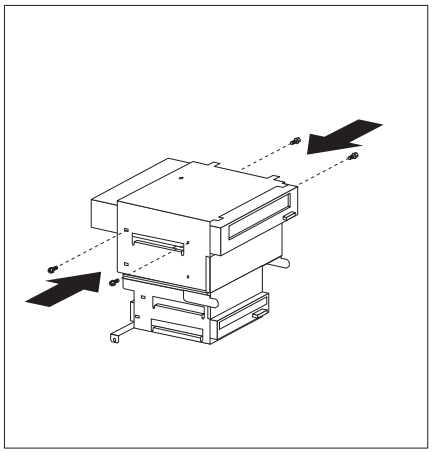
1 Determine which drive bay of the upper drive bracket you are going to use.

2 Remove the upper drive bracket. See “Accessing Drive Bays” on page 50.

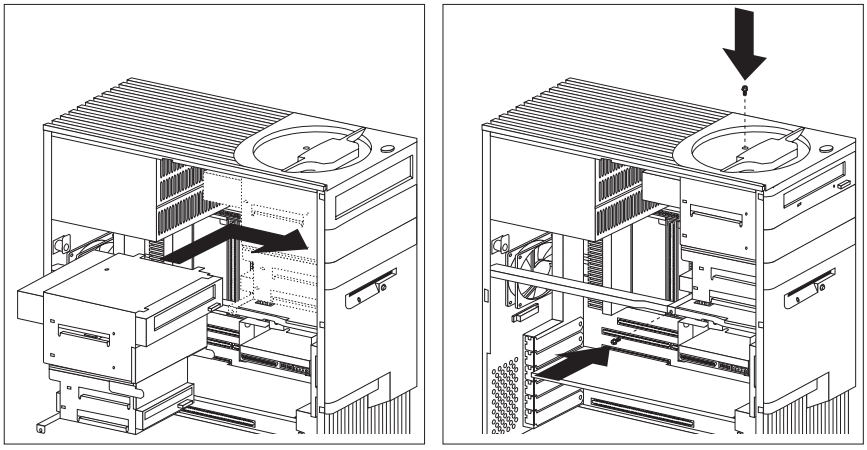
3 Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.

4 Install the drive into the upper drive bracket so that the power and signal cable connectors are to the rear of the computer. Align the screw holes and insert the four screws.

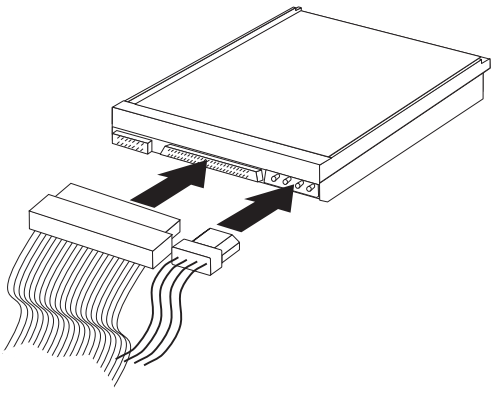




5 Reinstall the upper drive bracket and secure it with screws at the top and bottom.



6 Connect the power and signal cables to the drive(s).



What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Installing a drive in bay 5 or 6

Bays 5 and 6 can accommodate 3.5-inch hard disk drives only.

Before you begin:

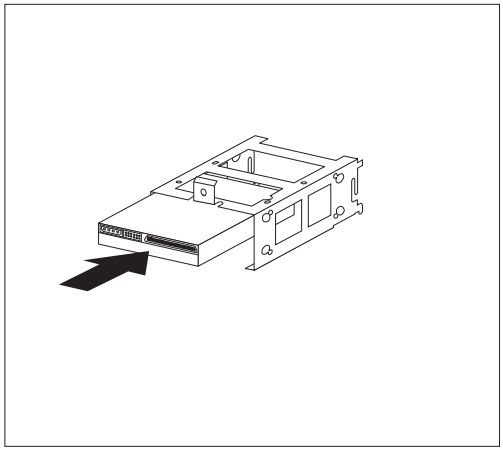
For information on installing SCSI drives, refer to Appendix A, "Tips for Installing SCSI Devices" on page 79 and the *Adaptec SCSI Documentation* provided on the *Ready-to-Configure Utility Program CD*.
Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn the computer and all other connected devices off.
Disconnect all external cables and power cords, and then remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).
Read the documentation that comes with the drive.
To install a SCSI drive in a model that has IDE drives only, you must purchase an internal SCSI cable. See your IBM reseller or IBM marketing representative.
Read "Internal Drives" on page 46.

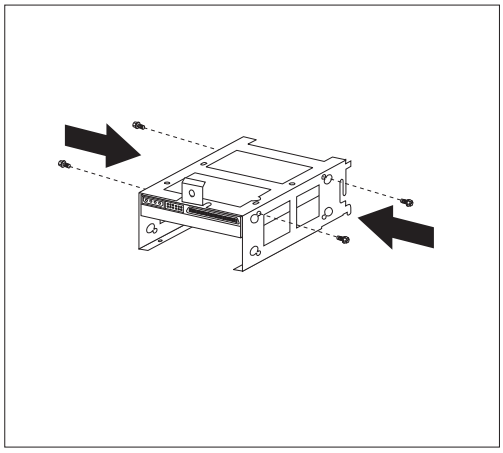
1 Determine which drive bay of the lower drive bracket you are going to use.

2 Remove the lower drive bracket. See "Accessing Drive Bays" on page 50.

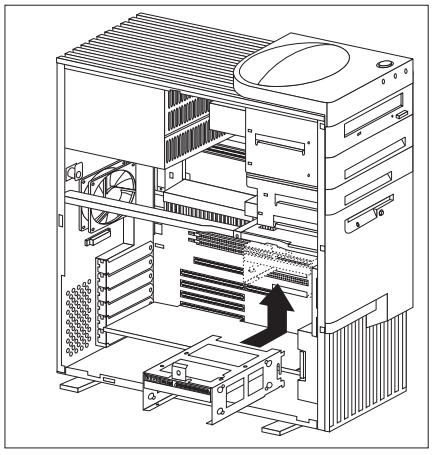
3 Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.

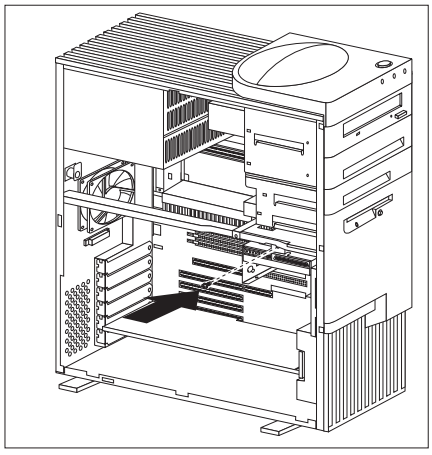
4 Install the drive into the lower drive bracket so that the power and signal cable connectors are to the open side of the computer. Align the screw holes and insert the four screws.



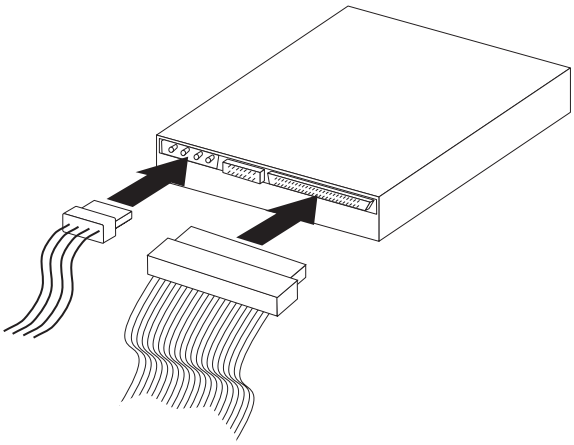


5 Reinstall the lower drive bracket and secure it with the screw.





6 Connect the power and signal cables to the drive(s).



What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Chapter 6. Working with Security Options

This section describes some of the security options that are available for your computer.

To help prevent hardware theft you can use the cover lock and add a security U-bolt and cable to your computer.

To erase lost or forgotten passwords in order to set up password protection, you can move the CMOS clear (password) jumper on the system board.

Important:
Clearing CMOS memory erases the configuration of your computer. Therefore, you must, reconfigure the computer after clearing CMOS memory. If possible, record the configuration information of your computer *before* moving the CMOS jumper.

Note:
Use the Configuration/Setup Utility program to set, change, or delete passwords. For more information, see *IntelliStation M Pro User Guide*.

To help deter software and data theft, you can set the diskette write-protect switch on the system board to prevent writing data to diskettes.

The following list is a quick reference to these procedures:

"Installing a Security U-bolt" on page 61

"Erasing Lost or Forgotten Passwords" on page 64

"Setting the Diskette Write-Protect Switch" on page 67

Installing a Security U-bolt

You can add a security U-bolt to the rear of your computer. Adding a U-bolt enables you to add a security cable and lock which helps prevent hardware theft. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

Before you begin:

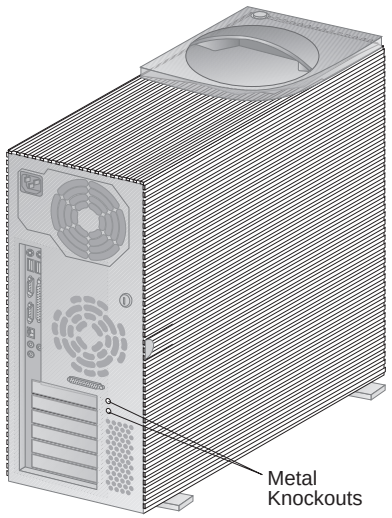
Obtain the following:
- A 19-mm (3/4 in.) U-bolt and threaded nuts that fit the U-bolt
- A security cable
- A lock, such as a combination lock or padlock
- An appropriately sized or adjustable wrench
- A flat-bladed screwdriver

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.

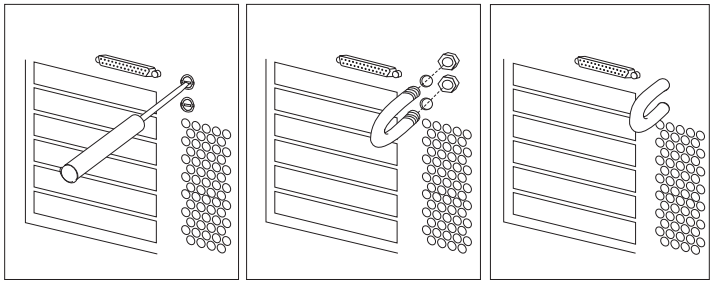
Turn the computer and all other connected devices off.

Disconnect all external cables and power cords, and remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).

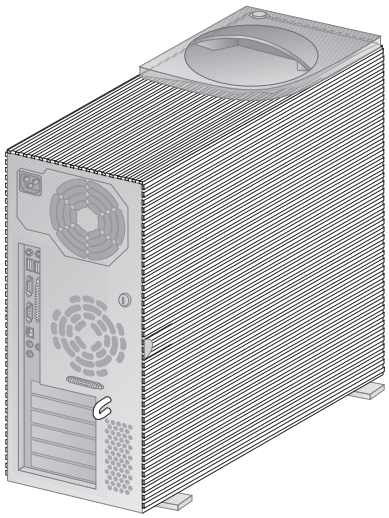
1 Use a tool, such as a screwdriver, to remove the two metal knockouts.



2 Insert the U-bolt through the rear panel, then attach and tighten the nuts with an appropriately sized or adjustable wrench.

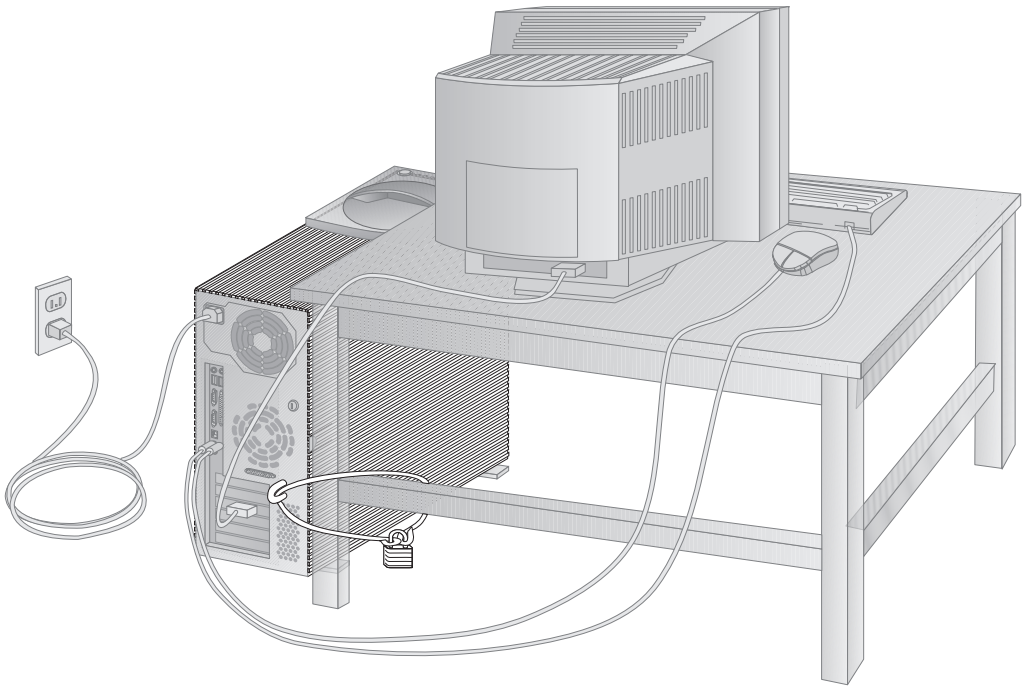


3 Replace the computer cover. For more information, see “Replacing the Cover and Connecting the Cables” on page 69.



4 Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed; then fasten the cable ends together with a lock.

The following illustration shows an example of how this might work.



Erasing Lost or Forgotten Passwords

Note:
To set, change, or delete a password, see *IntelliStation M Pro User Guide.*

Your computer uses *complementary metal-oxide semiconductor (CMOS)* memory on the system board for storing configuration and setup information. CMOS memory maintains information about:

- Date and time
- Security features
- Power-management devices
- Storage devices
- Keyboard and mouse
- ISA legacy configuration information
- Plug and Play configuration information
- Port assignments
- I/O addresses and interrupts
- Other selectable features

Within the security features are the settings for the power-on and administrator passwords. If you need to *erase* a lost or forgotten password, you must erase all CMOS configuration and setup information by moving the jumper designated as *Clear CMOS Request*.

To locate this jumper, see "Identifying Parts on the System Board" on page 15 or see the label inside the computer.

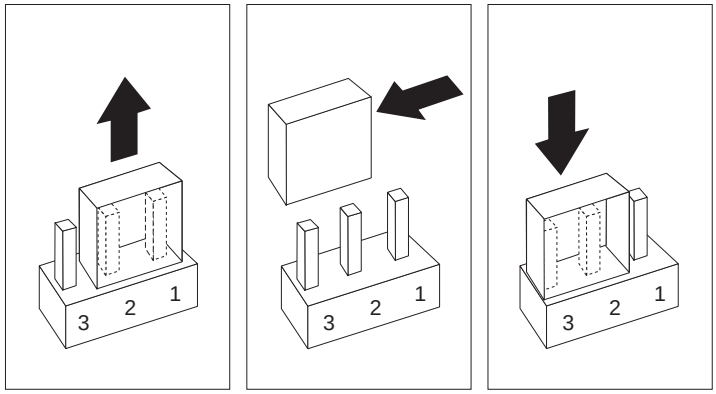
Important:
Clearing CMOS memory erases the configuration of your computer. Therefore, you must reconfigure the computer after clearing CMOS memory. If possible, record the configuration information of your computer *before* moving the CMOS jumper.

Before you begin:

Using the Configuration/Setup Utility program, record all configuration information.
Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn off the computer and unplug the power cord.
Remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).

1 Locate the *Clear CMOS Request* jumper on the system board. For more information, see "Identifying Parts on the System Board" on page 15 or see the label inside the computer.

2 Move the jumper from its normal position (pins 1 and 2) to pins 2 and 3. It might be helpful to use needlenose pliers to move the jumper, but be careful not to damage any system board components or crush the jumper.



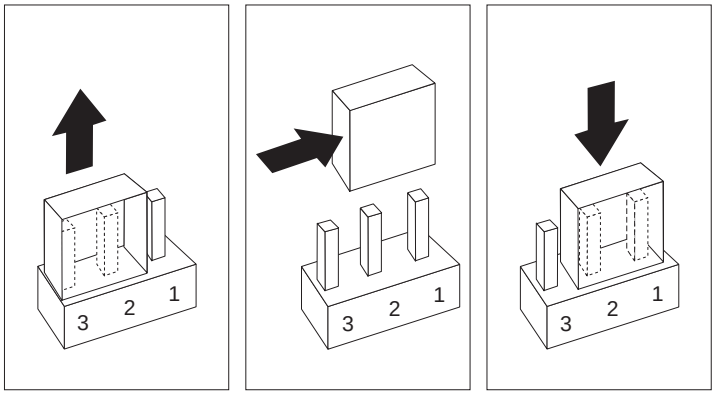
3 Turn the computer back on for approximately 10 seconds.

CAUTION:
Do not touch any components while power is on.

4 Turn off the computer. CMOS memory is now cleared.

Note:
You might not be able to power off with a single touch of the power switch until POST is nearly complete. Press and hold the power switch for 5 seconds or unplug the power cord to power off your computer.

5 Move the jumper back to its normal position (pins 1 and 2).



What to do next:
After clearing CMOS memory, you must reconfigure the computer. After reassembling the computer (go to Chapter 7, "Completing the Installation" on page 68), use the Configuration/Setup Utility program to reset the date and time, reset any passwords, and reconfigure the computer. For more information, refer to "Setting Passwords" on page 78 and *IntelliStation M Pro User Guide*.

Setting the Diskette Write-Protect Switch

The diskette write-protect switch controls whether you can write information to a diskette using a diskette drive. The ability to prevent writing to a diskette is particularly useful if you are concerned about the security of information that can be obtained through a network.

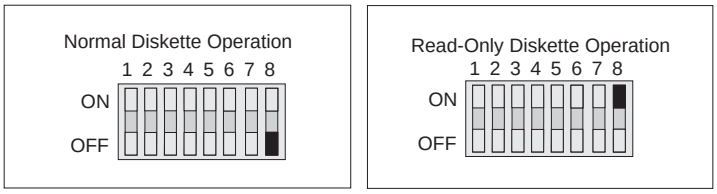
Note:
This switch does not affect the ability to read information from a diskette.

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
Turn the computer and all other connected devices off.
Disconnect all external cables attached to the computer, and then remove the computer cover (see Chapter 2, "Preparing to Install and Remove Options" on page 6).

1. Locate the rocker switches on the system board. Refer to the label inside the computer or see "Identifying Parts on the System Board" on page 15.

2. For normal diskette operation or for read-only diskette operation, set switch 8 as illustrated below. It might be helpful to use the end of a small screwdriver to set the switch.



What to do next:

To work with another option, go to the appropriate section.
To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Chapter 7. Completing the Installation

After working with options, you need to install any removed parts, replace the cover, and reconnect any cables, including power cords and telephone lines. Also, depending on the option installed, you might need to update information in the Configuration/Setup Utility program.

The following list is a quick reference to these procedures:

Replacing the Cover and Connecting the Cables

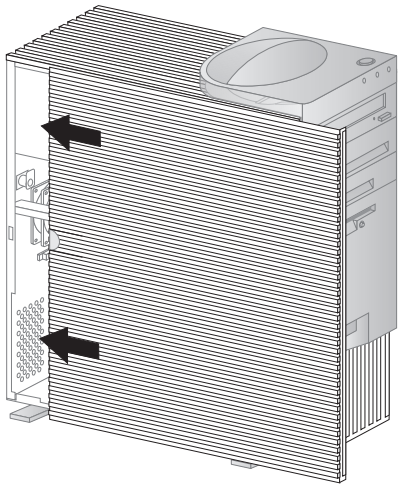
Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.

1 Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.

2 Clear any cables that might impede the replacement of the cover.

3 Install the side cover by placing it into position and sliding it to the rear as shown in the following illustration. Make sure the cover is latched into position.



4 Lock the cover. For more information on locking the computer cover, see *IntelliStation M Pro User Guide.*

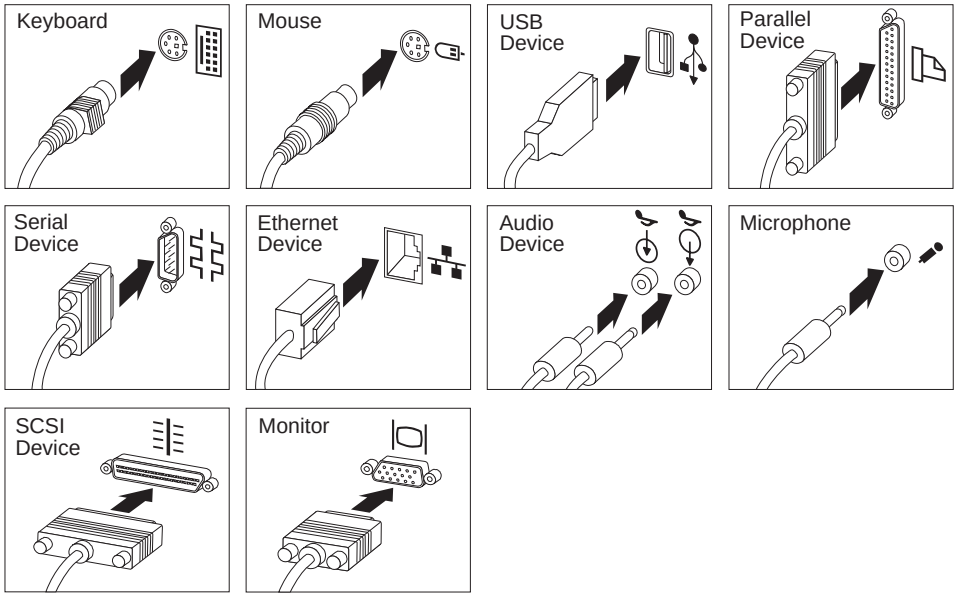
5 Make sure the stabilizing feet are rotated outward so that they properly support the computer. Refer to "Using the Stabilizing Feet" on page 6.

Important Information:

In the United Kingdom, by law, the telephone cable must be connected after the power cord.
The power line and power control behavior of the IntelliStation M Pro is different than earlier computer models. Please observe the following:

- When the power cord is first plugged in, the computer may appear to power on for a few seconds, then power off. This is a normal sequence to enable the computer to self initialize.
- The power switch will normally operate with a single touch. However, in some circumstances the computer may not immediately turn off. In this case, hold the power switch down for approximately 5 seconds. The computer will then turn off.

6 Reconnect the external cables and cords to the computer.



7 If you have a modem or fax machine attached to the computer, and you are not in the U.K., reconnect the telephone line to the wall outlet and the computer and plug the power cords into properly grounded electrical outlets. If you are in the U.K., plug in the power cords first and then connect the telephone line to the wall outlet and the computer.

Updating the Computer Configuration

Important:
The configuration information in this section applies to installing options. For more information on using the Configuration/Setup Utility program, see *IntelliStation M Pro User Guide*.

Also, you may need to install device drivers after updating the configuration settings. For more information, see the instructions that come with the option to determine if device drivers are required and how to install them. Also, video, SCSI, and Ethernet device drivers are on the *Ready-to-Configure Utility Program CD*.

After adding, removing, or replacing options, the configuration settings will need to be updated. This reconfiguration is performed automatically by the computer or *manually* by you. When the computer automatically configures an option, it uses system programs. However, you must save the new settings. If the system programs do not update the settings, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings.

For example, when you start your computer after adding most internal hard disk drives, the settings are automatically updated, and you use the Configuration/Setup Utility program to save those changes. However, if a resource conflict arises after an ISA legacy adapter is installed or removed, you must manually update the computer configuration and save the information.

Notes:

1. Make a record of all customized settings before you perform any of the following steps.
2. For more information on error messages from resource conflicts, see *IntelliStation M Pro User Guide*.

Starting the Configuration/Setup Utility Program

When you restart the computer for the first time after working with most options, a message appears indicating that a configuration change has occurred. You are then prompted to enter the Configuration/Setup Utility program to manually update the configuration settings or to confirm and save the settings that were automatically updated by the system programs.

After you change an option and restart the computer, the following screen might appear.

POST Startup Error(s)

The following error(s) were detected when the system was started:

162 Configuration Change Has Occurred

Select one of the following:

Continue
Exit Setup

Note:
Depending on the configuration changes that occurred, the error message you see might be different from the one shown here. If the preceding screen appears, select **Continue** until you reach the Configuration/Setup Utility menu (see "Changing Settings and Exiting" on page 74).

If the preceding screen does not appear, then use the following procedures to access the Configuration/Setup Utility menu.

To access the Configuration/Setup Utility program:

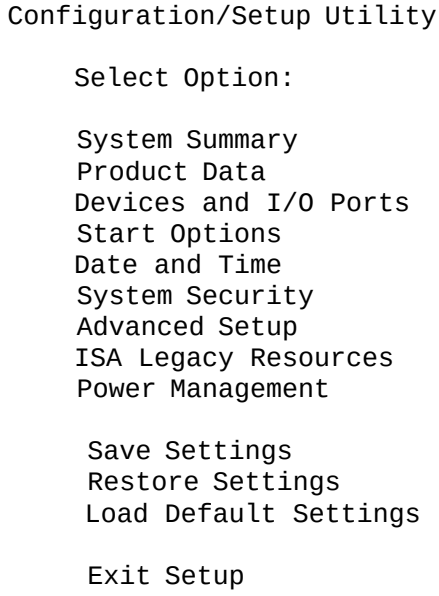
1. Turn on the computer.

   If your computer is on when you start this procedure, you must shut down the operating system, turn off the computer and wait a few seconds, and then restart the computer. Do not use **Ctrl+Alt+Del** to restart the computer.

2. When the Configuration/Setup Utility prompt appears in the lower left corner of the screen, press **F1**.

   a. If you have *not* set an administrator password, the Configuration/Setup Utility program menu appears. If you have set an administrator password, type the administrator password and press **Enter**.

   b. If you have set both an administrator and a power-on password, you can type either of the passwords at the password prompt. However, if you type your power-on password, you can *view* limited information in the Configuration/Setup Utility program, but you cannot *change* settings. To change settings in the Configuration/Setup Utility program, type your administrator password at the password prompt.



Note:
The menu you see on your computer might look slightly different from the menu shown here, but it will operate the same way.

Changing Settings and Exiting

In the Configuration/Setup Utility menus, you can accept the configuration changes by viewing and saving the changes, or you can make manual changes and then save the settings.

The following is a quick reference for identifying symbols in the Configuration/Setup Utility program. For information on the function of keys, see *IntelliStation M Pro User Guide*.

If a bullet ( ) is beside a menu item, then an additional menu is available.

Most information enclosed in brackets ([ ]) can be changed. You cannot change information that is not surrounded by [ ].

A right arrowhead (→) beside a menu item indicates that a configuration change occurred in that category. The → might also appear in subsequent menus.

If an asterisk (*) is beside a menu item, then a resource conflict is detected.

When you complete your changes or finish viewing information, return to the Configuration/Setup Utility menu and select **Save Settings** to save the changes. From this location, you can exit the Configuration/Setup Utility program.

To exit from the Configuration/Setup Utility program, follow these steps:

1. From the Configuration/Setup Utility menu, press **Esc**.
2. The Exit Setup menu appears. You can save your changes, exit from the Configuration/Setup Utility program without saving your changes, or return to the Configuration/Setup Utility menu. Use the arrow keys to select the desired option and press **Enter**.

Configuring an ISA Legacy Adapter

To configure an installed ISA legacy adapter, you might need to alter switch or jumper settings on the adapter. Also, you must use the Configuration/Setup Utility program to identify the ISA legacy resource requirements, such as memory locations, I/O assignments, and DMA and interrupt assignments.

Note:
For more information about required resources and switch settings, refer to the documentation that comes with the adapter.

To store the legacy resource information for an installed adapter:

1. Start the Configuration/Setup Utility (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **ISA Legacy Resources** from the Configuration/Setup Utility menu and press **Enter**.
3. As needed, select **Memory Resources, I/O Port Resources, DMA Resources,** or **Interrupt Resources**.
4. Set the appropriate resource to **ISA Resource** and press **Enter**.
5. Remember to save the changes when you exit from the Configuration/Setup Utility program.
6. Return to the Configuration/Setup Utility menu and select **Save Settings** to save the changes. From this location, you can exit the Configuration/Setup Utility program.

   To exit from the Configuration/Setup Utility program, follow these steps:

   a. From the Configuration/Setup Utility menu, press **Esc**.

   b. The Exit Setup menu appears. You can save your changes, exit from the Configuration/Setup Utility program without saving your changes, or return to the Configuration/Setup Utility menu. Use the arrow keys to select the desired option and press **Enter**.

If you remove an ISA legacy adapter, you must set to **Available** the system resources that are no longer being used. To do this, follow the above procedures and select **Available** at step 4.

Note:
For more information on adapters and resolving conflicts, see “Adapter Configuration” on page 37 and Appendix C, “Interrupt and DMA Resources” on page 83.

Configuring Startup Devices

Startup devices are devices where the computer looks for an operating system when it is powered on. After adding new devices to the computer, you might want to change the sequence of the startup devices. You can use the Configuration/Setup Utility program to configure startup devices.

To configure startup devices:

1. Start the Configuration/Setup Utility (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **Start Options** from the Configuration/Setup Utility menu and press **Enter**.
3. Select **Startup Sequence** from the Start options menu and press **Enter**.
4. Select **First Startup Device** and press **Enter**.
5. Use the arrow keys to make your selection and press **Enter**.
6. If necessary, repeat the above steps for **Second Startup Device**, **Third Startup Device**, and **Fourth Startup Device**.
7. If **Automatic Power On Startup Sequence** is enabled, repeat the above steps to select the startup devices.
8. Remember to save the changes when you exit from the Configuration/Setup Utility program.

Setting Passwords

If you used the *Clear CMOS Request* jumper to erase lost or forgotten passwords, configuration and setup information is also erased. You must reconfigure the computer, and reset the power-on and administrator passwords.

For information on clearing CMOS memory, see "Erasing Lost or Forgotten Passwords" on page 64.

For more information on password protection and setting the date and time, see *IntelliStation M Pro User Guide*.

To set a power-on or administrator password:

1. Start the Configuration/Setup Utility (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **System Security** from the Configuration/Setup Utility menu and press **Enter**.
3. Select **Administrator Password** or **Power-on Password** and press **Enter**.
4. Type in the new password in the appropriate fields.
5. Select **Change Password** and press **Enter**. For more information, see the passwords section of *IntelliStation M Pro User Guide*.
6. Remember to save the changes when you exit from the Configuration/Setup Utility program.

Appendix A. Tips for Installing SCSI Devices

Along with the *Adaptec SCSI Documentation* on the *Ready-to-Configure Utility Program CD* that comes with your computer, use the following information when you are installing SCSI devices.

1 Prepare each SCSI device *before* installation.

a. Ensure that the proper SCSI identification (ID) number is set. SCSI IDs range from 0 to 15, and the SCSI ID is automatically or manually set. The default setting for the Adaptec Dual Channel UltraSCSI controller is 7. If the SCSI device you are installing supports the SCSI Configured AutoMatically (SCAM) protocol, you do not need to manually assign the ID. However, if the device does not support the SCAM protocol, use the documentation that comes with the device to manually set the SCSI ID.

2 Use the instructions in Chapter 5, "Working with Internal Drives" on page 45 to install internal SCSI devices. These instructions are for the general installation of an internal drive in your computer.

3 To install a SCSI drive in a model that has IDE drives only, you must purchase an internal SCSI cable. See your IBM reseller or IBM marketing representative.

4 Ensure that the SCSI cables are set up properly.

a. The cables attach only one way to the connectors on the system board.

b. There are three cable connectors to the SCSI controller on the system board: a 68-pin, internal SCSI connector for channel A; a 68-pin, external SCSI connector for channel B; and a 50-pin, internal SCSI connector for channel B. If your computer has an internal SCSI hard disk drive, it is connected to the channel A, 68-pin connector.

For connecting external SCSI devices, there is a cable connecting The SCSI controller channel B, 68-pin connector to an external SCSI connector at the rear of the chassis.

c. Although the physical specifications of your computer limit the number of internal devices you can install, it is possible to add internal and external devices to the SCSI controller. For information on extra cables, contact your IBM reseller or IBM marketing representative. For more information, refer to the SCSI documentation on the *Ready-to-Configure Utility Program CD* that comes with your computer.

5 If necessary, use the SCSI*Select* utility program to change settings for the integrated AIC-7895 SCSI controller. For information on the default settings and how to use SCSI*Select*, refer to the SCSI documentation on the *Ready-to-Configure Utility Program CD* that comes with your computer.

Appendix B. Changing the Battery

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

Before you begin:

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.

Read the instructions that come with the replacement battery.

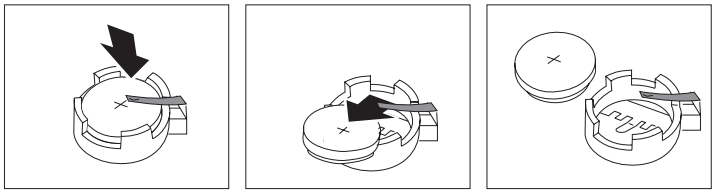
Turn the computer and all other connected devices off.

Disconnect all external cables attached to the computer and then remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 7 if you need additional information).

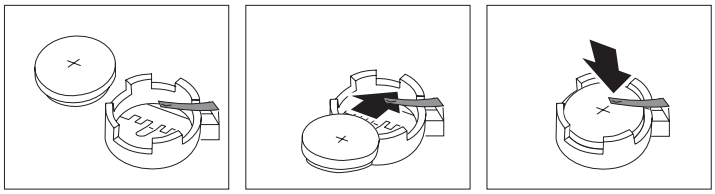
For information on locating the battery, see "Identifying Parts on the System Board" on page 15.

1. If necessary, remove the adapters installed in the option slots. For instructions, see "Removing Adapters" on page 42.
2. If necessary, disconnect any cables from the system board that might impede access to the battery.
3. Read "Lithium Battery Notice" on page vii.

4 Remove the old battery as shown in the following illustrations.



5 Install the new battery as shown in the following illustrations.



Note
When the computer is turned on for the first time after battery replacement, an error message might be displayed. This is normal after replacing the battery.

What to do next:

To work with another option, go to the appropriate section.

To complete the replacement, go to Chapter 7, "Completing the Installation" on page 68.

Use the Configuration/Setup Utility program to set the date and time and any passwords. For information on setting the date and time, refer to *IntelliStation M Pro User Guide*. For information on setting passwords, see "Setting Passwords" on page 78.

Dispose of the old battery as required by local ordinances or regulations.

Appendix C. Interrupt and DMA Resources

This appendix lists the settings for the default interrupt and direct-memory-access (DMA) resources for your computer.

Note
The interrupt and DMA settings might change when your computer is configured.

Interrupt Resources

Interrupt Request	System Resource
0	Timer
1	Keyboard
2	Interrupt Controller
3[2]	Serial Port 2
4[2]	Serial Port 1
5	Available
6	Diskette
7[2]	Parallel Port
8	Real Time Clock
9	Available
10	Available
11	Available
12	Mouse
13	Coprocessor
14	IDE Drives on primary channel
15	IDE Drives on secondary channel

The Advanced Programmable Interrupt Controller (APIC) manages additional hardware interrupts to the system BIOS. The following interrupts are available to the APIC.

Interrupt Request	System Resource
16	PCI Device
17	PCI Device
18	PCI Device
19	PCI Device
20	Not available
21	Not available
22	Not available
23	Not available
24	SMI (System Management Interrupt)

[2] Can be modified to alternative settings or disabled.

DMA Resources

DMA Channel	System Resource
0 - 8 bits	Available
1 - 8 bits	Available
2 - 8 bits	Diskette
3 - 8 bits	Parallel Port
4 - 16 bits	System Resource
5 - 16 bits	Available
6 - 16 bits	Available
7 - 16 bits	Available

Appendix D. Notices

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