System 3000
Model 3350

NCR

User Guide

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September 1992

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Technical Specifications

FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO FREQUENCY INTERFERENCE STATEMENT

WARNING

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

Information to User

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Part 15 of interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: HOW TO IDENTIFY AND RESOLVE RADIO-TV INTERFERENCE PROBLEMS. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

NCR Corporation is not responsible for any radio or television interference caused by unauthorized use or modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by NCR. The correction of interferences caused by such unauthorized modification, substitution, or attachment will be the responsibility of the user.

Certified to comply with Class B limits, Part 15 of FCC Rules.
See instructions if interference to radio reception is suspected.

Use only shielded cables to make options connections. Non-shielded cables may cause radio and TV reception interference.

Canadian Department of Communications Statement

The digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de le classé B prescrites dans le Reglemènt sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Safety Instructions

This computer has been tested for conformance to safety regulations and requirements, and has been certified for international use. Like any electronic device, however, the computer should be used with care. To protect yourself from possible injury and to minimize the risk of damage to the computer, read and follow these safety instructions:

General Guidelines

- Read all of these instructions.
- Save these instructions for later use.
- Follow all warnings and instructions marked on the computer.
- Except as explained elsewhere in this manual, do not attempt to service the computer yourself. Opening or removing those covers that are marked "Do Not Remove" might expose you to dangerous voltage points or other risks. Refer all servicing in marked compartments to service personnel.

Installation Restrictions

- Do not use the computer near water.
- Do not place the computer on an unstable cart, stand, or table. The computer might fall and be seriously damaged.
- Do not block or cover the ventilation slots on the cover or cabinet of the computer. Air must be allowed to circulate through these slots in order to ensure that the computer operates properly and does not overheat.
- Install the computer near an electrical outlet for ease of access. Use the plug on the power cord as the power disconnect device for the computer.
- Do not place the computer near or over a radiator or heat register or in direct sunlight. Place the computer in a small enclosure only if providing proper ventilation.
- Do not permit anything to rest on the power cord. Do not locate the computer where people can walk on its power cord.
- Do not plug the computer into a circuit with radio or television receivers.

Electrical Restrictions

- Use the three-wire grounding plug that is provided with the computer in an electrical outlet that is made for three-wire grounding plugs. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

  - For installation in the United States with a power source of 115 Vac, use an 18 AWG, type SJT, three-conductor power cord with a maximum length of 4.6 meters (15 feet) and a parallel-blade grounding plug rated 15 A, 125 Vac.

  - For installation in the United States with a power source of 230 Vac, use an 18 AWG, type SJT, three-conductor power cord with a maximum length of 4.6 meters (15 feet) and a tandem-blade grounding plug rated 15 A, 250 Vac.

  - For international installation with a power source of 230 Vac, use a 0.75mm^2 PVC sheathed flexible cord, type H05VV-F or H05VVH2-F, with a green/yellow protective earthing conductor that is electrically connected to the protective earthing terminal within the equipment and is connected to the protective earthing contact of the plug.

- Operate the computer from the type of power source indicated on the marking label. If you are unsure of the type of power available, consult your dealer or local power company.
- If you must use an extension cord with the computer, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total amperage of all products plugged into the electrical outlet does not exceed 15 amperes.

Operating and Maintenance Guidelines

- Never spill liquids or push objects of any kind into the computer through cabinet slots; liquids and foreign objects might touch dangerous voltage points or short out parts, creating a risk of fire or electrical shock.
- Keep the area around the computer free from static electricity and magnetic fields. Before you touch the computer, discharge static electricity on your body by touching a metallic surface.
- Operate the computer only when the cover is in the closed position.
- Do not turn the computer on and off in rapid succession. Doing so might damage data in the configuration files and on the fixed disk drive.
- Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls might result in damage and often requires extensive work by a qualified technician to restore the product to normal operation.
- Clean the display and computer periodically with a damp cloth. Do not use liquid or aerosol cleansers. Unplug the computer from its electrical outlet before cleaning it.

- Prepare the computer before moving it by taking the following actions:
  - Lock the cabinet cover.
  - Insert an old diskette in each flexible diskette drive.
  - Disconnect external peripheral devices.
- Unplug the computer from the wall outlet and refer servicing to qualified service personnel under any of the following conditions:
  - The cord or plug is damaged or frayed.
  - Liquid has been spilled into the computer.
  - The computer has been exposed to rain or water.
  - The computer does not operate normally when the operating instructions are followed.
  - The computer has been dropped or the cabinet has been damaged.
  - The computer exhibits a distinct change in performance, indicating a need for service.

Chapter 1

Getting Started

Overview

This chapter provides a brief introduction to the NCR 3350. It includes a listing of base models and their standard features, an architectural overview that describes and locates key components, and an introduction to standard software and firmware. The chapter then explains how to unpack and set up the computer for initial use.

After reading this chapter, you may wish to customize the computer to meet your specific needs and preferences. For information about using the *Reference/BIOS Diskette* and *Software Support Diskette* to customize firmware, refer to Chapter 2, "Using the Computer Software." For instructions about installing additional hardware, refer to Chapter 4, "Adding NCR Options." For a listing of related documentation, see Appendix B, "Documentation Concordance."

Identifying Models and Features

Base Models

The NCR 3350 is available in several versions or models, with each model number determined by the types of microprocessor and flexible diskette drive installed. The following figure identifies the base models of the computer.

Base Models of the NCR 3350

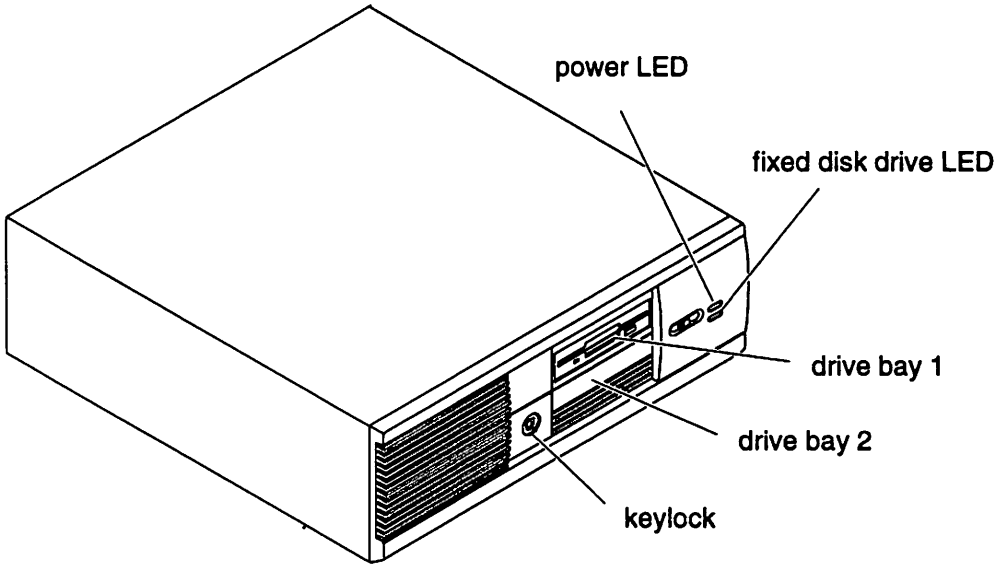
Expanded Model Number	Microprocessor	Flexible Diskette Drive
3350-1000	i486™ SX™ 25 MHz	1.44 MB
3350-1100	i486 SX 25 MHz	2.88 MB
3350-4000	i486 DX2™ 66 MHz	1.44 MB
3350-4100	i486 DX2 66 MHz	2.88 MB

Each base model includes the following in its minimum configuration:

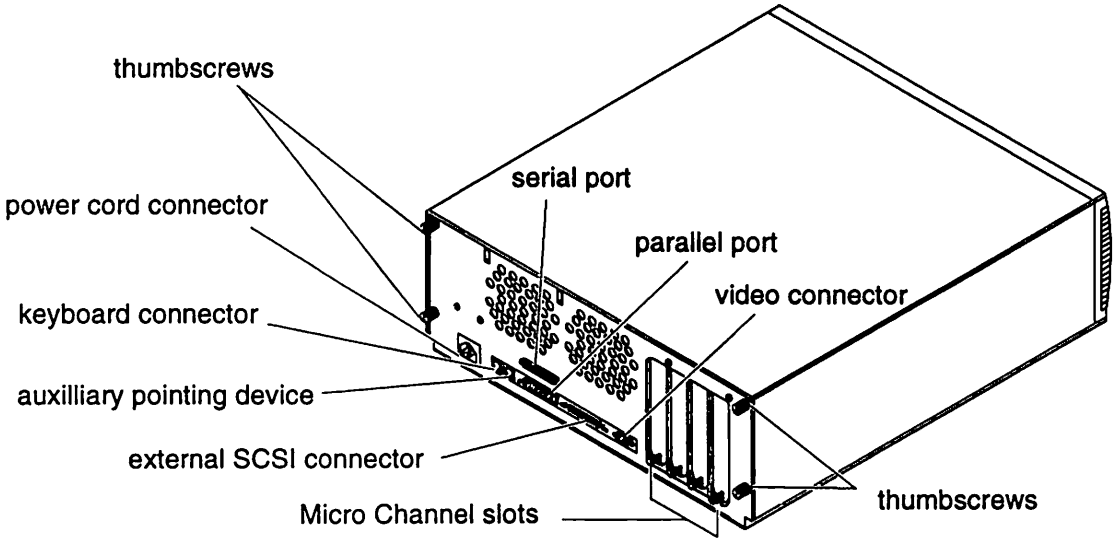
- Processor board with cache upgrade socket (microprocessor varies by model)
- 3.5-inch flexible diskette drive (capacity varies by model)
- 182 W power supply
- Two "Y"-connected serial ports
- One parallel port
- *Reference/BIOS, Software Support, and User Diagnostics* diskettes
- *System 3000 Model 3350 User Guide*

Drives, adapters, parity single in-line memory modules (SIMMs), keyboards, and monitors are not included in the base configuration. These components must be ordered as features at the time of manufacture or as kits for later installation.

External connectors and components are shown in the following illustrations.



Identifying Front Panel Components



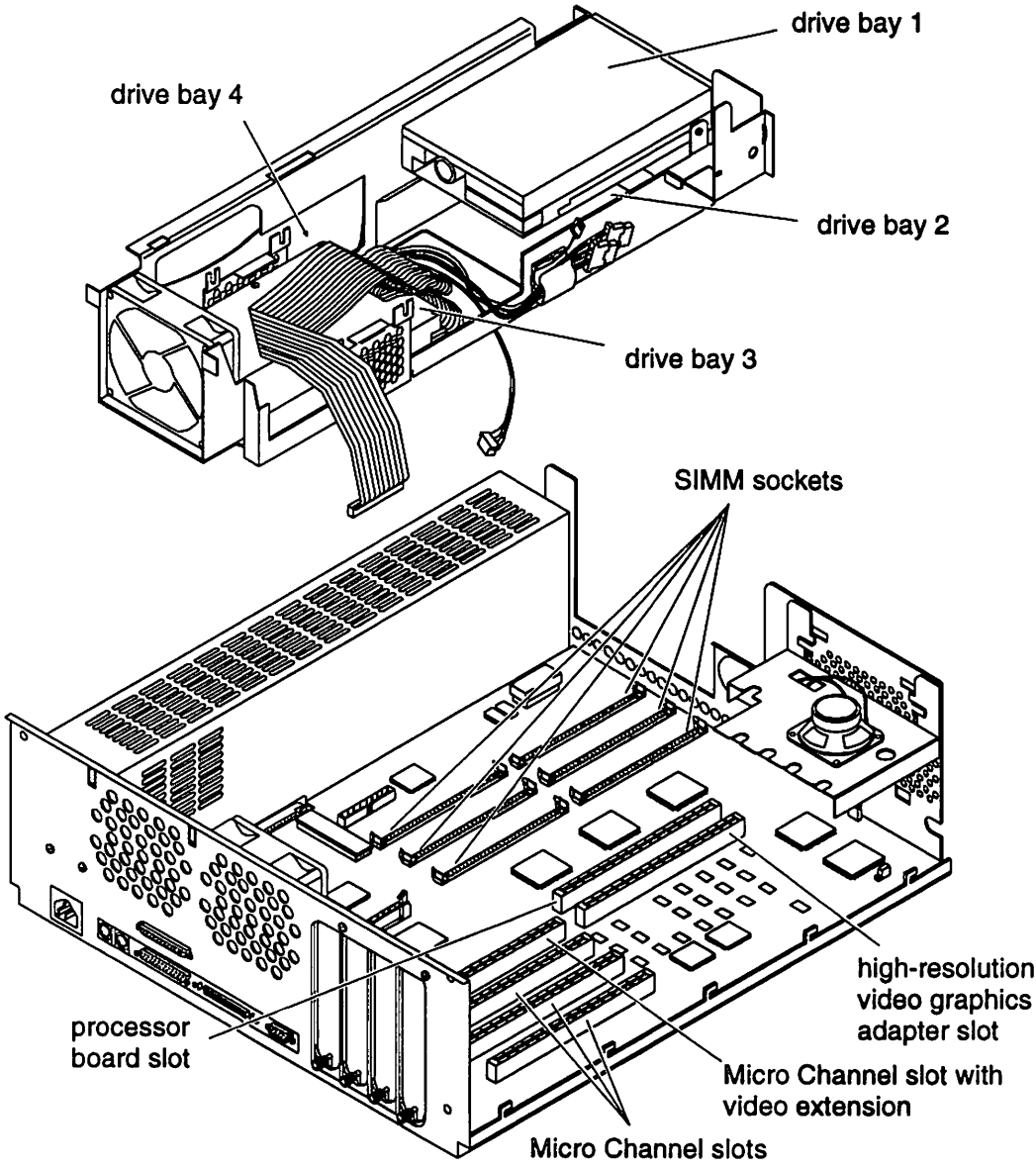
Identifying Rear Panel Components

Architectural Overview

The 3350 is designed to provide maximum flexibility in a high-performance desktop computer. Its architecture includes these features to allow the user to expand the computer configuration as required:

- Six memory SIMM sockets capable of supporting total parity memory of 2–192 MB
- Four Micro Channel expansion slots, one including a video extension
- One high-performance, high-resolution video graphics adapter slot
- Two internal drive bays
- Two external drive bays

These expansion slots and drive bays are identified in the following figure.



Identifying Expansion Slots and Drive Bays

Programmable Features

The diskettes provided with the computer and the basic input/output system (BIOS) firmware provide several options for customization. These include the keyboard speed option, the programmable option select program, and the programmable volume control.

For detailed information regarding these options, refer to Chapter 2, "Using the Computer Software."

Keyboard Speed Option

At its default speed, the keyboard transmits approximately two keystrokes per second. Using the *Reference/BIOS Diskette,* you may reset the keyboard to transmit approximately four keystrokes per second.

Programmable Option Select (POS)

Using the programmable option select (POS) feature of the *Reference/BIOS Diskette,* you may automatically configure the computer for each installed adapter. The POS program eliminates the need for manually configuring adapters with switches and jumpers.

Volume Control

Many computers support only one standard volume. Using the *Reference/BIOS Diskette,* you may set the computer speaker volume to one of eight levels.

Setting Up the Computer

Follow these steps to set up your computer:

1. Remove the computer and components from their packaging and place them on a desk or table.
2. Ensure that the power switch on the front panel of the computer is turned off.
3. Connect the keyboard cable to the keyboard connector on the rear panel of the computer.
4. Connect the monitor cable to the monitor connector on the rear panel of the computer.
5. Plug the monitor and computer power cables into an electrical outlet.
6. Insert the *Reference / BIOS Diskette* into drive A.
7. Turn on the video display and computer.
8. Watch the messages displayed on the monitor during the power-on diagnostic tests. If an error message is displayed, refer to Chapter 3, "Troubleshooting the Computer," for an explanation of the message and possible corrective actions. If no error message is displayed, follow the instructions displayed on the monitor to reach the Main Menu.
9. Make a working copy of the *Reference / BIOS Diskette,* referring to Chapter 2, "Using the Computer Software," if necessary for instructions.

Chapter 2

Using the Computer Software

Overview

This chapter describes files and utility programs on the *Reference/BIOS Diskette* and the *Software Support Diskette* which come with your computer. You use these programs to set up and customize your computer. Separate sections of this chapter discuss each diskette.

See Chapter 3, "Troubleshooting the Computer," for a discussion of the *User Diagnostics* diskette which also comes with your computer.

Using the Reference/BIOS Diskette

Introducing the Reference/BIOS Diskette

This section will examine the following topics:

- Looking at files and utility programs
- Copying the *Reference/BIOS Diskette*
- Looking at the *setup.exe* menus
- Starting with the *Reference/BIOS Diskette*
- Looking at the *setup.exe* menu screens
- Setting date and time
- Configuring the computer
- Securing the computer

Looking at Files and Utility Programs

The root (main) directory of the *Reference/BIOS Diskette* contains the following files and utility programs:

Files/Programs	Function
setup.exe	*Setup.exe* is a menu-based utility to configure the computer, make back-up copies of the *Reference/BIOS Diskette*, and regulate some special features.
filename.*adf*	Adapter description files (ADFs) have the extension *.adf* and contain information on various computer components and devices. *Setup.exe* uses the information in these files to configure your computer.
flash.exe and *rocxxxxx.bin*	*Flash.exe* transfers the BIOS image to the computer ROM BIOS chip. *Rocxxxxx.bin* (where *xxxxx* is the BIOS version) is the file where the BIOS image is stored.
kp.com	*Kp.com* is an MS-DOS memory-resident keyboard password utility.

Other files on the diskette permit these utility programs to work properly or provide help messages.

Copying the Reference/BIOS Diskette

Follow these steps to make a copy of the *Reference/BIOS Diskette*. You will need a blank 1.44 MB (high-density), 3.5-inch diskette.

NOTE: *There is a signature in the boot sector of every NCR* Reference/BIOS Diskette. *The Backup Disk utility will not write to a diskette that contains this signature. To overwrite an old working copy of the* Reference/BIOS Diskette, *you must reformat the diskette to erase the signature.*

Caution

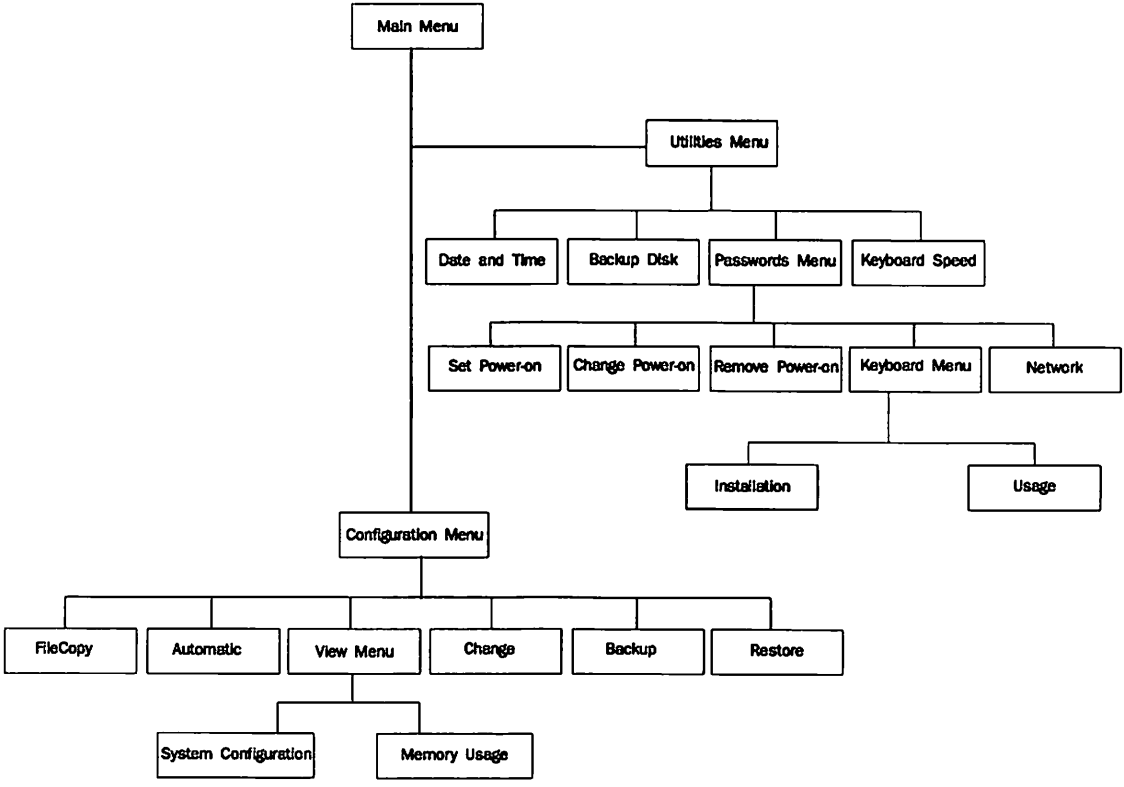
Make and use a working copy of the diskette to keep the original in good condition. If the working copy becomes worn or damaged, make another working copy.

To make a copy of the *Reference / BIOS Diskette,* follow this procedure:

1. Insert the *Reference / BIOS Diskette* in drive A.
2. Turn on the computer and display, or restart the computer by pressing the **Ctrl-Alt-Del** key combination. The *setup.exe* utility will start automatically.
3. When the *setup.exe* Main Menu appears, select `Utilities` and press **Enter**.
4. When the Utilities Menu appears, select `Backup Disk` and press **Enter**.
5. Follow the screen instructions for the copy procedure.
6. When the screen displays the message `Backup Complete`, your working copy of the *Reference / BIOS Diskette* has been completed and remains in drive A. Store the original master diskette in a safe place and use the new working copy as needed.

Looking at the Setup.exe Menus

Setup.exe is the primary utility program on the *Reference/BIOS Diskette*. The following menu tree illustrates the entire menu/command structure of *setup.exe*.



The following figure briefly describes each of the major menus and commands.

Menu	Command	Description
Main	Configuration	Selects the Configuration Menu.
	Utilities	Selects the Utilities Menu.
Configuration	FileCopy	Copies new adapter description files (ADFs) and support files to the *Reference/BIOS Diskette*.
	Automatic	Configures the computer based on information in the ADFs.
	View	Selects the View Menu. From the View Menu, you may select System Configuration to display the current computer configuration settings or Memory Usage to display the memory used by the baseboard and adapter boards.
	Change	Permits manual configuration of the computer for new and existing adapters without changing other existing settings.
	Backup	Copies current configuration settings to a file on the *Reference/BIOS Diskette*.
	Restore	Replaces current configuration information with the data previously saved using Backup.
Utilities	Date and Time	Sets the current date and time and stores them in the computer battery-maintained memory.
	Backup Disk	Copies the *Reference/BIOS Diskette* to another diskette to protect the original.
	Passwords	Selects the Passwords Menu from which you can set passwords for computer security. See the "Securing the Computer" section for a figure displaying Passwords menus and commands.
	Keyboard Speed	Sets keyboard speed.

Starting with the Reference/BIOS Diskette

If you have not made a working copy of the *Reference/BIOS Diskette*, refer to "Copying the Reference/BIOS Diskette" earlier in this chapter. Only use the working copy to run the programs.

You will use the *Reference/BIOS Diskette* primarily to run the *setup.exe* program. *Setup.exe* is a menu-based utility with context-sensitive help screens. This section will discuss frequently used or more difficult operations.

***NOTE:** When using the setup.exe program, remember that you may press* **F1** *for context-sensitive help messages.*

Unless otherwise instructed, follow these two steps before performing all tasks using the *Reference/BIOS Diskette setup.exe* program:

1. Insert the working copy of the *Reference/BIOS Diskette* in drive A and turn on the computer and display, or press the Control-Alternate-Delete (**Ctrl-Alt-Del**) key combination to restart the computer if it is already on.
2. Follow instructions on the *setup.exe* Main Menu.

NOTE: *Follow any screen instructions if error messages appear before the Main Menu.*

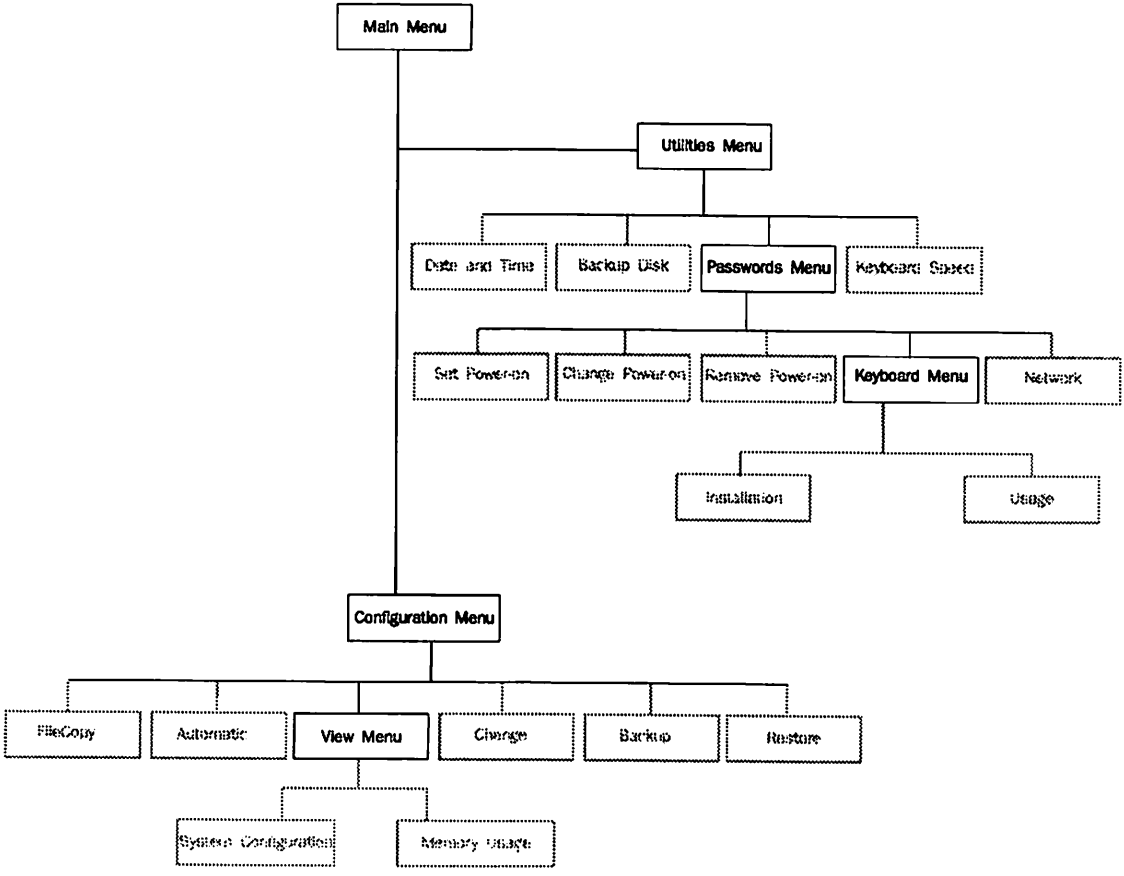
Looking at Setup.exe Menu Screens

A *Reference / BIOS Diskette setup.exe* menu screen has five sections, as shown in the following figure.

```
                          PASSWORDS MENU                              [1]

Set Power-on   Change Power-on   Remove Power-on   Keyboard   Network  [2]

Information on removing an existing password                          [3]

                                                                      [4]
  The power-on password can be removed at the power-on password
  prompt. At the power-on password prompt, type in the old password
  followed by the key above the right ALT key (to the left of the
  right shift key),and press ENTER.

                          Press any key to continue.                  [5]
```

Example of Setup.exe Screen Fields

Section [1] shows the name of one of six menus: Main, Utilities, Passwords, Keyboard, Configuration, or View.



Section [2] allows you to select the function you want to use.

Section [3] explains the purpose of the function selected.

Section [4] gives additional information or prompts you to type information when appropriate.

Section [5] shows which keys to press to use the program effectively.

When a menu screen appears, a box highlights one of the choices.

- Press **Enter** to accept the highlighted choice.
- To select a different choice, use the arrow keys to highlight your choice and press **Enter**. The next screen(s) may also prompt you for choices.

To get back to the MS-DOS prompt (A>), press the Escape (**Esc**) key as many times as necessary to go back through the sequence of menu screens. When you change certain settings or use certain utilities, the computer will restart after this series of pressing the **Esc** key.

When you press the **F1** key, a help screen with detailed information about the function in use will usually appear. To remove the help message from the screen, press **Esc**.

Setting Date and Time

If the date and time are incorrect for your installation, change them using the Date and Time utility on the Utilities Menu.

Configuring the Computer

The most common task you will typically use *setup.exe* to perform is configuration. This section describes the various tasks and options available for configuring your computer.

Understanding Configuration

Micro Channel computers use a set of data which application programs or operating systems (such as MS-DOS) use to run properly on the computer hardware. The *setup.exe* program gets the necessary information and stores it in a battery-maintained memory chip so that the information is not lost when you power down your computer.

Setup.exe gets most of the information about the computer hardware from adapter description files (ADFs). The *Reference/BIOS Diskette* includes the ADFs needed to configure your computer as delivered.

However, you may need the third-party option diskettes for some of the adapter boards you install in your computer. Manufacturers typically supply these option diskettes with their Micro Channel adapter boards. The ADFs on these diskettes specify all possible configurations for the adapter boards.

Viewing the Current Computer Configuration

When you select `System Configuration` from the View Menu, the screen displays a list of adapter slot numbers and the name of the card installed in each.

If an entry for an adapter board you installed in the computer reads `--Unrecognized Adapter Card--`, ensure that you installed the ADF for that board. The ADF has the MS-DOS extension *.adf* after the name of the file.

Select `Internal Options` or a slot about which you want more information. See "Configuring Internal Options" later in this chapter for more information.

NOTE: *If there are conflicting configuration values, they are noted on the screen by a theta character. You cannot change settings with View Menu selections. Use Change to manually change settings. See "Setting and Changing the Computer Configuration" further in this chapter for instructions.*

Follow these steps to view the computer configuration:

1. Select `Configuration` from the Main Menu.
2. Select `View` from the Configuration Menu.
3. Select `System Configuration` from the View Menu.
4. When the System Configuration screen appears, select one of the following:
   - `Internal options` to view the values assigned to basic computer components
   - The slot number of an installed adapter to view the configuration for that adapter
5. When you have reviewed the current configuration settings, press **Esc** as many times as needed to return to the MS-DOS prompt (`A>`).

Installing New Adapter Description Files

If you want to add new NCR or third-party adapter boards to your computer, you should first install the new adapter description file (ADF) on the option diskette that comes with your new board. Follow these steps to install a new NCR or third-party ADF on your working copy of the *Reference / BIOS Diskette*:

1. Select `Configuration` from the *setup.exe* Main Menu.
2. Select `FileCopy` from the Configuration Menu.
3. Follow the directions on the screen.
4. When the `FileCopy` task is complete, press **Enter** to return to the Configuration Menu.
5. Press **Esc** as many times as necessary to exit *setup.exe*.
6. Turn the power off and install the new adapter board. Refer to Chapter 4, "Adding NCR Options," for installation instructions.
7. Insert the *Reference / BIOS Diskette* in drive A and turn on the computer and display.
8. Run Automatic Configuration when the prompt appears on the screen. Running Automatic Configuration at this point will not affect other configuration values unless you are installing, removing, or moving memory SIMMs, adding a flexible diskette drive, or installing a new processor board.

Caution

Running Automatic Configuration will reset all configuration values when run from the Configuration Menu. Also, anytime you run Automatic Configuration after installing, removing, or moving memory SIMMs, all configuration values will be reset.

Setting and Changing the Computer Configuration

Change the computer configuration if one of the following occurs:

- You install additional components.
- You change the placement of adapter boards on the baseboard.
- The RTC/battery module that maintains the computer configuration fails and causes a loss of the settings information stored in the battery-maintained memory.
- POST detects a configuration error upon power-up.

There are two ways to set or change the computer configuration:

- Use the Automatic Configuration utility to allow the computer to attempt to find a combination of non-conflicting settings for adapter boards so that they may all operate properly.
- Use the Change Configuration utility to choose different settings for adapter boards than those specified by Automatic Configuration.

Using Automatic Configuration. The Automatic Configuration utility resets all selections for Micro Channel adapters to their default values. It configures the adapters in consecutive order by the number of the expansion slot occupied. The utility denotes a conflict in settings for boards by placing a theta character next to the name of the choice with the conflict.

When there is a conflict, the computer does not recheck the adapter boards installed in the lower-numbered slots. Reinstalling the adapters in a different order may resolve the conflict.

If you have repositioned the adapters and Automatic Configuration still cannot resolve a conflict, complete one of the following actions:

- Run the Change Configuration utility to manually try to solve the conflict.
- Turn off the computer power and follow the instructions in Chapter 4, "Adding NCR Options," to remove one of the conflicting adapters.

Micro Channel architecture permits interrupt sharing. Interrupt sharing permits more than one adapter to share the same Micro Channel interrupt level. If an installed adapter does not permit interrupt sharing, Automatic Configuration may not be able to resolve a conflict between two boards with the same interrupt level. Use the Change Configuration utility to set a different interrupt level for one of the conflicting adapters.

Follow these steps to use Automatic Configuration:

1. Select `Configuration` from the Main Menu.
2. Select `Automatic` from the Configuration Menu.
3. When the message `Warning: Adapter options will be set to their default choices. Continue (Y/N)?` appears, type **y**.
4. When the task is complete, press **Esc** as many times as necessary to restart the computer.

Using Change Configuration. The Change option allows you to manually change settings if two adapter settings conflict or a specific setting improves adapter performance.

You may also use the Change option to install a new adapter without changing the configuration settings for other adapters.

When using Change, you may accept the defaults shown or select custom settings for the adapter and save them by pressing **F10**. If there are no conflicting settings, the adapter will automatically be enabled. If there is a conflicting setting, the adapter will be disabled.

Follow these steps to change settings and store them in the battery-maintained memory:

1. Select `Configuration` from the Main Menu.
2. Select `Change` from the Configuration Menu. The screen will show all installed options for that adapter and their settings.
3. Select one of the following options:
   - `Internal options` to view the values assigned to basic computer components
   - The slot number of an installed adapter to view the configuration for that adapter

4. Select the setting you want to change.
5. A box will appear with allowed choices for that setting. Select one of the choices.
6. Press **F10** to save the new settings.
7. Repeat steps 4-6 for other settings you want to change or go to step 8.
8. Press **Esc** as many times as necessary to restart the computer.

Configuring Internal Options

You can view or change the settings of several internal options by selecting the View or Change functions from the Configuration Menu. Following are descriptions of some of the displayed choices.

Installed Memory is the amount of memory physically installed in the computer. You cannot use the Change function to change the installed memory configuration.

Available Memory is the amount of physically installed memory minus the 256 KB used by the BIOS and minus the 128 KB of video memory if video memory is not remapped. You cannot use the Change function to change the available memory configuration.

Video Driver Mode must be set to the correct mode to allow video graphics drivers to function properly. You must select the type manually since the software cannot detect the monitor type.

Video Access Mode allows you to install third-party video adapters that may require the computer Super VGA to be operated in 8-bit memory and I/O access.

Serial Port I is a built-in serial port that can be assigned as COM1 or COM2, or can be disabled. Use the **F5** (Previous) or **F6** (Next) keys to change the serial port setting.

Serial Port II supports independent programming of both the address and interrupt selects.

Parallel Port is a built-in parallel port which can be assigned as Parallel Port 1, 2, or 3 or can be disabled entirely. You can configure the port as an 8-bit bi-directional interface. Use the **F5** (Previous) or **F6** (Next) keys to change the parallel port setting.

Cache Disable disables the on-board cache memory of the Intel i486 SX microprocessor. Caching is sometimes disabled for diagnostic purposes, but disabling it will significantly degrade computer performance.

BIOS Cache Disable allows you to disable the processor cache during BIOS accesses. This caching is typically disabled only for diagnostic purposes.

CROM Cache Disable allows you to disable the processor cache during channel ROM accesses. This caching is typically disabled only for diagnostic purposes.

CROM Shadow identifies the areas of CROM to be shadowed. Some Micro Channel adapters have ROMs that can be shadowed (copied into RAM) for faster code execution. Some devices require shadowing, and others perform better with shadowing. It is necessary to identify the areas of ROM to be shadowed.

NOTE: *CROM shadowing is incompatible with some adapters, especially those which contain RAM in the ROM address space.*

Backing up the Computer Configuration

The Configuration Backup utility copies configuration settings from the battery-maintained memory chip to a file on the *Reference/BIOS Diskette.* It is useful to have a file copy of the configuration settings in case your RTC/battery module loses power.

For information about using the backed-up configuration, refer to "Restoring the Computer Configuration" following this section.

Follow these steps to back up the computer configuration settings:

1. Select `Configuration` from the Main Menu.
2. Select `Backup` from the Configuration Menu. Follow the screen instructions.
3. Press **Esc** as many times as necessary to return to the MS-DOS prompt (`A>`).

Restoring the Computer Configuration

The Configuration Restore utility is useful if the RTC/battery module fails and configuration settings are lost.

The Configuration Restore utility copies configuration settings from the *Reference/BIOS Diskette* to the battery-maintained memory chip. These settings must have been saved using the Configuration Backup utility. See "Backing up the Computer Configuration" which precedes this section.

NOTE: *Do not restore configuration settings made with a previous version of the* Reference/BIOS Diskette *to the current version. Doing so would negate the effects of the current version.*

To restore configuration files, follow these steps:

1. Select `Configuration` from the Main Menu.
2. Select `Restore` from the Configuration Menu. Follow the screen instructions to restore the computer configuration.
3. Press **Esc** as many times as necessary to return to the MS-DOS prompt (`A>`).

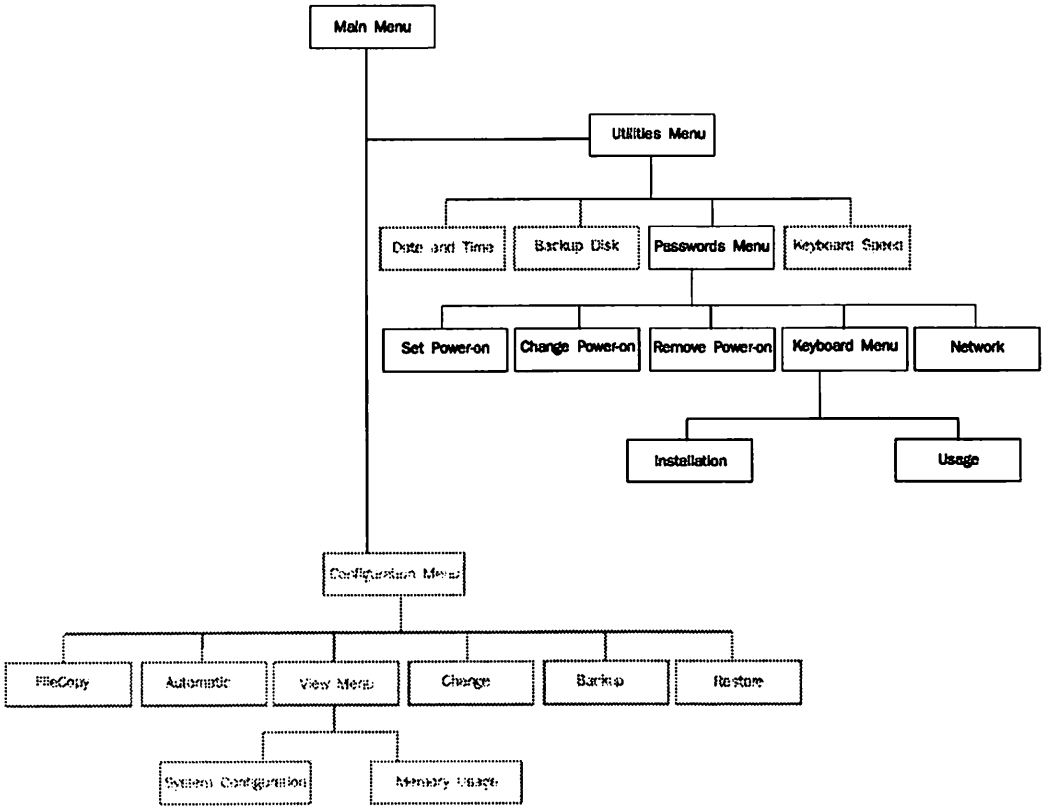
Securing the Computer

The *setup.exe* program on the *Reference/BIOS Diskette* permits the setting of passwords and keyboard and mouse locks to enhance computer security. Depending upon your individual needs, you also may want to use other security precautions.

Passwords and keyboard locks can provide a degree of security for your computer programs and data. This section describes the various options you have.

Looking at the Password Menus

The following menu tree illustrates the Passwords Menu and command structure portion of *setup.exe*.



The following figure briefly describes each of the password menus and commands.

Menu	Command	Description
Passwords	Set Power-on	Sets a power-on password and stores it in the computer RTC/battery-maintained memory.
	Change Power-on	Provides instructions on how to change power-on passwords.
	Remove Power-on	Provides instructions on how to remove power-on passwords.
	Keyboard	Selects the Keyboard Menu.
	Network	Prevents use of the keyboard on a computer used as a network file server.
Keyboard	Installation	Installs a keyboard password program that prevents use of the keyboard and mouse.
	Usage	Provides instructions on using the keyboard password program.

Using a Power-On Password

A power-on password prevents unauthorized people from using the computer.

As part of the power-on self-test (POST), the computer checks to see if a power-on password is saved in the battery-maintained memory.

If you have previously created a password, the computer will instruct you to type it the next time you turn on your computer. The computer permits you only three tries to enter the correct password. After that, it stops all operations. You must then turn the computer off and on to try again.

NOTE: *Each password can have up to seven characters. Any of the printable characters are acceptable. The computer does not distinguish between upper- and lowercase letters. However, it records each key you press. You cannot substitute a 6 from the top row for a 6 on the numeric keypad. To type the password, press the same keys you used to set it.*

Setting a Power-On Password

Follow these steps to install a power-on password:

1. Select `Utilities` from the Main Menu.
2. Select `Passwords` from the Utilities Menu.
3. Select `Set Power-on` from the Passwords Menu.
4. Type a password of no more than seven printable characters. If you make a mistake, use the backspace key to correct it. After you have typed the password, press **Enter.**
5. At the message `Is this correct? (Y/N)`, press **y** and then **Enter** if the password is correct, or **n** and **Enter** to correct the password.

   When you turn the computer power off and on again, the power-on password prompt will appear. You must type the correct password to use the computer.

Caution

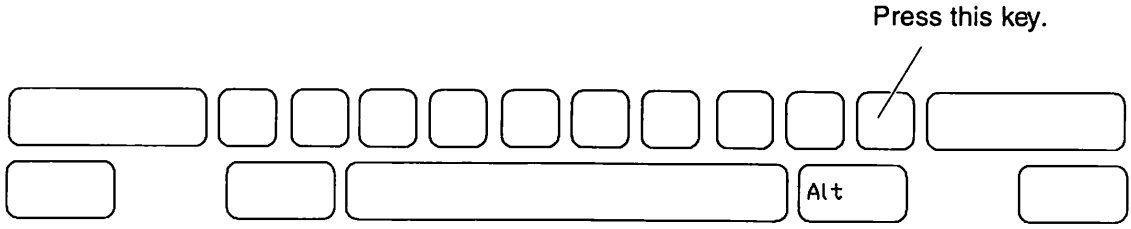
The power-on password prevents a person who does not know it from using the computer. Use a power-on password that you can easily remember. Avoid using an obvious password such as your name, birthday, or address. Write down the password and store it in a safe place.

If you forget your password, phone your dealer or NCR representative for help.

Changing or Removing a Power-on Password

The Change Power-on and Remove Power-on utilities on the Passwords Menu give instructions but do not actually permit you to change or remove the password. Read those instructions for additional help in changing or removing a power-on password.

Changing the Power-on Password. To change the password, turn the computer off and on. After the power-on self-test (POST) completes, the power-on password prompt will appear. At the prompt, type the current power-on password, press the key above the right **Alt** key, and type the new password. Press **Enter**.



The next time you turn on the computer and display, enter the new password at the password prompt.

Removing the Power-on Password. If you want no password, turn the computer off and on. When the power-on password prompt appears, type the current power-on password. Press the key above the right **Alt** key and then press **Enter**.

The password prompt will no longer appear when you turn on the computer.

Understanding the Network Server Mode Keyboard Lock

You may skip this section if you are not using the computer as a network file server.

If you intend to use the network server mode keyboard lock, you must first install a power-on password. See "Setting a Power-on Password" earlier in this chapter.

Network server mode operates in one of two ways:

- If you boot the computer from a flexible diskette, the computer firmware will cause a password prompt to be displayed. The keyboard will remain locked and the computer will not receive any input until you enter the power-on password.
- If you boot the computer from a fixed disk drive, no password prompt will be displayed on the monitor. The keyboard will remain locked and the computer will not receive any input until you enter the power-on password and press the **Enter** key.

In network server mode, other computers on the network can use unprotected files on the server but unauthorized people cannot access computer files through the server keyboard.

If the computer is in network server mode and you want to use the keyboard, turn off the computer, insert the *Reference/BIOS Diskette* in drive A, and turn the computer on. At the power-on password prompt, type the password and press **Enter**.

Setting the Network Server Mode Keyboard Lock. Follow these steps to activate the network server mode keyboard lock:

1. After you install the power-on password, select `Network` from the Passwords Menu.
2. At the message `Set network server mode?`, press **y** and **Enter**.

Removing the Network Server Mode Keyboard Lock. Follow these steps to remove the network server mode keyboard lock:

1. Insert the working copy of the *Reference/BIOS Diskette* in drive A and turn on the computer and display, or restart the computer (if on) by pressing the key combination **Ctrl-Alt-Del**.
2. When the prompt for the power-on password appears, type the password and press **Enter**.

NOTE: *If you remove the power-on password, you automatically also remove the network server mode keyboard lock.*

3. If you want to retain the power-on password but remove the network server mode keyboard lock, select `Network` from the Passwords Menu. At the message `Set network server mode?`, press **n** and **Enter**.

Using a Keyboard Password

The keyboard password utility allows you to lock the keyboard and mouse after you have turned on the computer. This prevents unauthorized use of the computer without your having to turn it off.

You can use the keyboard password utility in the following ways:

- From the *Reference/BIOS Diskette*
- From an MS-DOS partition on your fixed disk drive

Installing the Keyboard Password Program from the Reference/BIOS Diskette. If you are using the keyboard password program from the *setup.exe* program on the *Reference/BIOS Diskette*, no special installation procedure is required.

If you are using the keyboard password program from another flexible diskette, copy the file *kp.com* from the *Reference/BIOS Diskette to* the other diskette.

Installing the Keyboard Password Program from a Fixed Disk Drive. If you are using the keyboard password program from your fixed disk drive, make sure you have an MS-DOS partition on the fixed disk. The keyboard password utility works only with MS-DOS. Refer to your operating system documentation for information on setting up and using MS-DOS.

There are two ways to install a keyboard password on the fixed disk:

- Use the *setup.exe* Utilities Menu.
- Copy the file *kp.com* from the *Reference/BIOS Diskette* to the root directory on the fixed disk.

Follow these steps to install the keyboard password program on your fixed disk drive using the *setup.exe* Utilities Menu:

1. Insert the working copy of the *Reference/BIOS Diskette* in drive A and turn on the computer and display, or restart the computer (if on) by pressing the key combination **Ctrl-Alt-Del**.
2. Select `Utilities` from the Main Menu.
3. Select `Passwords` from the Utilities Menu.
4. Select `Keyboard` from the Passwords Menu.
5. Select `Installation` from the Keyboard Menu. After the screen message `Insert the Reference/BIOS Diskette in Drive A` appears, press **Enter**.
6. Screen messages will ask where you want to place the keyboard password program. The screen displays the default setting, `C:\`. If you press **Enter**, the program will install the keyboard password program in the root directory of the first fixed disk drive (drive C). The default setting is appropriate for most users. If you want to put the keyboard password program in another directory, follow the screen prompts.
7. Press **Esc** as many times as needed to return to the MS-DOS prompt (`C>`).

Follow these steps to install the keyboard password program by copying *kp.com* to the root directory on your fixed disk drive:

1. Insert the working copy of the *Reference/BIOS Diskette* in drive A and turn on the computer and display, or restart the computer (if on) by pressing **Ctrl-Alt-Del**.
2. Press **Esc** as many times as needed to return to the MS-DOS prompt (A>).
3. Type the following command and press **Enter**.

   copy kp.com c:

Setting a Keyboard Password with a Power-on Password. If you have a power-on password, you only need to set a keyboard password if you want it to be different from the power-on password.

Follow these steps to set a keyboard password different from the power-on password:

1. Insert the working copy of the *Reference/BIOS Diskette* in drive A and turn on the computer and display, or restart the computer (if on) by pressing the key combination **Ctrl-Alt-Del**.
2. Press **Esc** as many times as needed to return to the MS-DOS prompt (A>).

3. Change to the drive and directory to which you copied *kp.com*.
4. Type **kp/c** and press Enter.
5. Type the new password at the screen prompt and press Enter.

Setting a Keyboard Password with No Power-on Password. If you do not have a power-on password, and want to use a keyboard password, you must set the keyboard password each time you turn on the computer and display or restart by pressing the key combination **Ctrl-Alt-Del**.

Follow these steps to set a keyboard password:

1. Type **kp** and press **Enter**.
2. Type a keyboard password when instructed and press **Enter**.

To set the keyboard password so it remains resident in memory and accessible even when you are using an application program, type **kp/r** and press **Enter**.

Refer to the figure below for command parameters for the keyboard password program.

Command	Meaning
kp/c	Changes the password.
kp/r	Keeps the keyboard password in memory (resident) while the power remains on.
kp/u	Changes (uninstalls) so the password is not memory-resident.

Locking and Unlocking the Keyboard. Once you have set a keyboard password, you can lock and unlock the keyboard. When the keyboard is locked, you cannot enter any information until you enter your keyboard password.

There are two ways to lock the keyboard:

- From the MS-DOS root directory, type **kp** and press **Enter.**
- If the keyboard password is resident in memory, press **Alt-K** from the MS-DOS root directory or from an application program. You do not have to exit the application program and see a MS-DOS prompt (C>) to lock the keyboard.

To unlock the keyboard, type your keyboard password.

NOTE: Each password can have up to seven characters. Any of the printable characters are acceptable. The computer does not distinguish between upper- and lowercase letters. However, it records each key you press. You cannot substitute a 6 from the top row of the keyboard for a 6 on the numeric keypad. To use the computer, enter the password by pressing the same keys you used to set the password.

If you forget the keyboard password and it is different from the power-on password, turn the computer off. This will erase the *kp.com* password from memory.

Removing the Memory-Resident Keyboard Password. Choose one of these actions to remove the keyboard password:

- Turn the computer off and on.
- Type **kp/u** and press **Enter**.

You must type **kp/r** and press **Enter** the next time you turn on the computer to reinstall the keyboard password. If you have a power-on password, the keyboard password will be the same as the power-on password unless you change it.

Using the Software Support Diskette

Introducing the Software Support Diskette

The *Software Support Diskette* contains device drivers and utility programs to support Small Computer System Interface (SCSI) devices and Super Video Graphics Array (SVGA) display modes.

The root directory of this diskette is divided into two directories:

- **SCSI** - a directory which is further divided into directories that contain SCSI device drivers. These drivers are used to permit some software and hardware to work properly on the computer, including the following:
  - More than two fixed disk drives
  - One or more removable fixed disk drives
  - One or more optical read/write disk drives
- **VGA** - a directory which contains utility programs and device drivers and is divided into more directories that contain Super VGA support for a variety of software application programs.

Looking at Files and Utility Programs

This section explains how to use the following files and programs on the *Software Support Diskette*.

Files/Programs	Function
readme.exe	Displays the *readme.doc* file on the same directory.
readme.doc	Use *readme.exe* to display this file. *Readme.doc* is one of several text files with the same name that are in various directories. Each text file contains information on installing and using device drivers or utility programs.
high_res.sys	Use this driver if you plan to use extended VGA text or graphics modes.
exmode.exe	Use this menu-based utility to set VGA text modes. Requires use of *high_res.sys*.

Other files on the *Software Support Diskette* include SCSI and VGA device drivers. *Readme.doc* files on the diskette provide additional instructions on using these device drivers.

Copying the Software Support Diskette

Follow these steps to make a copy of the *Software Support Diskette*. You will need a blank 1.44 MB (high-density), 3.5-inch diskette.

> **Caution**
>
> Make and use a working copy of the diskette to keep the original in good condition. If the working copy becomes worn or damaged, make another working copy.

1. Insert the *Software Support Diskette* in drive A.
2. At the MS-DOS prompt (A>), type **diskcopy a: a:** and press **Enter**.
3. Follow the screen instructions for the copy procedure until the task is complete.
4. Store the original master diskette in a safe place, and use the new working copy as needed.

Using Readme.exe

The *Software Support Diskette* contains several *readme.doc* files which provide the latest instructions for installing and using SCSI and VGA device drivers on the computer. There is a copy of *readme.exe* on each directory that contains a *readme.doc* file. Follow these steps to use *readme.exe* to display the associated *readme.doc* file:

1. Insert the *Software Support Diskette* in drive A.
2. At the MS-DOS prompt, type **a:** and press **Enter**.
3. Switch to any directory that contains *readme.exe* and *readme.doc*. For example, type **cd \vga** and press **Enter**.
4. Type **readme** and press **Enter**.
5. The program will display the *readme.doc* file on the current directory. Use the **PgUp** and **PgDn** keys to view the entire file.

You may want to print any *readme.doc* files that you use often. The *readme.doc* files are ASCII files and can be printed with word processing software or through the MS-DOS **print** or **copy** commands. For example, if you wanted to print the *readme.doc* file on the VGA directory to your primary printer, you could follow these steps:

1. Follow steps 1-3 above.
2. Type **copy readme.doc lpt1:** and press **Enter**.

NOTE: *Some printers may require you to use word processors or utility programs to print ASCII files.*

Understanding High_res.sys and Exmode.exe

The Video Graphics Array (VGA) controller on the baseboard supports a color or monochrome VGA monitor. The controller automatically configures itself to operate the attached monitor at power-on.

Using the *high_res.sys* device driver and the *exmode.exe* utility on the *Reference/BIOS Diskette*, you can change VGA text display modes without setting hardware switches.

If the computer has two display adapters, the *exmode.exe* utility will work only when VGA is set as the primary display adapter.

Some software application programs which use the extended VGA **graphics** modes may require the use of *high_res.sys*. However, you can use *exmode.exe* only to change VGA **text** modes.

Exmode.exe is useful if you have software that uses the extended VGA text modes. Extended VGA text modes enable the screen to show one of the following configurations on any standard VGA display:

- 25 or 60 rows with 80 columns
- 25, 34, or 43 rows with 100 columns
- 25, 28, or 43 rows with 132 columns

These modes allow you to have much more information on the screen than is possible with the standard VGA modes. Some software application programs may require specific software files (device drivers) to take advantage of the extended VGA text modes. See your software application program manuals for more information.

Caution

Only use *exmode.exe* with MS-DOS. It is not compatible with other operating systems such as UNIX and MS OS/2.

Installing High_res.sys

If you want to use *exmode.exe*, you must first install *high_res.sys*. Also, if you are using a software application program which uses extended VGA graphics modes, you may need to install *high_res.sys*. Refer to the *readme.doc* file on the VGA directory for more information.

Follow these steps to install *high_res.sys*:

1. Turn on the computer and display, or restart the computer (if on) by pressing the key combination **Ctrl-Alt-Del**. Watch for the MS-DOS prompt (C>).
2. Place a working copy of the *Software Support Diskette* in drive A.
3. At the MS-DOS prompt (C>), type the following command and press **Enter**.

   copy a:\vga\high_res.sys c:

4. Use any pure-ASCII editor (such as the MS-DOS *edlin.com* program) or retype the *config.sys* file to add the following command to that file:

   device=c:\high_res.sys

NOTE: *You may need to use a parameter that allows* high_res.sys *to select monitor type on this line of the* config.sys *file. See the* readme.doc *file on the VGA directory for more information.*

5. Press **Ctrl-Alt-Del** to restart the computer.

Installing Exmode.exe

You can use *exmode.exe* utility in the following ways:

- From an MS-DOS partition on the fixed disk drive
- Directly from the *Software Support Diskette*

Installing Exmode.exe on the Fixed Disk Drive. Follow these instructions listed to install *exmode.exe* on the fixed disk drive root directory.

1. Turn on the computer and display, or restart the computer by pressing the key combination **Ctrl-Alt-Del**. Watch for the MS-DOS prompt (C>).
2. Place a working copy of the *Software Support Diskette* in drive A.

3. At the MS-DOS prompt (C>), type the following commands and press **Enter**.

   copy a:\vga\exmode.exe c:

   copy a:\vga\exmode.msg c:

Using Exmode.exe

You may use *exmode.exe* in one of two ways:

- From the *exmode.exe* menu
- From the MS-DOS command line

Follow these steps to use the *exmode.exe* menu:

1. Did you install *exmode.exe* on the root directory of your fixed disk drive?

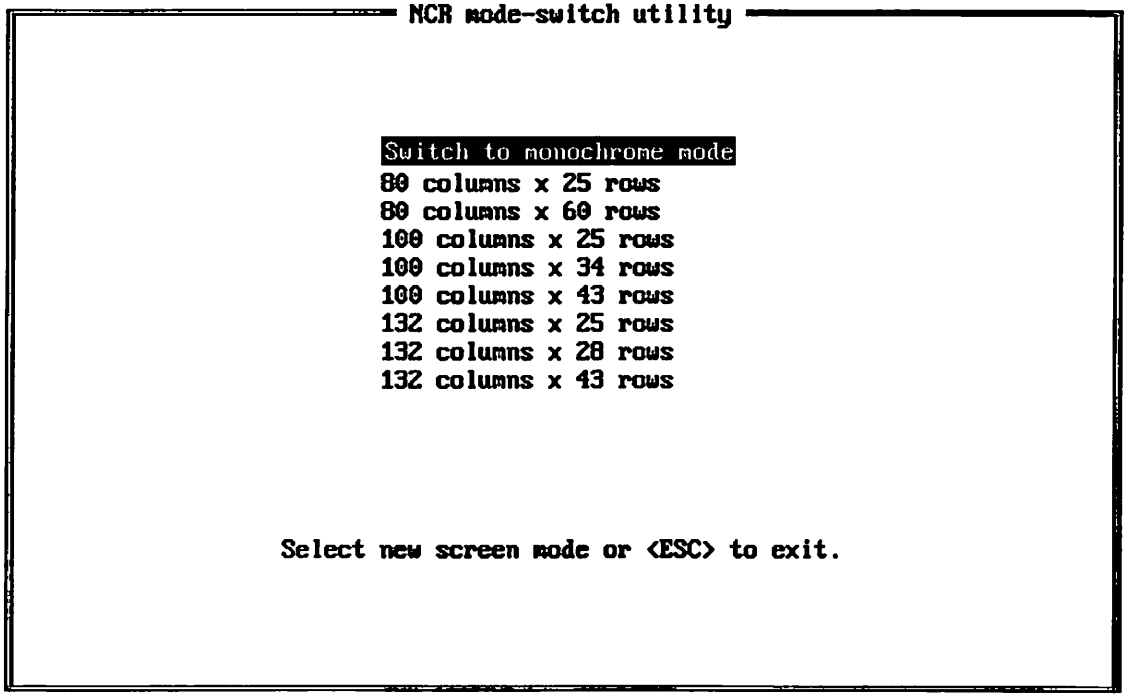
   Yes

   At the MS-DOS prompt (C>), type **exmode** and press **Enter**.

   No

   Insert the *Software Support Diskette* into drive A. At the MS-DOS prompt (A>), type **exmode** and press **Enter**.

2. A screen will appear similar to the one following. Use the arrow keys to change text modes and press **Enter** to record your choice.
3. Select `Exit to DOS` to return to the MS-DOS prompt (C>) or (A>).



Exmode.exe Menu Screen

You can also use *exmode.exe* from the MS-DOS prompt. Refer to the following figure to set the mode you want to use.

MS-DOS Command	Menu Option	Description
exmode	N/A	Displays the menu.
exmode ?	N/A	Displays a help screen.
exmode color	N/A	Switches to color mapping.
exmode mono	Switch to monochrome mode	Switches to monochrome mapping.
exmode 80 25	80 columns x 25 rows	Switches the board to 80 column/25 line text mode.
exmode 80 60	80 columns x 60 rows	Switches the board to 80 column/60 line text mode.*
exmode 100 25	100 columns x 25 rows	Switches the board to 100 column/25 line column text mode.*
exmode 100 34	100 columns x 34 rows	Switches the board to 100 column/34 line column text mode.*
exmode 100 43	100 columns x 43 rows	Switches the board to 100 column/43 line text mode.*
exmode 132 25	132 columns x 25 rows	Switches the board to 132 column/25 line text mode.*
exmode 132 28	132 columns x 28 rows	Switches the board to 132 column/25 line text mode.*
exmode 132 43	132 columns x 43 rows	Switches the board to 132 column/43 line text mode.*
* This feature is useful only with certain software application programs.		

If you know that an application program requires a specific operating mode, you can insert the *exmode.exe* command in your application batch file. For more information on installing special VGA display modes for application programs, refer to the following documents:

- The *readme.doc* files on the *Software Support Diskette*
- Your MS-DOS and software application program manuals

Often an inappropriate application program screen display means that the VGA mode is incompatible with the software.

The specified VGA text mode will remain in effect until one of the following actions happens:

- You select another mode from the *exmode.exe* menu.
- You type another *exmode.exe* command at the MS-DOS prompt (C>) or (A>).
- You restart the computer by pressing **Ctrl-Alt-Del**.
- You turn the computer off and on again.
- An application program invokes a new display mode.

Chapter 3

Troubleshooting the Computer

Overview

This chapter includes information to help you correct problems that might occur with your computer. The problem-solving information is organized by the following categories:

- Problem description
- Error number
- Screen message

Listings within each category includes possible causes of the problem and possible remedies.

Perform the activities listed under Possible Remedy in the order in which they appear. If activity 1 does not correct the error, try activity 2. If activity 1 corrects the error, resume using the computer; do not perform additional correction activities. If you cannot correct the error, phone your service representative for assistance.

The chapter also includes instructions for running the *User Diagnostics* diskette. This diskette contains programs that will help pinpoint operating problems with the computer.

Other sections or chapters of the *User Guide* contain the following information that may be useful in diagnosing and correcting problem(s):

- How to run utility programs on the *Reference/BIOS Diskette* and the *Software Support Diskette*. Refer to Chapter 2, "Using the Computer Software."
- How to install or replace options. Refer to Chapter 4, "Adding NCR Options."
- How to run the user diagnostics program on the *User Diagnostics* diskette. Refer to "Running User Diagnostics" further in this chapter.

If you suspect there may be a problem but cannot identify it, refer to "Running User Diagnostics" for instructions about the tests.

If you suspect a software problem, refer to your software documentation.

Troubleshooting Problems

Problem	Possible Cause	Possible Remedy
Power lamp not lit.	On/off switch set to off position.	Set switch to on position.
	Computer not plugged into working outlet.	Use another outlet.
	Power cable not connected correctly.	Insert cable snugly into computer and wall outlet.
	Power cable is faulty.	Replace cable.
	Internal system problem.	Phone your service representative.
No prompt at power-on.	Display not connected correctly.	Insert display cable snugly into computer and power cord snugly into wall outlet.
	Display not plugged into working outlet.	Use another outlet.
	Display controls not set properly.	Check display controls.
	Operating system not loaded correctly.	Install the operating system according to operating system manual instructions.

Problem	Possible Cause	Possible Remedy
Unable to type in data through keyboard correctly.	Keyboard cable not connected.	Connect cable.
	Keyboard plugged into auxiliary device connector.	Plug keyboard into keyboard connector.
	Incorrect type of keyboard to use with this software on this computer.	Replace the keyboard with a 101-key workstation keyboard.
	File server password set. System password set. Keyboard password set.	Type in password required.
	Computer set for network server mode.	Turn computer off. Insert *Reference/BIOS Diskette* in drive A; turn on the computer; type in power-on password.
	Forgot power-on password.	Phone your service representative.
	Num Lock, Scroll Lock, or **Caps Lock** is set incorrectly.	Reset keys.
	Keyboard buffer full.	Wait until present operation is complete.
	Internal computer problem.	Phone your service representative.

Problem	Possible Cause	Possible Remedy
Unable to read from or write to flexible diskette.	No operating system installed.	Install operating system.
	Diskette not inserted correctly.	Insert diskette with label up and metal tab towards the drive.
	Diskette not located in specified drive.	Place diskette in drive specified.
	Diskette damaged.	Use different diskette.
	Diskette not formatted.	Format diskette according to your operating system manual instructions.
	Diskette write-protected.	Move the write-protect tab, if appropriate, or use another diskette.
	Internal computer problem.	Phone your service representative.

Problem	Possible Cause	Possible Remedy
Unable to read from or write to fixed disk.	No operating system installed.	Install operating system on disk according to operating system manual.
	Disk not formatted correctly.	See your operating system instructions for formatting the fixed disk.
	Internal problem with fixed disk drive.	1. Run the user diagnostics tests for the type of drive installed. 2. Run the Initialize SCSI Fixed Disk utility from the *User Diagnostics* diskette for the type of fixed disk you have. 3. Phone your service representative; it may be necessary to replace the fixed disk drive.
	Fixed disk drive controller not working properly.	1. Run the user diagnostics tests for the type of drive installed. 2. Phone your service representative; it may be necessary to replace the fixed disk drive controller.

Problem	Possible Cause	Possible Remedy
Unable to print.	Printer not turned on properly.	1. Turn on the printer. 2. Turn on the on-line indicator.
	Printer not plugged into working outlet.	Check power plug and outlet.
	Signal cable not connected properly.	Insert cable snugly into computer and printer.
	Incorrect software configuration.	Ensure that the type of printer installed on your computer is correctly identified in your software installation program.
Computer does not recognize all installed adapters.	1. The *Reference / BIOS Diskette* does not have an ADF for an adapter installed in the computer. 2. There are conflicts in the adapter settings.	1. Install the ADF for the adapter on the *Reference / BIOS Diskette*. 2. Run the *setup.exe* Change Configuration utility on the *Reference / BIOS Diskette*. Change settings so they do not conflict.

Problem	Possible Cause	Possible Remedy
Undefined problem — unable to continue any processing.	Problem with operating system or application.	1. Restart the computer. 2. Reinstall the application. 3. Reinstall operating system.
	Computer not configured properly.	Use the *setup.exe* Automatic Configuration utility on the *Reference/BIOS Diskette*.
	Cables and cords not tightly connected.	Check all internal and external cables and cords.
	Computer overheating.	1. Reposition unit so there is sufficient airflow around it. 2. Ensure that the fan is working properly. 3. If the fan is not working properly, phone your service representative; it may be necessary to replace the fan.
	Internal computer problem.	Phone your service representative.

Interpreting Power-On Diagnostics

Every time you turn on the computer or restart it by pressing **Ctrl-Alt-Del**, power-on diagnostics, also called the power-on self-test (POST), run. POST diagnostic programs test basic computer components.

Failure of a basic computer component may cause the computer to stop. If such a condition occurs, the computer will attempt to sound a beep code to indicate the type of error. Write down the pattern of the beep code and give the information to your service representative.

After the VGA circuitry and video display pass their tests, the name of each tested component will appear on the screen as it is tested.

If one of these components fails, an error code will appear on the screen next to the name of the component and `Press the F1 key to continue` will appear after the POST completes its tests. Doing so allows you to put the *Reference/BIOS Diskette* in drive A and read, from the display screen, the meaning of the error code. You may be able to run the *setup.exe* Automatic Configuration utility on the *Reference/BIOS Diskette* to correct the error.

Refer to the next section, "Interpreting Error Codes and Messages," for a listing of error codes and suggestions on how to correct the errors.

Interpreting Error Codes and Messages

This section lists all error codes for this computer in numerical order. Errors that occur during the POST are noted.

Perform the activities listed under Possible Remedy to correct the error. Follow the listed order of activities. If activity 1 does not correct the error, try activity 2. If activity 1 corrects the error, resume using the computer; do not perform additional correction activities.

If you cannot correct the error, phone your service representative for assistance.

Error Code	Message	Possible Cause	Possible Remedy
100 (POST Error)	BIOS ROM Checksum Failure	The computer's read only memory (ROM) failed during power-on self-test (POST).	Phone your service representative; it may be necessary to replace the baseboard or ROM BIOS.
102 (POST Error)	System Board Failure	Timer 0 or 2 failed during POST.	Phone your service representative; it may be necessary to replace the baseboard.
103 (POST Error)	System Board Failure	The timer interrupt failed while testing Timer 0 during POST.	Phone your service representative; it may be necessary to replace the baseboard.
104 (POST Error)	System Board Failure	An unexpected interrupt occurred while the processor was in protected mode.	Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
108 (POST Error)	System Board Failure	Timer 2 failed during POST.	Phone your service representative; it may be necessary to replace the baseboard.
110	Memory Parity Error at *xxxxx*	Memory is failing. If the non-maskable interrupt (NMI) handler can determine the address of the failing memory, it appears in place of *xxxxx*. If the failing memory is not found, the message reads `Memory Parity Error????`	1. Run user diagnostics to check the baseboard and all installed devices for proper operation. 2. Replace the failing devices. 3. Phone your service representative; it may be necessary to replace the failing devices or the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
111	I/O Card Parity Error at *xxxxx*	The I/O adapter board failed. If the NMI handler can determine the address of the failing I/O board, it appears in place of *xxxxx*. If the failing address is not found, the message reads `I/O Card Parity Error????`	1. Run user diagnostics to check the baseboard and all installed devices for proper operation. 2. Phone your service representative; it may be necessary to replace the failing devices or the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
112	Watchdog Timeout	The watchdog timer detected that the timer 0 interrupt was not serviced. A program or device probably failed while interrupts were off.	1. Restart the computer. 2. Note if one or more software programs cause the error. If one program causes this error, suspect a software problem. If several programs cause the error, suspect a hardware problem. 3. Run user diagnostics to check the baseboard and all installed devices for proper operation. 4. Phone your service representative; it may be necessary to replace the failing devices or the baseboard.
113	DMA BUS Timeout	The DMA ASIC could be damaged.	Phone your service representative.

Error Code	Message	Possible Cause	Possible Remedy
114 (POST error)	Adapter ROM (*XXXX*) Checksum Failure	The checksum calculated for an option ROM does not match the checksum stored in the option ROM. *XXXX* shows the segment address of the failing option ROM.	Phone your service representative; it may be necessary to replace the failing devices.
130 (POST error)	System Board Failure (Shutdown)	A failure occurred during POST which caused the computer to halt.	Phone your service representative; it may be necessary to replace the baseboard.
131 (POST error)	System Board Failure	Gating of the A20 address line failed when entering or exiting protected mode.	Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
161 (POST error)	Real-Time Clock Failure (Battery). Please Reconfigure and Retry.	The computer back-up battery failed.	1. Run the *setup.exe* Automatic Configuration on the *Reference / BIOS Diskette.* 2. Phone your service representative; it may be necessary to replace the RTC/battery module or baseboard.
163 (POST error)	Time and Date Not Set.	The date and time in the battery-maintained memory is not set or is incorrect.	1. Run the *setup.exe* Date and Time utility on the *Reference / BIOS Diskette*. Set the correct date and time. 2. Phone your service representative; it may be necessary to replace the RTC/battery module or baseboard.

Error Code	Message	Possible Cause	Possible Remedy
164 (POST error)	Invalid Configuration (Memory)	The amount of memory found in the computer does not match the amount of memory specified in the configuration information saved by the back-up battery.	1. Run the *setup.exe* Automatic Configuration utility on the *Reference / BIOS Diskette.* 2. Phone your service representative; it may be necessary to replace the baseboard.
165 (POST error)	Adapter Timeout in Slot *X*	A plug-in option adapter configured by the *setup.exe* Configuration utility on the *Reference / BIOS Diskette* slot specified (*X*) or the adapter is not responding.	1. Run the *setup.exe* Automatic Configuration utility on the *Reference / BIOS Diskette.* 2. Run the setup.exe FileCopy utility on the *Reference / BIOS Diskette* to copy the ADF for the plug-in board to the *Reference / BIOS Diskette*; run the Automatic Configuration utility again.

Error Code	Message	Possible Cause	Possible Remedy
166 (POST error)	Adapter Mismatch in Slot *X*	A plug-in option adapter configured by the *setup.exe* Configuration utility on the *Reference / BIOS Diskette* does not exist in the correct slot (X) in the computer.	1. Run the *setup.exe* Automatic Configuration utility on the *Reference / BIOS Diskette.* 2. Run the *setup.exe* FileCopy utility on the *Reference / BIOS Diskette* to copy the ADF for the plug-in board to the *Reference / BIOS Diskette*; run the Automatic Configuration utility again. 3. Replace the plug-in option board.

Error Code	Message	Possible Cause	Possible Remedy
167 (POST error)	Invalid Configuration Information (diskette)	Diskette drive configuration does not match physical drives present.	1. Run the *setup.exe* Automatic or Change Configuration utility on the *Reference / BIOS Diskette.* 2. Phone your service representative; it may be necessary to replace the baseboard.
168 (POST error)	Invalid Configuration Information (Coprocessor)	Math coprocessor either not operating, missing, or just installed.	1. Run the *setup.exe* Automatic or Change Configuration utility on the *Reference / BIOS Diskette.* 2. Replace or remove the coprocessor; run the Automatic Configuration utility again.

Error Code	Message	Possible Cause	Possible Remedy
170 (POST error)	Intel Floating Point Unit Failure	Math coprocessor is not operating.	1. Run the *setup.exe* Automatic or Change Configuration utility on the *Reference/BIOS Diskette.* 2. Replace or remove the coprocessor; run the Automatic Configuration utility again.
172 (POST error)	Invalid Configuration (2nd Level Cache)	Second-level cache module has been installed/removed.	Run the *setup.exe* Automatic or Change Configuration utility on the *Reference/BIOS Diskette.*
173 (POST error)	CRC on CMOS/ Extended CMOS Failed.	Checksum for the battery-maintained memory is incorrect.	1. Run the *setup.exe* Automatic Configuration utility on the *Reference/BIOS Diskette.* 2. Phone your service representative; it may be necessary to replace the RTC/battery module or baseboard.

Error Code	Message	Possible Cause	Possible Remedy
174 (POST Error)	Invalid Configuration Information	CMOS settings do not match the current configuration.	Run the *setup.exe* Automatic Configuration utility on the *Reference/BIOS Diskette.*
175 (POST error)	Setup *XX.XX.XX* Or Later Required	Computer requires the indicated version (*XX.XX.XX* or later) of *setup.exe* to function properly.	Phone your service representative to obtain the indicated version of *setup.exe*.
200 (POST error)	System Halted, No Memory	No usable memory can be found by the computer.	1. Install matching SIMMs in slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/ BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
201 (POST error)	SIMM 0 and SIMM 1 Size Mismatch	The SIMMs in SIMM slots 0 and 1 are not the same size/type, which is a requirement for operation.	1. Install matching SIMMs in slots 0 and 1. If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	SIMM 0 Missing	SIMM slot 0 is empty.	1. Install a SIMM in slot 0 that matches the SIMM in slot 1. If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
201 (continued)	SIMM 1 Missing	SIMM slot 1 is empty.	1. Install a SIMM in slot 1 that matches the SIMM in slot 0. If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
202 (POST error)	SIMM 2 and SIMM 3 Size Mismatch	The SIMMs in SIMM slots 2 and 3 are not the same size/type, which is a requirement for operation.	1. Install matching SIMMs in slots 2 and 3. If no SIMMs are available, remove all from slots 2 and 3. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
202 (continued)	SIMM 2 Missing	SIMM slot 2 is empty.	1. Install a SIMM in slot 2 that matches the SIMM in slot 3. If no SIMMs are available, remove all from slots 2 and 3. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	SIMM 3 Missing	SIMM slot 3 is empty.	1. Install a SIMM in slot 3 that matches the SIMM in slot 2. If no SIMMs are available, remove all from slots 2 and 3. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
203 (POST error)	SIMM 4 and SIMM 5 Size Mismatch	The SIMMs in SIMM slots 4 and 5 are not the same size/type, which is a requirement for operation.	1. Install matching SIMMs in slots 4 and 5. If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	SIMM 4 Missing	SIMM slot 4 is empty.	1. Install a SIMM in slot 4 that matches the SIMM in slot 5. If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
203 (continued)	SIMM 5 Missing	SIMM slot 5 is empty.	1. Install a SIMM in slot 5 that matches the SIMM in slot 4. If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
211 (POST error)	Bank 0: SIMM 0 Failure	The SIMM in SIMM slot 0 failed the memory pattern test during POST.	1. Replace the SIMM in slot 0 (use a SIMM that matches slot 1). If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	Bank 0: SIMM 1 Failure	The SIMM in SIMM slot 1 failed the memory pattern test during POST.	1. Replace the SIMM in slot 1 (use a SIMM that matches slot 0). If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference / BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
212 (POST error)	Bank 1: SIMM 0 Failure	The SIMM in SIMM slot 0 failed the memory pattern test during POST.	1. Replace the SIMM in slot 0 (use a SIMM that matches slot 1). If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	Bank 1: SIMM 1 Failure	The SIMM in SIMM slot 1 failed the memory pattern test during POST.	1. Replace the SIMM in slot 1 (use a SIMM that matches slot 0). If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
213 (POST error)	Bank 2: SIMM 2 Failure	The SIMM in SIMM slot 2 failed the memory pattern test during POST.	1. Replace the SIMM in slot 2 (use a SIMM that matches slot 3). If no SIMMs are available, remove all from slots 2 and 3. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	Bank 2: SIMM 3 Failure	The SIMM in SIMM slot 3 failed the memory pattern test during POST.	1. Replace the SIMM in slot 3 (use a SIMM that matches slot 2). If no SIMMs are available, remove all from slots 2 and 3. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
214 (POST error)	Bank 3: SIMM 2 Failure	The SIMM in SIMM slot 2 failed the memory pattern test during POST.	1. Replace the SIMM in slot 2 (use a SIMM that matches slot 3). If no SIMMs are available, remove all from slots 0 and 1. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	Bank 3: SIMM 3 Failure	The SIMM in SIMM slot 3 failed the memory pattern test during POST.	1. Replace the SIMM in slot 3 (use a SIMM that matches slot 2). If no SIMMs are available, remove all from slots 2 and 3. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
215 (POST error)	Bank 4: SIMM 4 Failure	The SIMM in SIMM slot 4 failed the memory pattern test during POST.	1. Replace the SIMM in slot 4 (use a SIMM that matches slot 5). If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	Bank 4: SIMM 5 Failure	The SIMM in SIMM slot 5 failed the memory pattern test during POST.	1. Replace the SIMM in slot 5 (use a SIMM that matches slot 4). If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
216 (POST error)	Bank 5: SIMM 4 Failure	The SIMM in SIMM slot 4 failed the memory pattern test during POST.	1. Replace the SIMM in slot 4 (use a SIMM that matches slot 5). If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.
	Bank 5: SIMM 5 Failure	The SIMM in SIMM slot 5 failed the memory pattern test during POST.	1. Replace the SIMM in slot 5 (use a SIMM that matches slot 4). If no SIMMs are available, remove all from slots 4 and 5. (See "Installing Memory Modules" in Chapter 4.) Reconfigure, using the *Reference/BIOS Diskette setup.exe* utility. 2. Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
220 (POST error)	2nd Level Cache Memory Error	The second-level cache failed the memory pattern test during POST.	Replace the second-level cache. If replacement is not possible, disable the second-level cache using the *setup.exe* Change Configuration utility on the *Reference/BIOS Diskette.*
230 (POST error)	Memory Adapter Memory Error	A third-party memory (adapter) board failed the memory pattern test during POST.	Remove the memory adapter. Reconfigure, using the *setup.exe* Automatic Configuration utility on the *Reference/BIOS Diskette.*

Error Code	Message	Possible Cause	Possible Remedy
301 (POST error)	Keyboard Controller Failure	The keyboard controller failed during POST.	1. Ensure that the keyboard is installed properly. 2. Replace the keyboard. 3. Phone your service representative; it may be necessary to replace the baseboard.
304 (POST error)	Keyboard Clock Line Failure	The clock line on the keyboard controller failed during POST.	1. Ensure that the keyboard is installed properly. 2. Replace the keyboard. 3. Phone your service representative; it may be necessary to replace the baseboard.
305 (POST error)	Keyboard Unknown Error	An unknown error was detected when testing the keyboard during POST.	Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
306 (POST error)	Keyboard Data Line Failure	The data line on the keyboard controller failed during POST.	1. Ensure that the keyboard is installed properly. 2. Replace the keyboard. 3. Phone your service representative; it may be necessary to replace the baseboard.
401 (POST error)	Fuse F1 Blown (Keyboard)	The keyboard fuse is blown.	Phone your service representative; it may be necessary to replace the baseboard.
402 (POST error)	Fuse F2 Blown (Flex 5V)	The flexible disk 5-volt power fuse is blown.	Phone your service representative; it may be necessary to replace the baseboard.
403 (POST error)	Fuse F2 Blown (Flex 12V)	The flexible disk 12-volt power fuse is blown.	Phone your service representative; it may be necessary to replace the baseboard.
404 (POST error)	Fuse F4 Blown (SCSI Termination)	The SCSI termination fuse is blown.	Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
410 (POST error)	Revision Level Mismatch (77c22e)	Incomplete revision of the NCR 77c22e VGA controller.	Phone your service representative; it may be necessary to replace the baseboard.
601 (POST error)	Diskette Drive Failure	The reset function failed on the flexible diskette drive subsystem.	1. Ensure that the flexible diskette drive data cable and power cable are connected properly to the drive and the baseboard. 2. Phone your service representative; it may be necessary to replace the baseboard.
602 (POST error)	Diskette Drive Failure	The seek function failed to locate a flexible diskette drive.	1. Run the *setup.exe* Automatic or Change Configuration utility on the *Reference/BIOS Diskette.* 2. Phone your service representative; it may be necessary to replace the flexible diskette drive.
901 (POST error)	System Board Parallel Port Failure	The parallel port on the baseboard is not operating properly.	Phone your service representative; it may be necessary to replace the baseboard.

Error Code	Message	Possible Cause	Possible Remedy
1101 (POST error)	System Board Serial Port Failure	The serial port on the computer baseboard failed.	1. Run the *setup.exe* Automatic or Change Configuration utility *Reference / BIOS Diskette.* 2. Phone your service representative; it may be necessary to replace the baseboard.
8602 (POST error)	Pointing Device Interface Failure	The pointing device (auxiliary device/ mouse) was detected but an interface error occurred during testing.	1. Check the mouse (auxiliary/pointing device) for proper operation. 2. Replace the mouse. 3. Phone your service representative; it may be necessary to replace the baseboard.

Using System Start-Up Messages

These messages may appear when you are first starting the computer.

Message	Possible Cause	Possible Remedy
Not a Boot Diskette	The flexible diskette in drive A does not have an operating system or start-up program.	Replace the diskette in drive A with one which has an operating system and try again. The operating system on the *Reference/BIOS Diskette* restarts the computer.
No Boot Device Available	The flexible diskette drive did not respond in the time allotted. There is no fixed disk with an operating system.	1. Replace the diskette in drive A with one which has an operating system and try again. 2. Ensure that the flexible diskette drive data cable and power cable are connected properly to the drive and the baseboard. 3. Phone your service representative; it may be necessary to replace the flexible diskette drive or the baseboard.

Message	Possible Cause	Possible Remedy
ROM BASIC is not supported	There is no operating system recognized on the start-up drive.	1. Install operating system. 2. Ensure that the SCSI fixed disk drive data and power cables are connected properly to the drive and the SCSI host adapter. 3. Check the SCSI ID on the fixed disk drive.
No boot sector on fixed disk	Disk does not have a start-up partition.	1. Run *fdisk*, or reformat the disk. 2. May require replacement drive.
Diskette Read Failure	Error in reading boot sector.	Replace diskette or drive.

Message	Possible Cause	Possible Remedy
Fixed Disk Read Failure	The computer could not load data from the fixed disk.	1. Try to start the computer again. 2. Partition the fixed disk using the *User Diagnostics* initialization utility for the drive installed or the MS-DOS *fdisk* utility. Format the disk for your operating system. Install the operating system. 3. Ensure that the fixed disk drive data cable and power cable are connected properly to the drive and the baseboard. 4. Phone your service representative; it may be necessary to replace the fixed disk drive or the baseboard.
Press <**F1**> to continue	A power-on self-test found an error.	Put the *Reference/BIOS Diskette* in drive A and press the **F1** key to continue loading the system.

Using Password Messages

These messages may appear when you are using the password features of this computer.

Message	Possible Cause	Possible Remedy
Enter password	A password has been installed and now controls access to the computer.	Enter the correct 1-7 character password.
Password Ok	The password you typed is correct.	No action.
Password has been removed	The old password has been deleted. There is no password protection until a new password is installed.	You do not need a password to use the computer.
A new password has been installed.	A new password was installed.	Type the password to use the computer.
System halted! Must power down	The password typed into the computer is incorrect. The computer will process no more information. Start the computer again.	1. Use the correct password. 2. If you do not know the password, only a dealer or service representative can remove the password.

Message	Possible Cause	Possible Remedy
Password is incorrect	The password typed into the computer is incorrect. After three tries the computer halts.	Type the correct password.
Address mark not found	There is no MS-DOS partition on the fixed disk for installation of the keyboard password program.	Install MS-DOS on the fixed disk.

Using SCSI Messages

These messages may appear when you are using the SCSI fixed disk drive.

Message	Possible Cause	Possible Remedy
Read Capacity Failed; Slot, Type, PUN, LUN: *ss, tt, pp, ll*	The problem is related to the device identified by the indicated slot number (*ss*), SCSI peripheral type (*tt*), the SCSI physical unit—or ID—number (*pp*), and the SCSI logical unit number (*ll*). The SCSI drive is not compatible with this computer.	1. Verify the drive is certified for use in this computer. 2. Phone your service representative; it may be necessary to replace the drive with a certified drive.
Hard Disk Not Ready; Slot, Type, PUN, LUN: *ss, tt, pp, ll*	The problem is related to the device identified by the indicated slot number (*ss*), SCSI peripheral type (*tt*), the SCSI physical unit—or ID—number (*pp*), and the SCSI logical unit number (*ll*). 1. Cable is not properly terminated. 2. Cable is not properly connected. 3. The drive is bad.	1. Check the terminating resistors. 2. Check for proper cable connections. 3. Phone your service representative; it may be necessary to replace the drive with a certified drive.

Message	Possible Cause	Possible Remedy
Error Determining Disk Parameters; Slot, Type, PUN, LUN: *ss, tt, pp, ll*	The problem is related to the device identified by the indicated slot number (*ss*), SCSI peripheral type (*tt*), the SCSI physical unit—or ID—number (*pp*), and the SCSI logical unit number (*ll*). The SCSI drive is not compatible with this computer.	1. Verify the drive is certified for use in this computer. 2. Reformat the disk using `Initialize SCSI Fixed Disks` on the Utilities Menu of the *User Diagnostics* diskette. 3. Phone your service representative; it may be necessary to replace the drive with a certified drive.
No SCSI RAM Available	1. The RAM used by the SCSI host adapter could not be found. 2. The SCSI host adapter may be disabled.	1. Run the *setup.exe* Change Configuration utility on the *Reference/BIOS Diskette* to ensure that the the SCSI host adapter is enabled. 2. Phone your service representative. It may be necessary to replace the SCSI host adapter.
SCSI RAM Failed Tests - Initialization Aborted	The random-access memory (RAM) used by the SCSI host adapter is bad.	1. Run user diagnostics to check the memory and SCSI host adapter for proper operation. 2. Phone your service representative; it may be necessary to replace the failing RAM or SCSI host adapter.

Message	Possible Cause	Possible Remedy
No SCSI Adapters Detected	No SCSI host adapters are in the computer.	1. Verify that the computer has SCSI host adapter(s). 2. Phone your service representative; it may be necessary to replace the SCSI host adapter(s).
No SCSI Devices Detected; Slot:	1. The SCSI data cable is not connected properly to the drive or the connector on the baseboard. 2. There is no SCSI drive installed. 3. The drive is not receiving power. 4. Two drives have the same SCSI ID. 5. The SCSI drive ID is set to the same ID number as the SCSI host adapter. 6. The cable is not properly terminated.	1. Reconnect the SCSI data cable to the drive and the connector on the baseboard. 2. Install an approved SCSI drive. 3. Ensure that the power cable is properly connected to both the drive and the power supply. 4. Change the SCSI drive ID number of one drive. 5. Reset the SCSI drive ID number to 06. 6. Check the terminating resistors.

Running User Diagnostics

The *User Diagnostics* diskette contains programs which identify computer hardware problems. The tests are designed for use with minimal supporting documentation. As the computer runs the tests, the display shows the name of the test and states whether the component passed or failed.

It is helpful to use diagnostics programs when you do the following:

- Set up the computer
- Add or remove options
- Suspect that a problem may exist

NOTE: *Programs on the* User Diagnostics *diskette are intended to help detect problems. Only qualified technicians should repair the computer.*

Copying the User Diagnostics Diskette

Before using the *User Diagnostics* diskette, make a working copy as described below:

1. Insert the original diskette into drive A and turn on the computer.
2. Follow the screen messages to copy the diskette.

NOTE: *Run user diagnostics only from the working copy that you make of the diskette.*

Using User Diagnostics

The diagnostics tests display computer configuration and other information. Respond to the messages displayed on the screen until the Main Menu appears.

A typical Main Menu is shown on the following page.

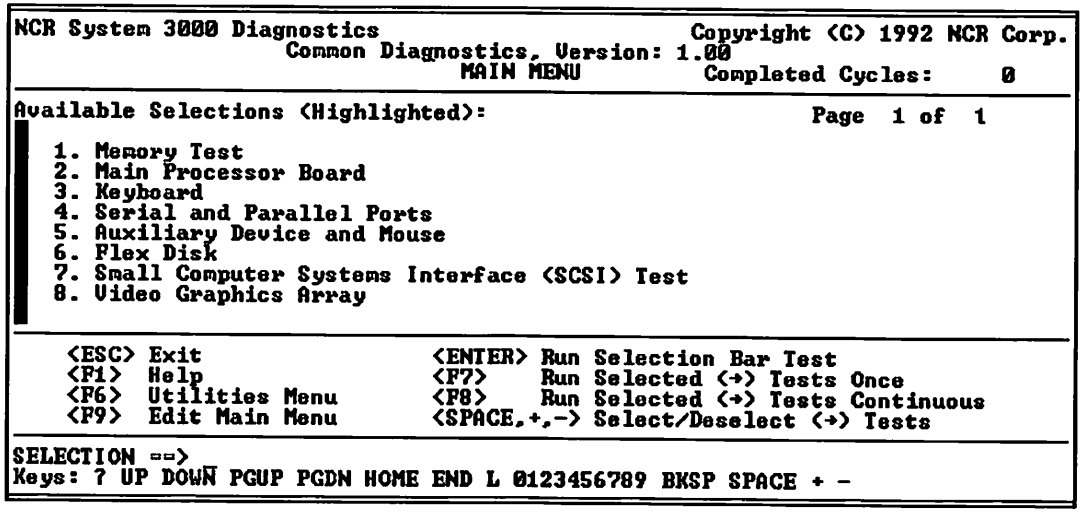
Select the test you want to run by either of the following two methods:

- Enter the test's number and press **Enter**.
- Use your keyboard arrow keys to move the selection bar to the desired test and press **Enter**.

Select a group of tests by moving the selection bar to each desired test and pressing the space bar. To cancel a selection, press the space bar again.

Once you have selected the desired tests, press the **F7** key to run all selected tests once. Press the **F8** key to run all selected tests continuously.

NOTE: *If you use choice 7,* `Small Computer System Interface (SCSI) Test`*, the time required to complete the* `Send Diagnostics` *sub-test differs depending on the type of drive being tested. Do not assume there is an error if you have to wait a minute or more for the test to complete.*



Sample Screen Display of the User Diagnostics Main Menu

Interpreting Diagnostic Error Messages

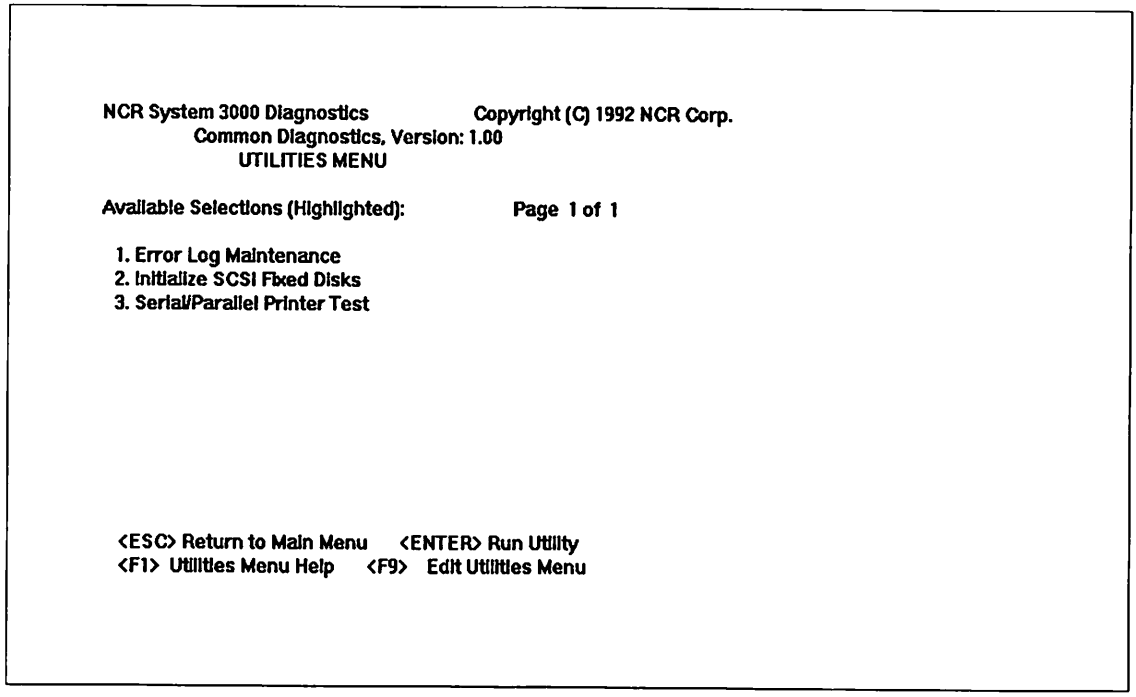
After a diagnostic test has been completed, a PASSED/FAILED message will appear next to the test title. The passed or failed message is valid only at the time of the test. Intermittent failures, especially disk failures, may not be detected.

If all tested components function properly, the screen will display PASSED next to the name of the test. If the module detected one or more errors, it will displays FAILED. A blank next to the name of a test means that the test was not completely executed.

If you receive an error message on a test, run the test again in continuous mode for a few minutes to see if the error continues to occur. If no further failures occur, a temporary condition probably caused the error. If the error continues to occur, call your dealer or representative for advice.

Using Diagnostics Utilities

Press the **F6** key from the Main Menu to access the Utilities Menu. You have the choices shown below.



Example Screen Display of User Diagnostics Utilities Menu

Initializing Fixed Disks

Caution

The Initialize SCSI Fixed Disk utility destroys all data stored on the fixed disk drive.

Use the Initialize SCSI Fixed Disk utility in the following circumstances:

- A newly installed drive does not have the proper MS-DOS format
- Your disk does not access files properly

Follow screen prompts to initialize the disk. The process can take several minutes for a large disk.

After using this utility, run the MS-DOS *fdisk* and *format* utilities or appropriate disk preparation utilities in other operating systems.

Error Log Maintenance

This utility allows you to display, print, and delete files which record errors discovered by running diagnostics. You may need the information in this file for reporting errors to your dealer or representative.

NOTE: *Do not use a working copy of the* User Diagnostics *diskette with more than one computer. The error files are accurate only if you always use a dedicated* User Diagnostics *diskette for each computer.*

Add/Delete Tests

The Add/Delete Tests screen is displayed when you press the **F9** key after the Main Menu screen appears. This program allows you to integrate test modules that come with option kits into your working copy of the *User Diagnostics* diskette.

To add a test, follow the steps listed below:

1. Exit the diagnostics program.
2. Copy the new test module to the *User Diagnostics* diskette.
3. Return to Add/Delete Tests.
4. Fill in the blanks of the Add Tests program with the required information. You must enter the exact file name as it appears on the diagnostics diskette that accompanies the optional component.

Chapter 4

Adding NCR Options

Overview

This chapter lists operating environments and explains the general procedure for installing the following NCR kits:

- Boards
- Drives
- Memory modules
- Processor board upgrades
- Real-time clock modules

Each installation procedure begins with an overview and then proceeds with a detailed set of instructions. These installation instructions include procedures for removing and replacing components.

Instructions in this chapter should be used in conjunction with specific kit documentation, which contains illustrations and information unique to that kit. To ensure success, read both the instructions in this *User Guide* and the kit documentation before beginning an installation procedure.

NOTE: *The installation procedures for monitors, mice, and keyboards are not discussed in this chapter. To install one of these options, refer to Chapter 1, "Getting Started."*

Installing Operating Environments

The following operating environments are supported on the NCR 3350:

- MS-DOS®
- MS-Windows
- Novell® Advanced NetWare®
- SCO UNIX™

To install any of these operating environments, refer to the documentation provided with the environment. The operating environment manuals should discuss installation procedures and considerations such as the use of multiple operating environments (for example, UNIX and MS-DOS) on one machine.

Installing Boards

This section explains the general procedure for installing boards. The documentation included with your board kit provides additional instructions pertaining to that particular board.

The procedure for installing any board consists of seven steps, with the actual installation being the fifth step:

1. Review warnings and cautions.
2. Disconnect cabling and remove the cover from the computer.
3. Locate the correct slot for the board.
4. Prepare the computer and board for installation.
5. Plug in the board.
6. Replace the computer cover and cabling.
7. Reconfigure the computer using the *Reference/BIOS Diskette.*

Reviewing Warnings and Cautions

Be sure to note the warnings and cautions outlined in this section. Failure to follow these guidelines could lead to personal injury or damaged equipment.

Warning

To avoid electric shock, turn off the power switch and unplug the power cord before you begin work.

Disconnect components only as directed by installation instructions.

Caution

Install only options that have been approved for use with this computer. The installation of non-approved options may cause damage to the equipment and violate local safety or radio interference regulations. Consult your service representative or supplier for more information about the suitability of options to this computer.

Touch a metal surface to ground yourself before handling boards or components. Static charges on your body could damage electronic equipment.

Do not install options in an area known to contain static electricity, such as a room with static-inducing carpet.

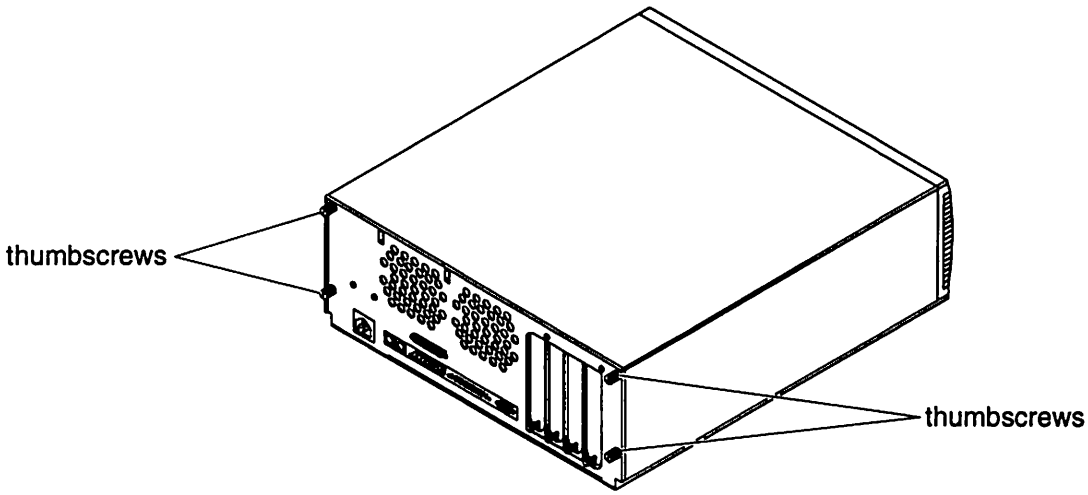
Do not handle printed-circuit boards more than necessary. Hold option-controller boards by the edges and do not touch the components.

Use only shielded cables to make option connections. Use of non-shielded cables may cause interference with radio and TV reception.

Removing the Cover

To remove the cover from your computer, follow these steps:

1. Turn off the computer power switch and unplug the power cord from its socket.
2. If you will be moving the computer in order to install the board, disconnect any cables that will impede movement of the computer. Move the computer to a work surface.
3. Unlock the keylock on the front of the computer.
4. Unscrew the four thumbscrews that hold the cover to the back panel. The locations of these thumbscrews are shown in the following figure.

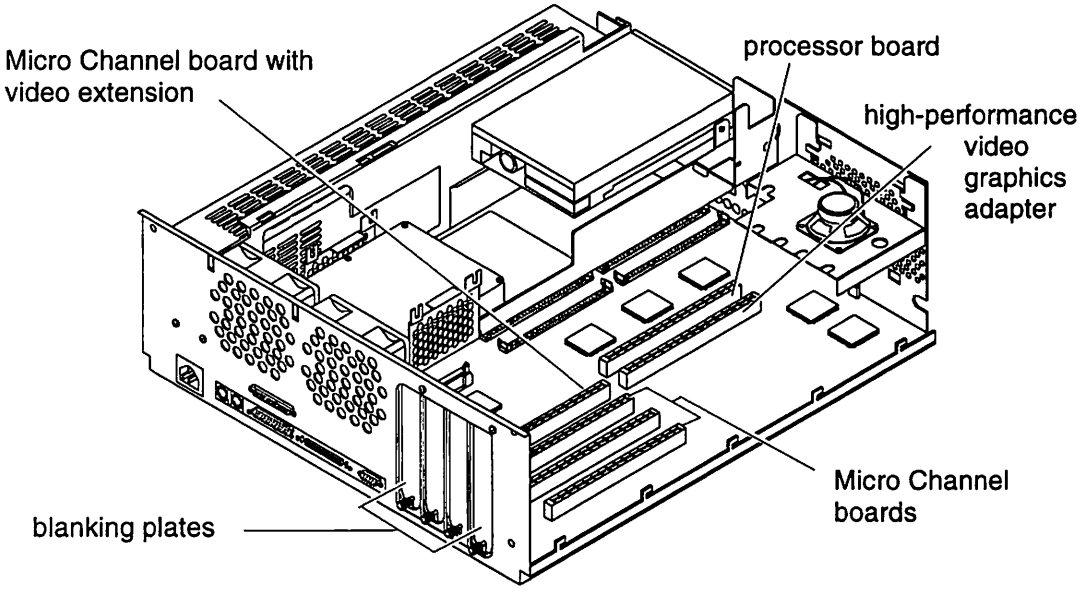


Locating the Rear Thumbscrews

5. Slide the computer cover forward slightly and then lift it off of its tracks.

Locating the Proper Board Connector

The baseboard of the computer contains six board connectors, as shown in the following illustration. One connector is for the processor board, one is for a high-performance video graphics adapter, and the remaining four are for Micro Channel cards.



Locating Board Connectors and Blanking Plates

If you are installing a processor or high-performance video graphics card, or a Micro Channel board that uses the video extension, you must locate the board in the slot identified in the preceding figure. If you are installing a Micro Channel board that does not require the video extension, you may locate it in any Micro Channel slot.

NOTE: *If you install a high-performance video graphics card in this computer, you cannot install a board in the Micro Channel slot with the video extension.*

Preparing the Computer for Board Installation

This section discusses steps that you must take to prepare the computer for installation of certain types of boards. For instructions about preparing a particular board for installation, refer to the *User Information* packaged with the board.

Preparing for a SCSI Host Adapter

Follow the instructions in this section if you are installing a SCSI host adapter.

The computer supports up to seven SCSI devices through a SCSI bus incorporated in the computer baseboard. (Up to three of the devices may be internal.) The computer may also house up to two SCSI host adapters, each capable of supporting up to seven additional SCSI devices. Each adapter has its own SCSI bus, which operates independently of the bus of another adapter and the bus on the computer baseboard.

Termination for a SCSI host adapter installed in the computer is independent of termination supplied to the baseboard SCSI bus or to a second adapter. For a SCSI bus to be properly terminated, terminating resistors must be installed at both ends of the bus.

- If only one SCSI device is attached to a host adapter, the device and the adapter should provide termination. Refer to the *User Information* packaged with the adapter and ensure that termination is provided.

- If the host adapter does not serve as an end device on its SCSI bus, it should not be terminated. Refer to the *User Information* packaged with the host adapter and ensure that the adapter is not terminated.

Preparing for a Board with an External Connector

If you are installing a board with an external connector, such as a SCSI adapter or Ethernet board, remove the blanking plate for the slot you selected, saving the plate for possible future use. Refer to the previous illustration for the locations of the blanking plates.

Installing a Board

To replace a board or to install a board in an empty slot, follow these steps:

1. If you are installing a board in an empty slot, skip to step 2.

   If you are replacing a processor board, disconnect its power cable from the board. To remove any type of board, grasp it by the top corners and lift it straight up from its baseboard connector.

NOTE: *If you are removing a board with an external connector and will not replace the board, insert a blanking plate in the connector slot on the rear of the computer cabinet.*

2. Grasp the new board by its top corners with the keyed finger connector facing downward and matching the key of the baseboard connector.
3. Align the finger connector of the new board with the baseboard connector.
4. Insert the board into the baseboard connector by applying steady, firm pressure on both corners.
5. If you are replacing a processor board, attach the two-wire power harness that runs through the fan mounting to the processor board connector.

Replacing the Cover

Follow these steps to replace the computer cover:

1. Hold the cover over the computer so that approximately five inches of the rear of the computer are exposed.
2. Lower the cover into place, being sure to engage the side rails.
3. Slide the cover into position, ensuring that the rear edge of the cover and the back panel of the computer are flush.

4. Replace and gently tighten the four thumbscrews that hold the cover in place.
5. Relock the keylock on the front of the computer.
6. Reconnect any cables that you disconnected when you removed the cover.

Reconfiguring the Computer

If you replaced a board with an identical board, you do not need to reconfigure the computer.

If you removed a board from or installed a new board in your computer, run the Automatic Configuration or Change Configuration utility on the *Reference / BIOS Diskette.* Refer to Chapter 2, "Using the Computer Software," for a discussion of these utilities.

Installing a Drive

This section explains the general procedure for installing internal drives. The documentation included with your drive kit provides additional instructions pertaining to that particular drive.

The procedure for installing any drive consists of eight steps, with the actual installation being the seventh step:

1. Review warnings and cautions.
2. Review current SCSI drive ID assignments. (This is necessary only for SCSI devices.)
3. Access the drive bays.
4. Locate the correct bay for the drive.
5. Prepare the computer for installation of the drive.
6. Prepare the drive for installation. (This is necessary only for SCSI devices.)
7. Install the drive.
8. Reassemble the computer and configure it to recognize the new drive.

Reviewing Warnings and Cautions

Be sure to note the warnings and cautions outlined in this section. Failure to follow these guidelines could lead to personal injury or damaged equipment.

Warning

To avoid electric shock, turn off the power switch and unplug the power cord before you begin work.

Disconnect components only as directed by installation instructions.

Caution

Install only options that have been approved for use with this computer. The installation of non-approved options may cause damage to the equipment and violate local safety or radio interference regulations. Consult your service representative or supplier for more information about the suitability of options to this computer.

Touch a metal surface to ground yourself before handling boards or components. Static charges on your body could damage electronic equipment.

Do not install options in an area known to contain static electricity, such as a room with static-inducing carpet.

Remove the flexible diskettes from flexible diskette drives before installing these options.

Use only shielded cables to make option connections. Use of non-shielded cables may cause interference with radio and TV reception.

Reviewing SCSI Assignments

If you are installing, removing, or replacing a SCSI drive, you will need to know the current SCSI device ID assignments. Use the View Internal Options utility on the *Reference/BIOS Diskette* to review the assignments. Refer to Chapter 2, "Using the Computer Software," for a discussion of this utility.

Write down the ID assignments so you may refer to them while you are installing or removing a drive. You may wish to keep a listing of all SCSI ID assignments in the table on the inside front cover of this manual.

Accessing the Drive Bays

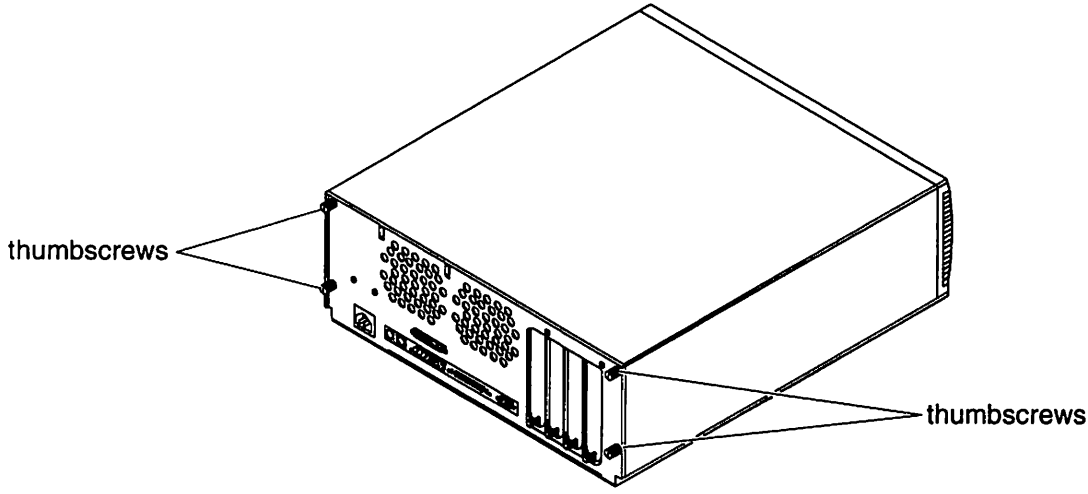
To access the drive bays, you must remove the cover from your computer and then remove the drive platform from its mounting.

Removing the Cover

To remove the cover from your computer, follow these steps:

1. Turn off the computer power switch and unplug the power cord from its socket.
2. If you will be moving the computer in order to install the drive, disconnect any cables that will impede movement of the computer. Move the computer to a work surface.

3. Unlock the keylock on the front of the computer.
4. Unscrew the four thumbscrews that hold the cover to the back panel. The locations of these thumbscrews are shown in the following figure.



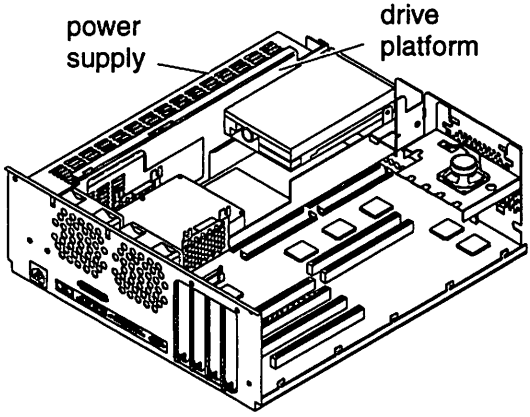
Locating the Rear Thumbscrews

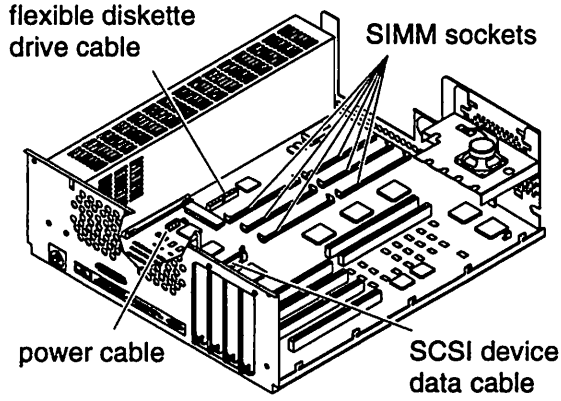
5. Slide the computer cover forward slightly and then lift it off of its tracks.

Removing the Drive Platform

To remove the drive platform from its mounting, follow this procedure:

1. Referring to the following figures, grasp the drive platform by its sides and lift it part of the way out of the computer. Place the platform on top of the power supply.





Locating the Drive Platform and Cable Connectors

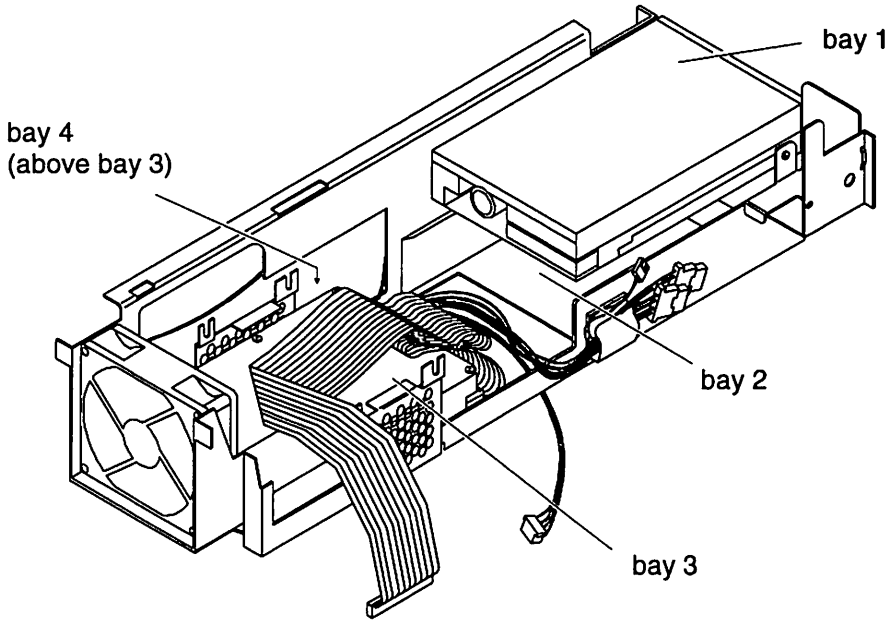
2. Detach the power cable from its connector on the baseboard.
3. Detach the flexible diskette drive and SCSI device data cables from their baseboard connectors.

4. Place the drive platform on the work surface next to the computer.

NOTE: You may wish to label the cable connectors with masking tape to avoid possible confusion when you reinstall the cables.

Locating the Proper Drive Bay

The computer drive platform may hold up to four drives, as shown in the following figure. The 3.5-inch flexible diskette drive ordered with each base model of the computer is installed in bay 1 upon delivery unless the computer is ordered with a 5.25-inch flexible diskette or CD-ROM drive. If the computer is initially configured with a 5.25-inch drive, the 3.5-inch flexible diskette drive will be mounted in bay 2 upon delivery.



Identifying the Drive Bays

The following figure illustrates the permissible combinations and recommended locations of drives in the computer. Considering these restrictions, choose the bay in which you will install the drive.

Permissible Drive Combinations			
Bay 1	**Bay 2**	**Bay 3**	**Bay 4**
3.5-inch flex			
3.5-inch flex	Tape		
3.5-inch flex		Fixed	
3.5-inch flex	Tape	Fixed	
3.5-inch flex		Fixed	Fixed
3.5-inch flex	Tape	Fixed	Fixed
5.25-inch flex or CD-ROM	3.5-inch flex		
5.25-inch flex or CD-ROM	3.5-inch flex	Fixed	

NOTE: *The computer design physically prevents a 5.25-inch flexible diskette or CD-ROM drive from being installed in any bay except drive bay 1. If a 5.25-inch drive is installed in bay 1, bay 4 cannot be used. Only drives with removable media should be installed in bay 2.*

Further restrictions related to the permissible locations of a particular drive may be listed in the User Information *packaged with the drive.*

Preparing the Computer for Drive Installation

Before installing a drive, you may need to move a drive that is installed in the bay you have chosen. If you are installing or moving a SCSI drive, you must also verify that the terminating resistors of all SCSI drives are properly set. Finally, if you are installing a drive in bay 1 or bay 2, you may need to remove or replace a section of the bezel from the computer cover.

Removing a Drive

To remove a drive from the platform, follow the procedure below:

1. Disconnect the data and power cables, if any, from the drive.
2. Remove the drive-retaining screws that fasten the drive to the drive platform.
3. Remove the drive from the drive platform.

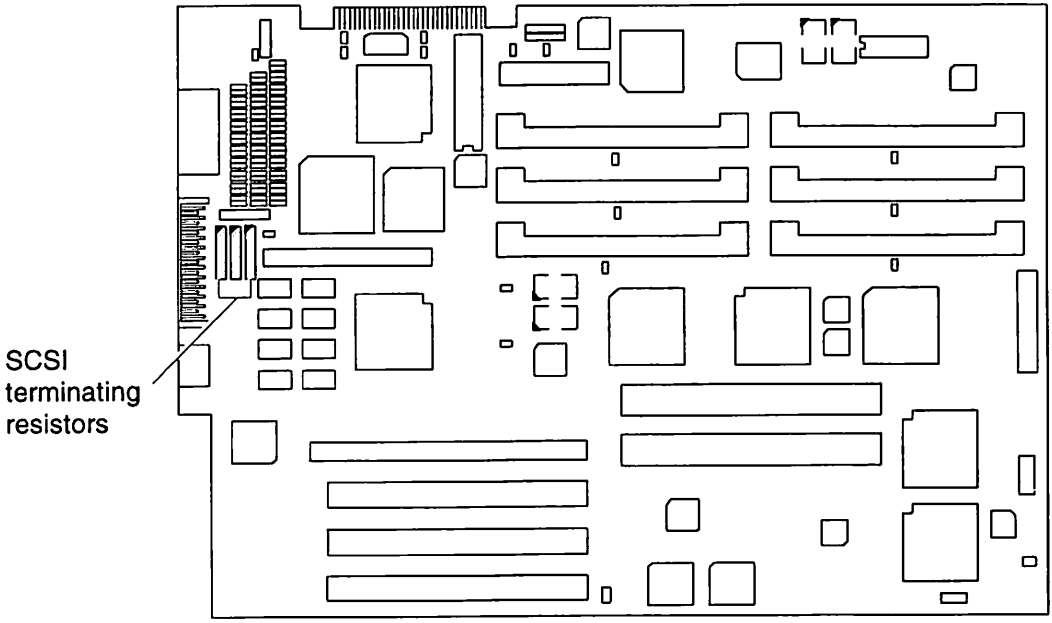
Adjusting SCSI Termination

Follow these instructions only if you are installing, removing, or relocating a SCSI drive.

Proper SCSI termination requires that the device attached to each end of the daisy-chain cable of the SCSI bus have terminating resistors installed and that the other devices have their terminating resistors removed.

The computer is delivered with a set of external terminating resistors installed on the baseboard, as shown in the following figure.

- If your computer will support only internal SCSI devices, leave the terminating resistors installed on the baseboard.
- If you are installing an external SCSI device, remove the terminating resistors from the baseboard and save them for possible future use. To remove the resistors, grasp each with a pair of tweezers or needle-nose pliers and lift it from its socket.



Locating the SCSI Terminating Resistors

For a further discussion of SCSI termination, refer to "Preparing for a SCSI Host Adapter" in the board installation instructions earlier in this chapter.

Modifying the Front Bezel

If you are replacing a 3.5-inch flexible diskette drive in bay 1 with a 5.25-inch flexible diskette or CD-ROM drive, or if you are installing a flexible diskette or tape drive in bay 2, follow these instructions for modifying the front bezel.

Turn the computer cover upside down on your work surface. Using your fingers, push out the plastic bezel piece that prevented access to the bay. Save the bezel piece for possible future use.

Preparing a SCSI Drive for Installation

In an earlier procedure, you verified that the terminating resistors on the computer baseboard were installed or removed as required for your SCSI drive configuration. You must also ensure that terminating resistors on each SCSI drive are installed or removed to provide proper termination. Finally, you must set the jumpers of each drive to assign a SCSI identification value and must verify that other jumper settings are correct.

Adjusting Terminating Resistors

Referring to the *User Information* packaged with each SCSI drive, locate the terminating resistor sockets. Verify that the terminating resistor settings on the drives meet the following conditions:

- Terminating resistors are installed or enabled on the drive that will be attached to the end connector of the SCSI data cable.
- Terminating resistors are not installed or enabled on the drives that will be attached to the two middle connectors of the SCSI data cable.

If you must remove resistors from a drive, grasp them gently with a pair of tweezers or needle-nosed pliers and lift them from their sockets. Save the resistors for possible future use.

Assigning a SCSI ID Value

Each SCSI device installed must be assigned a unique address in order to be recognized by the computer. These addresses, represented by device identification numbers, are pre-set to certain default values according to the operating system installed.

The default values for internal devices running under DOS and OS/2 are shown in the following figure; the values must be set on external devices for individual system configurations.

Recommended ID Values for SCSI Devices, DOS and OS/2	
Assigned ID	**Device**
0	External device
1	External device
2	External device or CD-ROM
3	External device
4	Tape
5	Second fixed disk
6	First fixed disk
7	SCSI host adapter

NOTE: *The default values for tape drives running under UNIX SVR4 and SCO UNIX are 3 and 4, respectively.*

NOTE: *Because the SCSI polling feature grants the highest priority to the device with the highest SCSI ID, it is suggested that the default values specified in the preceding table and note be retained. Use an alternate ID only if you are certain that doing so will enhance your computer's performance.*

After choosing the SCSI ID value for the new drive, set the ID by following these steps:

- If you are assigning an unused SCSI ID to the new drive, refer to the *User Information* packaged with the drive to determine how its jumpers or switches must be set to establish the ID. Record the chosen ID in the table in the cover of this *User Guide.* When you have reassembled the computer, run the Change Configuration utility on the *Reference/BIOS Diskette.*

- If you must reassign the SCSI ID of a previously installed drive, refer to the *User Information* packaged with the old and new drives to determine how to set or reset the jumpers or switches to reflect the chosen ID values. Record both IDs in the table in the front of this *User Guide.* When you have reassembled the computer, run the Change Configuration utility on the *Reference/BIOS Diskette.*

Verifying Jumper Settings

Referring to the *User Information* for the new device, locate the jumpers or switches used to set the parity, self-seek, and motor start wait/spin options. Verify that odd parity is enabled, the self-seek option is disabled, and the wait/spin option is set for a wait delay.

Installing a Drive

To install a drive in an empty bay, follow the steps below. To replace a drive, refer to the section "Removing or Adjusting a Drive" earlier in this chapter.

The instructions in this procedure explain how to install and cable any permissible combination of SCSI devices. Begin the installation by choosing the "Connecting a Drive" instructions that match your configuration. Complete all installations by following the procedure "Reassembling the Computer" further in this chapter.

If you are installing drives in any configuration other than one specified on the following pages, combine the connection procedures to match your configuration. For example, if you are installing a tape drive in drive bay 2 and fixed disk drives in bays 3 and 4, follow the instructions "Connecting a Tape Drive" and then complete the sequence "Connecting Two Fixed Disk Drives."

Connecting One or Two Flexible Diskette Drives

If you are installing one flexible diskette drive in your computer, you will attach it to the end connector of the flexible diskette drive data cable and will install it in bay 1. You may install a second flexible diskette drive in bay 2. (Note that a 5.25-inch flexible diskette drive may only be installed in bay 1.)

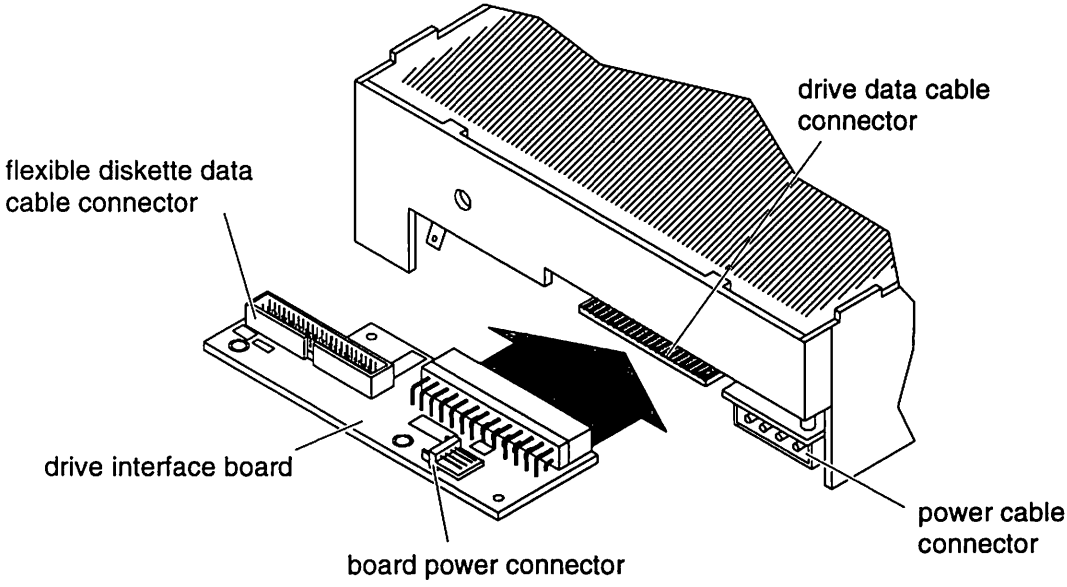
Use the following procedure to install one or two flexible diskette drives.

NOTE: *If you are installing a 3.5-inch flexible diskette drive and a CD-ROM drive, position the diskette drive in bay 2 and attach it to the end connector of the flexible diskette drive cable.*

1. Position the first drive in bay 1 of the drive platform with its data cable connector on the bottom and facing the rear of the computer.

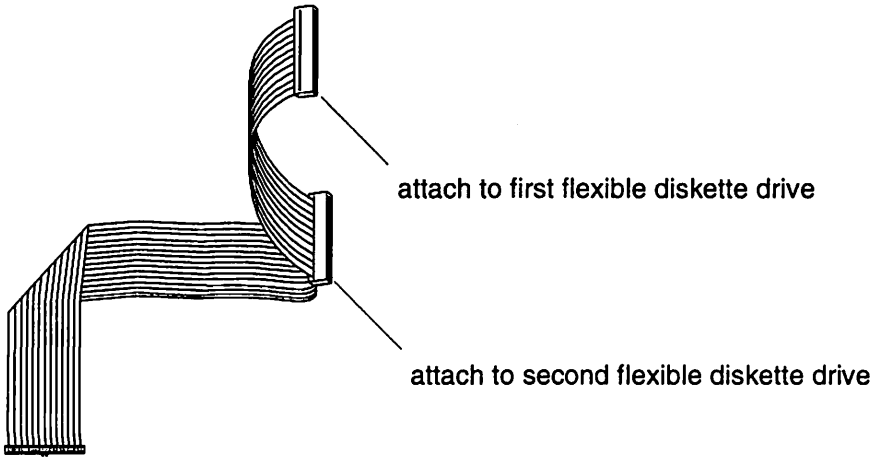
2. If you are installing a 3.5-inch flexible diskette drive, skip to step 4.

   If you are installing a 5.25-inch flexible diskette drive, refer to the following figure and attach a drive interface board to the drive data cable connector. This board is included in kit 3350-K410 or orderable as kit 3350-K412.



Installing the Diskette Drive Interface Board

3. Attach the power cable labelled BP3 to the power cable connector on the diskette drive. Attach the two-wire power cable that feeds into BP3 to the power connector on the drive interface board.
4. Hold the flexible diskette drive data cable as shown in the following figure.



Preparing the Flexible Diskette Drive Data Cable for One or Two Drives

5. Attach the flexible diskette data cable to the drive or drive assembly:
   - If the drive in bay 1 has a 3.5-inch form factor, attach the end connector of the flexible diskette data cable to the 34-pin data connector on the flexible diskette drive.
   - If the drive in bay 1 has a 5.25-inch form factor, attach the end connector of the flexible diskette data cable to the 34-pin data connector on the diskette drive interface board.
6. Align the holes on the sides of the drive with the slots on the drive platform. Insert drive-retaining screws into the holes and tighten the screws into the drive.
7. If you are not installing a second flexible diskette drive, continue with the instructions "Reassembling the Computer" further in this section. If you are installing a second flexible diskette drive, position it in drive bay 2 with its circuit board facing downward and its data cable connector facing the rear of the computer.

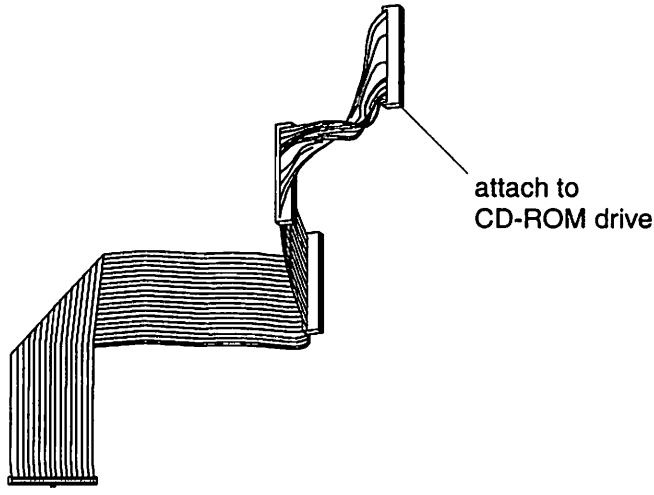
8. Attach the middle connector of the flexible diskette data cable to the data connector on the flexible diskette drive in bay 2. If necessary, refer to the *User Information* packaged with the drive to locate its data connector.
9. Align the holes on the sides of the drive with the slots on the drive platform. Insert drive-retaining screws into the holes and tighten the screws into the drive.
10. Continue with the instructions "Reassembling the Computer" further in this section.

Installing One CD-ROM Drive

If you are installing a CD-ROM drive, you will attach it to the end connector of the SCSI data cable and will install it in bay 1.

1. Position the CD-ROM drive in bay 1 of the drive platform with its 50-pin data cable connector on the bottom and facing the rear of the computer.

2. Twist the end of the SCSI data cable as shown in the following figure.



Preparing the SCSI Data Cable for a CD-ROM Drive

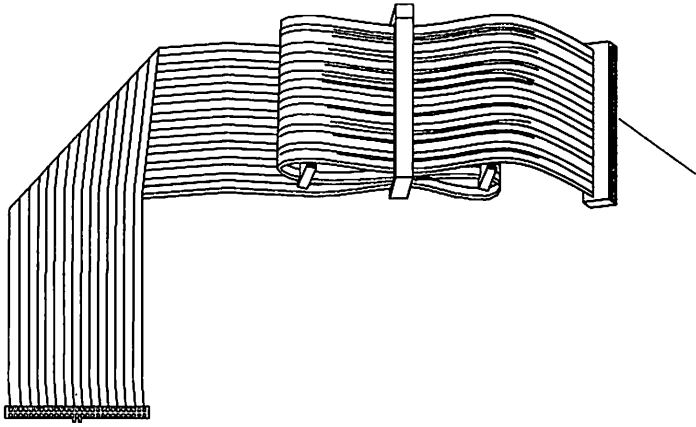
3. Attach the end connector of the data cable to the 50-pin data cable connector on the CD-ROM drive. If necessary, refer to the *User Information* packaged with the drive to locate its data cable connector.
4. Attach the end connector on the four-wire power cable to the power connector on the drive.

5. Align the holes on the sides of the drive with the slots on the drive platform. Insert drive-retaining screws into the holes and tighten the screws into the drive.
6. If you have not relocated the flexible diskette drive to bay 2, refer to the instructions "Installing One or Two Flexible Diskette Drives." If you have installed the flexible diskette drive, continue with the instructions "Reassembling the Computer."

Connecting One Fixed Disk Drive

If you are installing a fixed disk drive as the only SCSI device in your computer, you will attach it to the end connector of the SCSI data cable. It is recommended that you install the drive in bay 3. Follow this installation procedure:

1. Position the fixed disk drive in bay 3 of the drive platform with its 50-pin data cable connector on the bottom and facing the front of the computer.
2. Fold and clip the SCSI data cable so that only the end connector is exposed, as shown in the following figure.



Preparing the SCSI Data Cable for One Fixed Disk Drive

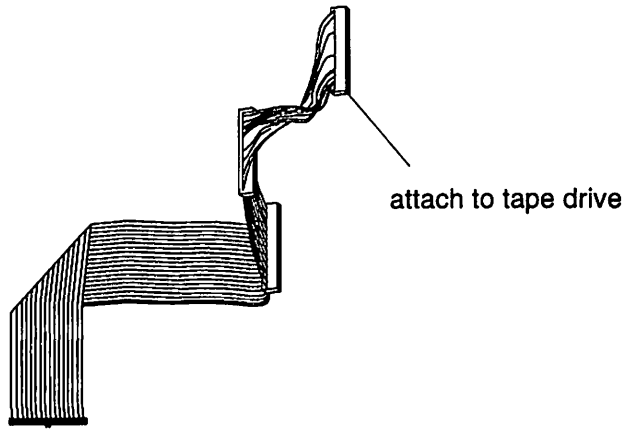
3. Attach the end connector of the data cable to the 50-pin cable connector on the fixed disk drive. If necessary, refer to the *User Information* packaged with the drive to locate its data connector.
4. Attach the connector on the four-wire power cable that is labelled BP1 to the power connector on the drive.
5. Align the holes on the underside of the drive with the slots on the drive platform. Place the ventilated drive mounting brackets on the exterior of the drive platform so that its slots are aligned with the drive and drive platform slots. Insert drive-retaining screws into the holes and tighten the screws into the drive.

6. Continue with the instructions "Reassembling the Computer" further in this section.

Connecting One Tape Drive

If you are installing a tape drive as the only SCSI device in your computer, you will attach it to the end connector of the SCSI data cable and will install it in bay 2. Follow this installation procedure:

1. Position the tape drive in bay 2 of the drive platform with its circuit board facing downward and its 50-pin data cable connector facing the rear of the computer.
2. Twist the end of the SCSI data cable as shown in the following figure.



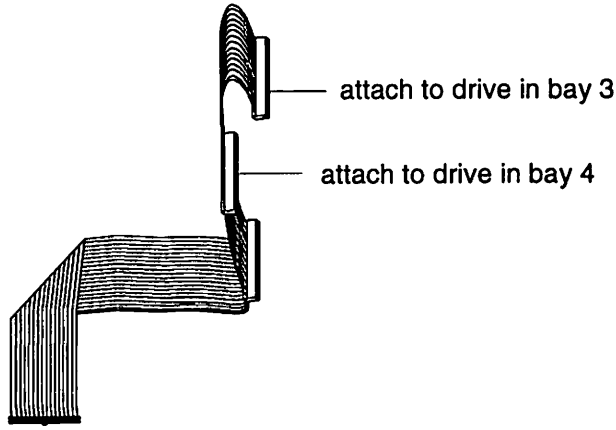
Preparing the SCSI Data Cable for One Tape Drive

3. Attach the end connector of the data cable to the 50-pin data cable connector on the tape drive. If necessary, refer to the *User Information* packaged with the drive to locate its data cable connector.
4. Attach the connector on the four-wire power cable that is labelled BP2 to the power connector on the drive.
5. Align the holes on the bottom or sides of the drive with the slots on the drive platform. Insert drive-retaining screws into the holes and tighten the screws into the drive.
6. Continue with the instructions "Reassembling the Computer" further in this section.

Connecting Two Fixed Disk Drives

If you are installing two fixed disk drives in your computer, you will attach them to the end connector and its adjacent connector on the SCSI data cable and will install the drives in bays 3 and 4. Follow this installation procedure:

1. Position the first fixed disk drive in bay 3 of the drive platform with its 50-pin data cable connector on the bottom and facing the front of the computer.
2. Hold the SCSI data cable as shown in the following figure.



Preparing the SCSI Data Cable for Two Fixed Disk Drives

3. Attach the end connector of the data cable to the 50-pin data connector on the drive in bay 3. If necessary, refer to the *User Information* packaged with the drive to locate its data connectors.
4. Attach the connector on the four-wire power cable that is labelled BP1 to the power connector on the drive in bay 3.
5. Align the holes on the underside of the drive in bay 3 with the slots on the drive platform. Position the ventilated drive mounting brackets so that the slots in the brackets line up with the slots in the drive and drive platform. Insert drive-retaining screws through the mounting brackets into the holes and tighten the screws into the drive.

6. Position the second fixed disk drive in bay 4 of the drive platform with its 50-pin data cable connector on the bottom and facing the front of the computer.
7. Attach the second connector of the data cable to the 50-pin data cable connector on the drive in bay 4. If necessary, refer to the *User Information* packaged with the drive to locate its data cable connector.
8. Attach the connector on the four-wire power cable that is labelled BP2 to the power connector on the drive in bay 4.
9. Align the holes on the sides of the drive in bay 4 with the slots on the ventilated drive mounting brackets. Insert drive-retaining screws through the mounting brackets into the holes and tighten the screws into the drive.
10. Continue with the instructions "Reassembling the Computer" further in this section.

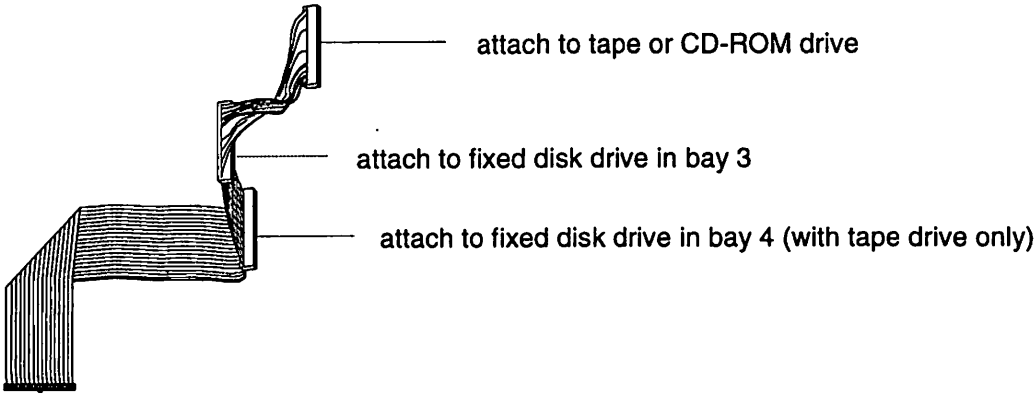
Connecting One Tape or CD-ROM and One or Two Fixed Disk Drives

You may install a CD-ROM drive with a fixed disk drive, or a tape drive with one or two fixed disk drives.

If you are installing a tape or CD-ROM drive and one fixed disk drive, you will attach the removable-media drive to the end connector of the SCSI data cable. You will attach the first fixed disk drive to the second data cable connector and install it in bay 3. With a tape drive, you may install a second fixed disk drive in bay 4. This drive will be attached to the third connector on the SCSI data cable.

Follow this installation procedure:

1. Position the tape drive in bay 2 or the CD-ROM drive in bay 1 of the drive platform with its 50-pin data cable connector on the bottom and facing the rear of the computer.
2. Twist the end of the SCSI data cable as shown in the following figure.



Preparing the SCSI Data Cable for One Tape or CD-ROM Drive and One or Two Fixed Disk Drives

3. Attach the end connector of the data cable to the 50-pin data cable connector on the drive you are installing. If necessary, refer to the *User Information* packaged with the drive to locate its data connector.
4. Attach the correct power cable connector of the four-wire power cable to the drive:
   - Attach connector BP2 to a tape drive.
   - Attach the end connector to a CD-ROM drive.
5. Align the holes on the bottom or sides of the drive with the slots on the drive platform. Insert drive-retaining screws into the holes and tighten the screws into the drive.
6. Position the first fixed disk drive in bay 3 of the drive platform with its 50-pin data cable connector on the bottom and facing the front of the computer.
7. Attach the second connector on the data cable to the 50-pin data cable connector on the fixed disk drive. If necessary, refer to the *User Information* packaged with the drive to locate its data connectors.

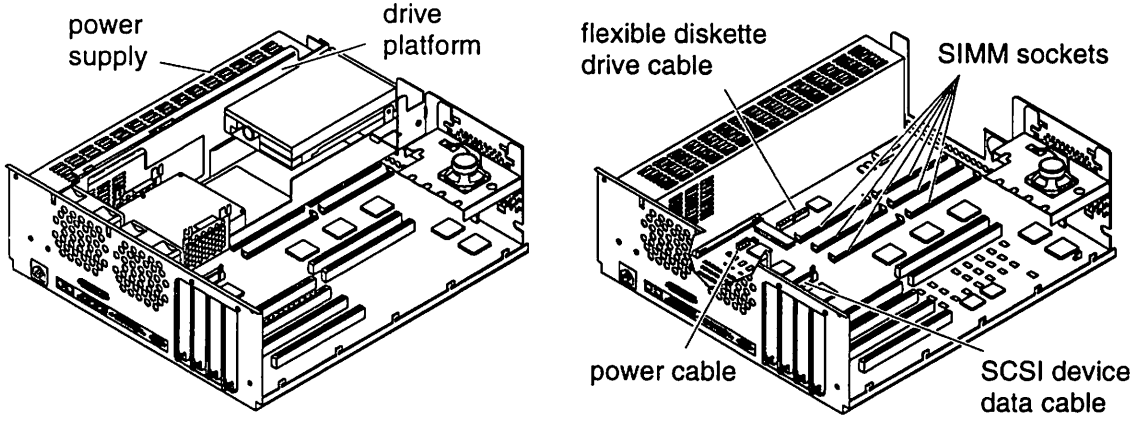
8. Attach the connector on the four-wire power cable that is labelled BP1 to the power connector on the drive in bay 3.
9. Align the holes on the underside of the fixed disk drive in bay 3 with the drive platform and the slots on the ventilated drive mounting brackets. Insert drive-retaining screws through the mounting brackets into the holes and tighten the screws into the drive.
10. If you are not installing a second fixed disk drive, continue with the instructions "Reassembling the Computer."

    If you are installing a second fixed disk drive, position it in bay 4 with its 50-pin data cable connector on the bottom and facing the front of the computer.
11. Attach the end connector on the four-wire power cable to the power connector on the drive in bay 4.
12. Align the holes on the sides of the fixed disk drive in bay 4 with the slots on the ventilated drive mounting brackets. Insert drive-retaining screws through the mounting brackets into the holes and tighten the screws into the drive.
13. Continue with the instructions "Reassembling the Computer."

Reassembling the Computer

Once you have connected any drives you are installing or moving, you are ready to reassemble the computer. To do so, follow these steps:

1. Place the drive platform on top of the power supply.
2. Reattach the four-wire power cable to the drive power cable connector on the baseboard. Refer to the following illustration for the location of the connector.



Locating the Cable Connectors

3. Matching the keys on mated connectors, attach the flexible diskette drive and SCSI device data cables to their respective baseboard connectors.
4. Reposition the drive platform in the computer, making sure that the rear platform tabs engage the guides on the back of the cabinet and that the front platform tabs are on the outside of the cabinet.
5. Replace the computer cover, being careful to engage the side rails.
6. Slide the cover into position, ensuring that the rear edge of the cover and the back panel of the computer are flush.
7. Replace and gently tighten the four thumbscrews that hold the cover in place.
8. Reconnect any cables that you disconnected when you removed the cover.
9. Relock the keylock on the front of the computer.

10. Run the Automatic Configuration or Change Configuration utility on the *Reference/BIOS Diskette.* Refer to Chapter 2, "Using the Computer Software," for a discussion of these utilities.

11. Refer to your operating system documentation, if necessary, for information about configuring the drive(s) for use with your computer.

Installing Memory Modules

This section explains the general procedure for installing industry-standard single in-line memory modules (SIMMs) in the computer.

The procedure for installing a SIMM module consists of six steps, with the actual installation being the fifth step:

1. Review warnings and cautions.
2. Disconnect cabling and remove the cover from the computer.
3. Remove the drive platform from the computer.
4. Locate the correct expansion socket for the SIMM.
5. Plug in the SIMM.
6. Reassemble the computer and configure it to recognize the new SIMM installation.

Reviewing Warnings and Cautions

Be sure to note the warnings and cautions outlined in this section. Failure to follow these guidelines could lead to personal injury or damaged equipment.

Warning

To avoid electric shock, turn off the power switch and unplug the power cord before you begin work.

Disconnect components only as directed by installation instructions.

Caution

Install only options that have been approved for use with this computer. The installation of non-approved options may cause damage to the equipment and violate local safety or radio interference regulations. Consult your service representative or supplier for more information about the suitability of options to this computer.

Touch a metal surface to ground yourself before handling boards or components. Static charges on your body could damage electronic equipment.

Do not install options in an area known to contain static electricity, such as a room with static-inducing carpet.

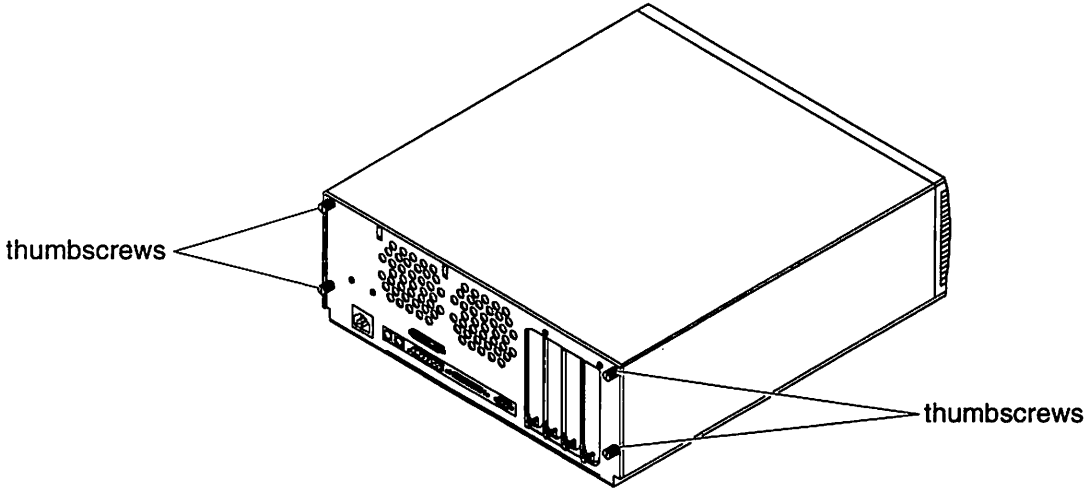
Do not handle printed-circuit boards more than necessary. Hold option-controller boards by the edges and do not touch the components.

Use only shielded cables to make option connections. Use of non-shielded cables may cause interference with radio and TV reception.

Removing the Cover

To remove the cover from your computer, follow these steps:

1. Turn off the computer power switch and unplug the power cord from its socket.
2. If you will be moving the computer in order to install the SIMM module, disconnect any cables that will impede movement of the computer. Move the computer to a work surface.
3. Unlock the keylock on the front of the computer.
4. Unscrew the four thumbscrews that hold the cover to the back panel. The locations of these thumbscrews are shown in the following illustration.



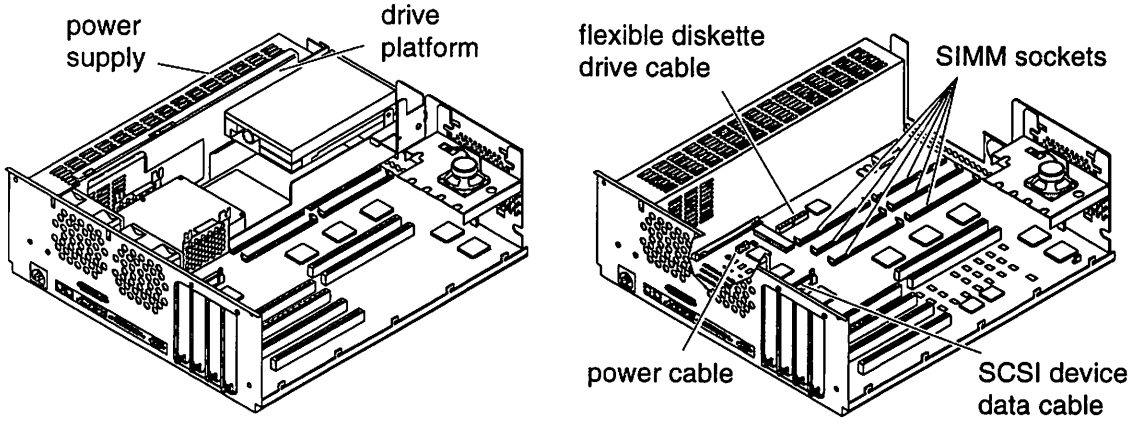
Locating the Rear Thumbscrews

5. Slide the computer cover forward slightly and then lift it off of its tracks.

Removing the Drive Platform

The sockets that hold the SIMM modules are located on the baseboard underneath the drive platform, as shown in the following figure. To access the sockets, you must remove the drive platform from the computer. Follow this procedure to remove the drive platform from its mounting:

1. Referring to the following figure, grasp the drive platform by its sides and lift it part of the way out of the computer. Place the platform on top of the power supply.



Locating the Drive Platform and Cable Connectors

2. Detach the power cable from its connector on the baseboard.
3. Detach the flexible diskette drive and SCSI device data cables from their baseboard connectors.

4. Place the drive platform on the work surface next to the computer.

NOTE: *You may wish to label the cable connectors with masking tape to avoid possible confusion when you reinstall the cables.*

Locating the Proper SIMM Socket

As shown in the previous figure, the baseboard of the computer contains six SIMM sockets. Each socket will hold a standard memory module of 2, 4, 16, or 32 MB, providing a total memory capacity of 192 MB. The SIMM sockets should be populated according to these restrictions:

- SIMMs must be installed in pairs.
- Both SIMMs in a pair must have the same memory capacity.
- Pairs of SIMMs must be installed in adjacent sockets.

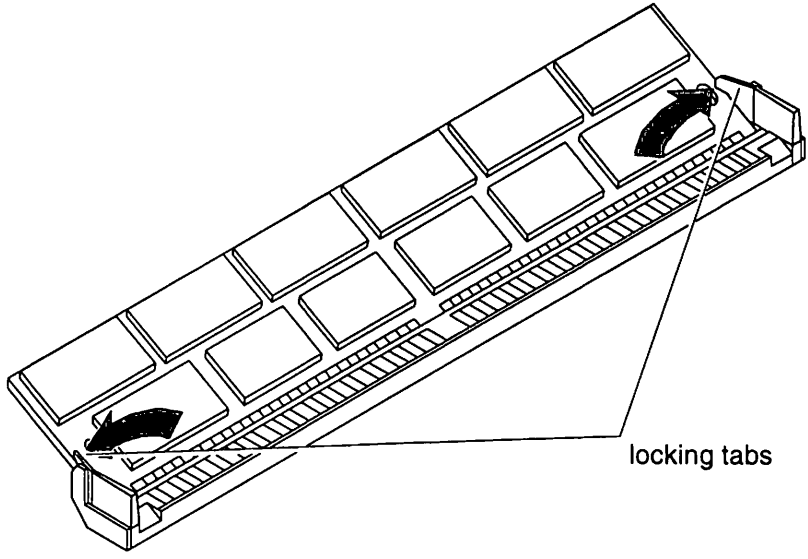
Considering these restrictions, locate the sockets in which you will install memory modules.

Installing SIMMs

To remove or install SIMMs, follow this procedure:

1. If you are installing a SIMM in an empty socket, refer to step 3.

   If you must remove a SIMM from its socket, push the locking tabs that hold the module in place outward to release the board. Refer to the following illustration to locate these tabs.



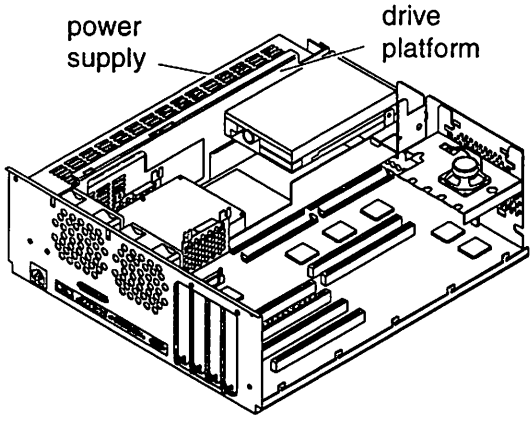
Unlocking a SIMM Module

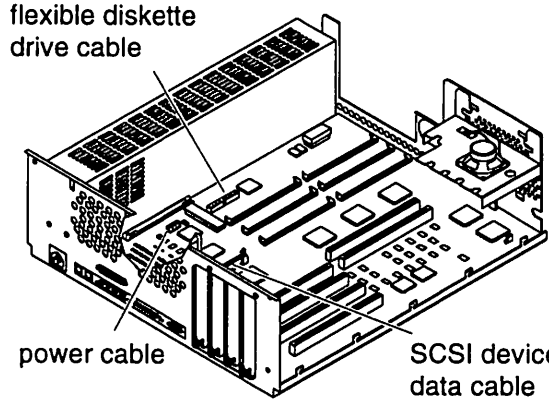
2. Rotate the unlocked SIMM upward and lift it from its socket.
3. To install a SIMM, hold it at an angle of approximately 85 degrees with keyed finger connector against the baseboard socket.
4. Insert the angled SIMM in its socket.
5. Gently push the SIMM down until the locking tabs engage. The tabs should engage with an audible click when the SIMM forms an angle of approximately 45 degrees with the baseboard.
6. Repeat these steps to install a second SIMM.

Reassembling the Computer

Once you have installed all SIMMs, you are ready to reassemble the computer. To do so, follow these steps:

1. Place the drive platform on top of the power supply.
2. Reattach the four-wire power cable to the drive power cable connector on the baseboard. Refer to the following illustration for the location of the connector.





Locating the Cable Connectors

3. Matching the keys on mated connectors, attach the flexible diskette drive and SCSI device data cables to their respective baseboard connectors.

4. Reposition the drive platform in the computer, making sure that the rear platform tabs engage the guides on the back of the cabinet and that the front platform tabs are on the outside of the cabinet.
5. Replace the computer cover, being careful to engage the side rails.
6. Slide the cover into position, ensuring that the rear edge of the cover and the back panel of the computer are flush.
7. Replace and gently tighten the four thumbscrews that hold the cover in place.
8. Reconnect any cables that you disconnected when you removed the cover.
9. Relock the keylock on the front of the computer.
10. Run the Automatic Configuration or Change Configuration utility on the *Reference/BIOS Diskette*. Refer to Chapter 2, "Using the Computer Software," for a discussion of these utilities.

Installing Processor Board Upgrades

This section explains the general procedure for installing processor board upgrades including microprocessors, coprocessors, and cache modules. For instructions about installing a processor board, refer to the section "Installing a Board."

The procedure for installing a microprocessor, coprocessor, or cache module consists of six steps, with the actual installation being the fifth step:

1. Review warnings and cautions.
2. Disconnect cabling and remove the cover from the computer.
3. Remove the processor board from the computer.
4. Locate the correct socket for the upgrade.
5. Install the upgrade.
6. Reassemble the computer and reconfigure it to recognize the upgrade.

Reviewing Warnings and Cautions

Be sure to note the warnings and cautions outlined in this section. Failure to follow these guidelines could lead to personal injury or damaged equipment.

Warning

To avoid electric shock, turn off the power switch and unplug the power cord before you begin work.

Disconnect components only as directed by installation instructions.

Caution

Install only options that have been approved for use with this computer. The installation of non-approved options may cause damage to the equipment and violate local safety or radio interference regulations. Consult your service representative or supplier for more information about the suitability of options to this computer.

Touch a metal surface to ground yourself before handling boards or components. Static charges on your body could damage electronic equipment.

Do not install options in an area known to contain static electricity, such as a room with static-inducing carpet.

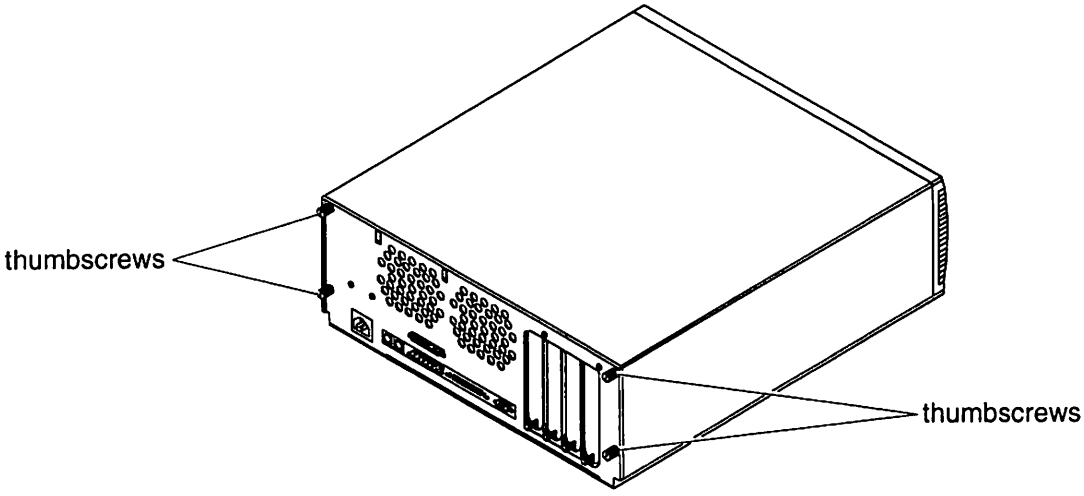
Do not handle printed-circuit boards more than necessary. Hold option-controller boards by the edges and do not touch the components.

Use only shielded cables to make option connections. Use of non-shielded cables may cause interference with radio and TV reception.

Removing the Cover

To remove the cover from your computer, follow these steps:

1. Turn off the computer power switch and unplug the power cord from its socket.
2. If you will be moving the computer in order to install the processor board upgrade, disconnect any cables that will impede movement of the computer. Move the computer to a work surface.
3. Unlock the keylock on the front of the computer.
4. Unscrew the four thumbscrews that hold the cover to the back panel. The locations of these thumbscrews are shown in the following figure.



Locating the Rear Thumbscrews

5. Slide the computer cover forward slightly and then lift it off of its tracks.

Removing the Processor Board

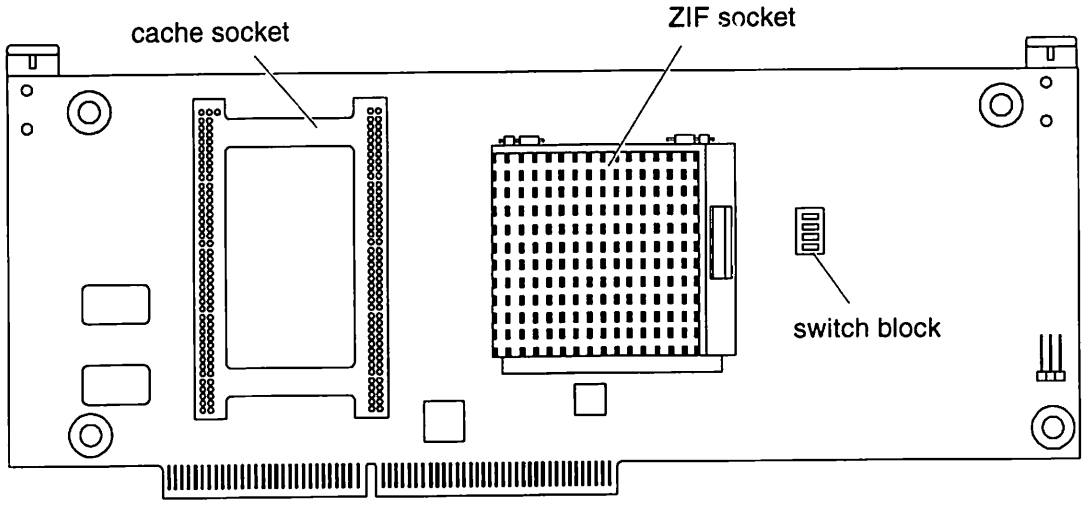
To remove the processor board, first disconnect its power cable from the board. Then grasp the board by its top corners and lift it from its baseboard connector. Place the board on your work surface to install the upgrade.

Locating the Proper Upgrade Socket

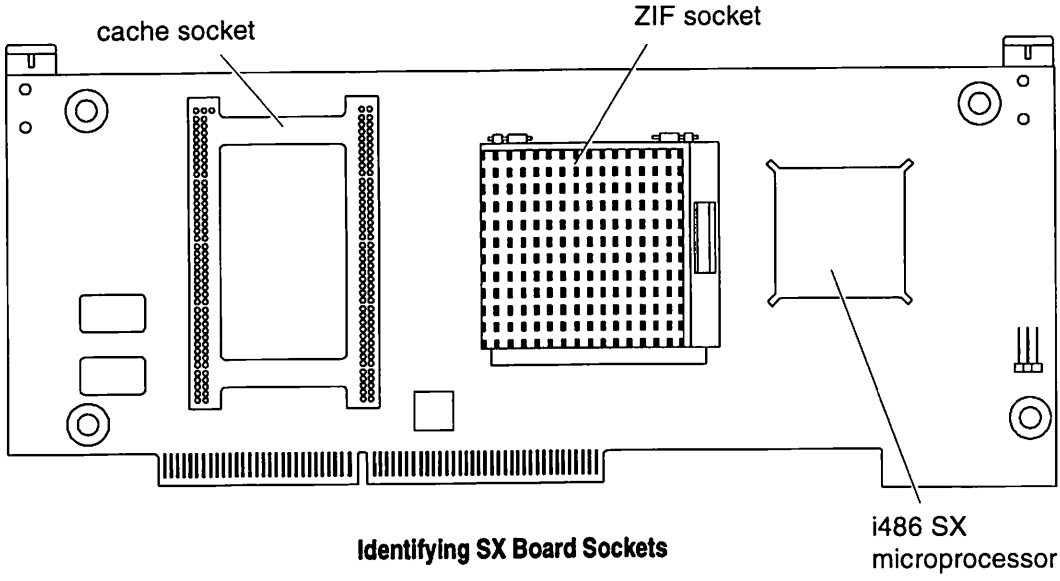
Two types of processor boards are available for the computer:

- The DX2 processor board houses an Intel i486 DX2 microprocessor in a zero-insertion-force (ZIF) socket and contains an upgrade cache socket. In addition, this board contains a switch block used to identify the installed microprocessor.
- The SX board houses an Intel i486 SX microprocessor, a ZIF upgrade socket for a coprocessor or future microprocessor, and a cache socket. This board requires no switches to identify the installed microprocessor.

Referring to the following figures, identify your processor board and locate the correct socket for the upgrade you are installing.



Identifying DX2 Board Sockets



Identifying SX Board Sockets

Installing an Upgrade

If you are installing a cache module on your processor board, the procedure is not dependent upon the board type. If you are installing a microprocessor or coprocessor on a DX2 board, you must change switch settings on the board.

Installing a Cache Module

To remove or install a cache module on a DX2 or an SX processor board, follow these steps:

1. Discharge any static electricity on your body by touching a grounded metal surface.
2. If you are removing a cache module, lift it from its socket and place it in an anti-static bag.
3. Locate the three-pin corner of the new cache module and position the module so that this corner matches the three-pin corner of the socket.
4. Insert the cache module into its connector, using gentle pressure.
5. Continue to the instructions "Reassembling the Computer."

Installing a Microprocessor or Coprocessor

To install a microprocessor or coprocessor on a DX2 or an SX board, follow these steps:

1. Discharge any static electricity on your body by touching a grounded metal surface.
2. If you are removing a processor from a ZIF socket, lift the left end of the socket lever and swing it to the right. Then lift the processor from the socket and place the processor in an anti-static bag.
3. Align the new processor with the ZIF socket so that the extra pin on the bottom of the processor is above the extra pin on the socket. (This corner of the socket is marked with a white triangle on the processor board.)
4. Lower the processor into the socket.
5. Lower the end of the socket lever to lock the processor in place.
6. If your processor board is an SX board, continue to step 7.

   If you changed the type of processor installed on a DX2 board, locate the switch block adjacent to the ZIF socket. Ensure that the switch for the installed processor is set to the on position and that all other switches are set to the off position.

7. Continue to the instructions "Reassembling the Computer."

Reassembling the Computer

To reassemble the computer, you must reinstall the processor board, replace the cover, and reattach any cables you disconnected. You must then run the *Reference / BIOS Diskette* to reconfigure the computer. Follow this procedure:

1. Hold the processor board by its top corners with the keyed finger connector facing downward and matching the key of the baseboard connector.
2. Align the finger connector of the processor board with the baseboard connector.
3. Insert the board into the baseboard connector by applying steady, firm pressure on both corners.
4. Reconnect the power cable that runs through the fan mounting to the processor board.
5. Replace the computer cover, being careful to engage the side rails.
6. Slide the cover into position, ensuring that the rear edge of the cover and the back panel of the computer are flush.

7. Replace and gently tighten the four thumbscrews that hold the cover in place.
8. Reconnect any cables that you disconnected when you removed the cover.
9. Relock the keylock on the front of the computer.
10. Run the Automatic Configuration or Change Configuration utility on the *Reference/BIOS Diskette*. Refer to Chapter 2, "Using the Computer Software," for a discussion of these utilities.

Replacing the Real-Time Clock/Battery Module

The computer stores time, date, and configuration information in an integrated circuit chip that includes a battery. The battery maintains its information when power is not applied to the computer.

Because its current drain is extremely low, the real-time clock (RTC)/battery module should operate properly for up to 10 years. The life of the battery cannot be guaranteed to be this great because many variable conditions can influence the performance of the RTC/battery module.

If the computer displays an incorrect date or time, or displays the message `Real-Time Clock Failure` during power-on diagnostics, the module should be replaced.

NOTE: *If you cannot immediately replace the RTC/battery module, run the Automatic Configuration utility from your* Reference/BIOS Diskette *each time you turn on the computer. The computer memory will retain the date and time set as long as the computer remains on.*

The procedure for replacing an RTC/battery module consists of six steps, with the actual replacement being the fourth step:

1. Review warnings and cautions.
2. Disconnect cabling and remove the cover from the computer.
3. Remove the drive platform from the computer.
4. Remove and replace the RTC/battery module.
5. Reassemble the computer and reconfigure it to reset stored information.

Reviewing Warnings and Cautions

Be sure to note the warnings and cautions outlined in this section. Failure to follow these guidelines could lead to personal injury or damaged equipment.

Warning

To avoid electric shock, turn off the power switch and unplug the power cord before you begin work.

Disconnect components only as directed by installation instructions.

The RTC/battery module used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 100°C (212°F), or incinerate. Do not expose the contents of the battery cells to water. Consider local regulations when discarding the old battery. Replace the battery with an NCR 006-2001339 (I.C.-RTC+CMOS) RTC/battery module only. Use of another RTC/battery module may present a risk of fire or explosion.

Caution

Install only options that have been approved for use with this computer. The installation of non-approved options may cause damage to the equipment and violate local safety or radio interference regulations. Consult your service representative or supplier for more information about the suitability of options to this computer.

Touch a metal surface to ground yourself before handling boards or components. Static charges on your body could damage electronic equipment.

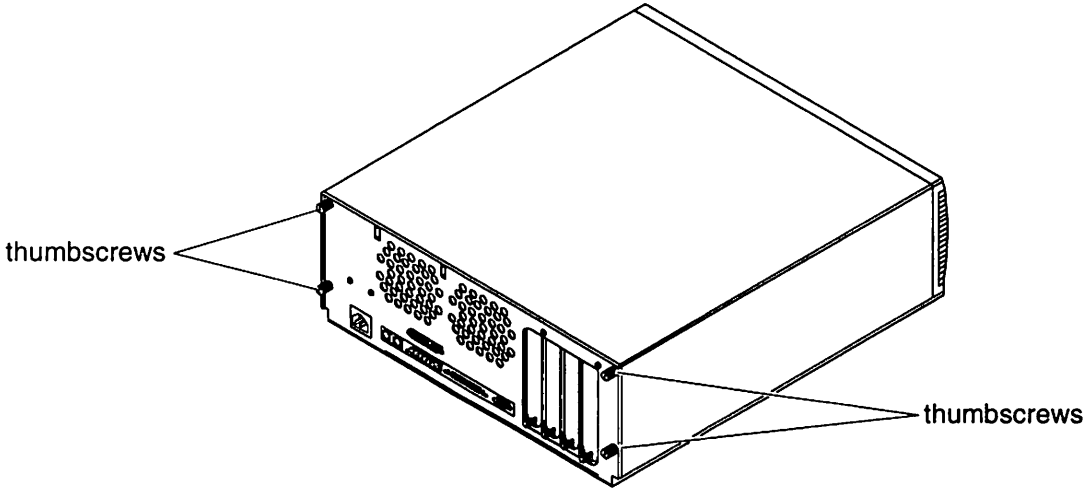
Do not install options in an area known to contain static electricity, such as a room with static-inducing carpet.

Use only shielded cables to make option connections. Use of non-shielded cables may cause interference with radio and TV reception.

Removing the Cover

To remove the cover from your computer, follow these steps:

1. Turn off the computer power switch and unplug the power cord from its socket.
2. If you will be moving the computer in order to install the RTC/battery module, disconnect any cables that will impede movement of the computer. Move the computer to a work surface.
3. Unlock the keylock on the front of the computer.
4. Unscrew the four thumbscrews that hold the cover to the back panel. The locations of these thumbscrews are shown in the following illustration.



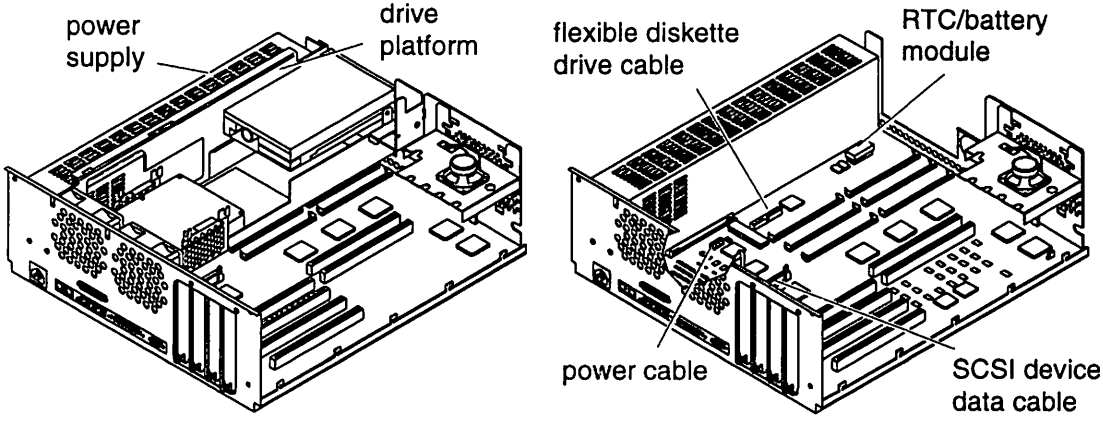
Removing the Cover

5. Slide the computer cover forward slightly and then lift it off of its tracks.

Removing the Drive Platform

The RTC/battery module is located on the baseboard underneath the drive platform, as shown in the following figure. To access the module, you must remove the drive platform from the computer. Follow this procedure to remove the drive platform from its mounting:

1. Referring to the following figures, grasp the drive platform by its sides and lift it part of the way out of the computer. Place the platform on top of the power supply.



Locating the Drive Platform and Cable Connectors

2. Detach the power cable from its connector on the baseboard.
3. Detach the flexible diskette drive and SCSI device data cables from their baseboard connectors.
4. Place the drive platform on the work surface next to the computer.

NOTE: *You may wish to label the cable connectors with masking tape to avoid possible confusion when you reinstall the cables.*

Replacing the RTC/Battery Module

To replace the RTC/battery module, follow this procedure:

1. Locate the RTC/battery module on the baseboard, referring to the previous figure.
2. Remove the old RTC/battery module from its socket. Set the old module aside.
3. Position the new RTC/battery module in the socket so that the dot on the module matches the notched end of the socket. (A notch is also silkscreened on the baseboard.) Gently push the module into the socket.

Reassembling the Computer

To reassemble the computer, you must replace the drive platform, replace the cover, and reattach any cables you disconnected earlier. You must then run the Automatic Configuration or Change Configuration utility on the *Reference/BIOS Diskette*. Follow this procedure:

1. Place the drive platform on top of the power supply.
2. Reattach the four-wire power cable to the drive power cable connector on the baseboard. Refer to the previous figure for the location of the connector.
3. Matching the keys on mated connectors, attach the flexible diskette drive and SCSI device data cables to their respective baseboard connectors.
4. Reposition the drive platform in the computer, making sure that the rear platform tabs engage the guides on the back of the cabinet and that the front platform tabs are on the outside of the cabinet.
5. Replace the computer cover, being careful to engage the side rails.

6. Slide the cover into position, ensuring that the rear edge of the cover and the back panel of the computer are flush.
7. Replace and gently tighten the four thumbscrews that hold the cover in place.
8. Reconnect any cables that you disconnected when you removed the cover.
9. Relock the keylock on the front of the computer.
10. Run the Automatic Configuration or Change Configuration utility on the *Reference / BIOS Diskette*. Refer to Chapter 2, "Using the Computer Software," for a discussion of these utilities.
11. Dispose of the old RTC/battery module promptly so that children and animals may not find it. Do not disassemble the RTC/battery module and do not dispose of it in fire.

Appendix A

Technical Specifications

Technical Specifications

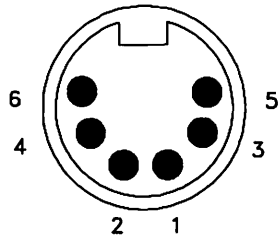
This appendix provides technical specifications of the NCR 3350 in an alphabetical, quick-reference format. The locations of features discussed in this appendix are identified elsewhere in the manual.

Airflow Clearances

Airflow and Circulation Clearances	
Front	20.32 cm (8.0 inches)
Back	10.16 cm (4.0 inches)
Top	5.08 cm (2.0 inches)
Bottom	0.64 cm (0.25 inches)
Sides	5.08 cm (2.0 inches)

NOTE: *The computer should be installed so that, at a minimum, the front, bottom, and back are free of all restrictions. Review other proposed installation environments with a site preparation specialist.*

Auxiliary Pointing Device



1	O	+DATA
2	O	RESERVED
3	O	GROUND
4	O	+5 Vdc
5	O	CLOCK
6	O	RESERVED

Environmental Requirements

Environmental Requirements	
Temperature Range	**Relative Humidity**
Operating 10° to 40°C (50° to 104°F) with 10°C (18°F) change per hour Derated 3.3°C (5.9°F) per 1000 m (3280 ft) between 500 m (1640 ft) and 3000 m (9850 ft)	20%–80%, 10% change per hour
Storage -10° to +50°C (14° to 122°F) for three months 15°C (27°F) change per hour	10%–90% with no condensation
Transit -40° to +60°C (-40° to +140°F) 20°C (36°F) per hour	5%–95% with no condensation
NOTE: The range of acceptable barometric pressures under all conditions is 105–69 000 Pa up to 3002 m (9850 ft).	

Circulation Clearances

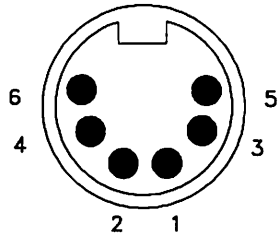
See Airflow Clearances.

Interfaces

The following figure provides connector specifications.

I/O Interfaces	
Connector	**Specifications**
Serial	Plug, 25-pin D-shell, RS 232-C
Parallel	Receptacle, 25-pin D-shell, bi-directional, TTL
Keyboard and Auxiliary	6-pin,IBM PS/2-compatible, bi-directional, TTL
Flexible diskette drive	34-pin industry-standard FDD interface, CMOS logic levels
SCSI Internal External	50-pin single-ended interface 2x25 header, unshielded 2x25 shielded D-shell Fused termination power supplied

Keyboard



1	O	+DATA
2	O	RESERVED
3	O	GROUND
4	O	+5 Vdc
5	O	CLOCK
6	O	RESERVED

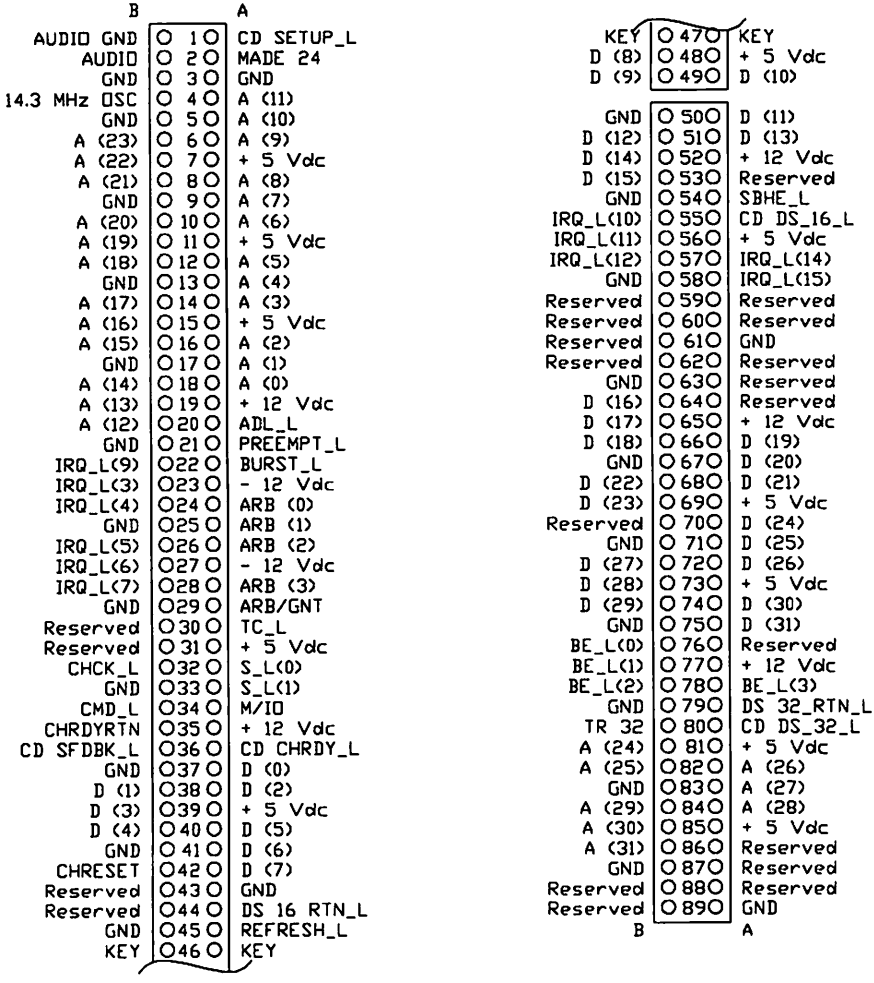
Media

See Storage Media.

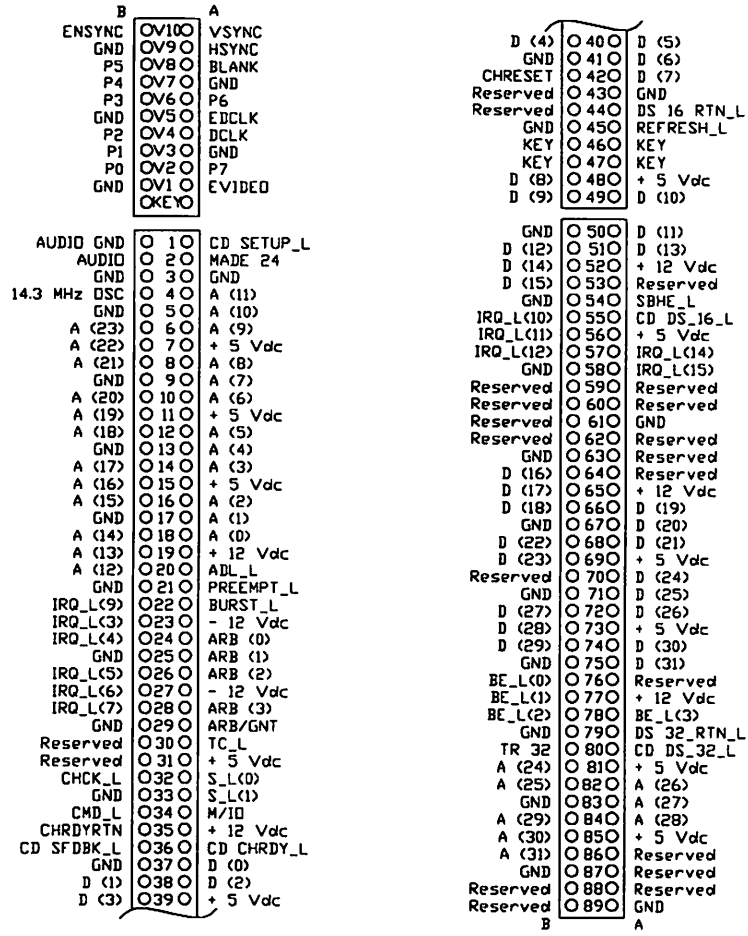
Memory Map

System Memory Map	
Address Range	**Function**
00H–9FFFFH	System RAM
A0000H–BFFFFH	VGA video buffer (RAM)
C0000H–DFFFFH	Expansion RAM/ROM for adapters
E0000H–FFFFFH	System ROM
100000H–FFFDFFFFH	System/Micro Channel RAM
FFFE0000H–FFFFFFFFH	System ROM

Micro Channel Adapter



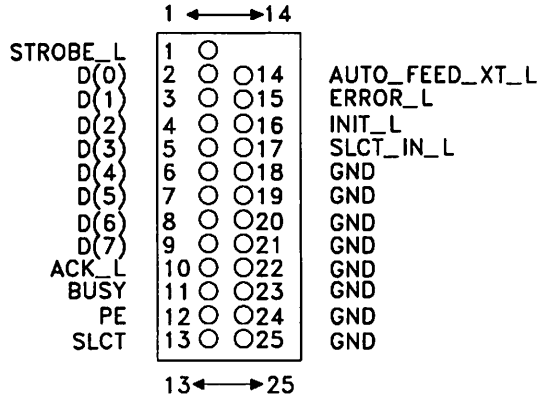
Micro Channel Adapter with Video Extension



Mouse

See Auxiliary Pointing Device.

Parallel Port



Physical Characteristics

Weights provided below are approximate.

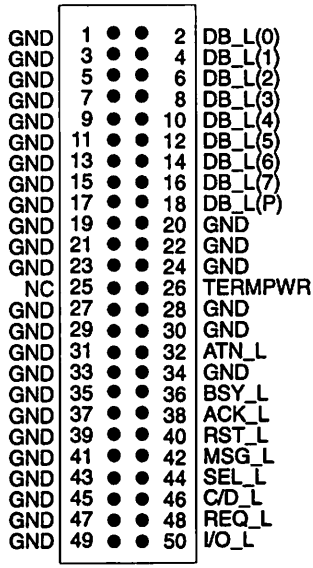
Physical Characteristics	
Width	37.9 cm (14.9 inches)
Depth	43.2 cm (17.0 inches)
Height	15.0 cm (5.9 inches)
Weight (base model)	11 kg (24.2 lbs)

Power Requirements

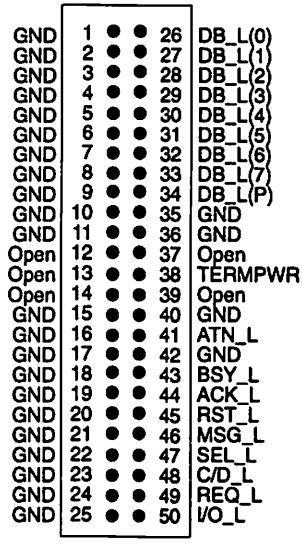
Power Requirements		
Requirement	**U.S. Value**	**International Value**
Source Voltage	115 Vac	230 Vac
Voltage Range	90–136 Vac	198–264 Vac
Frequency Range	47–63 Hz	47–63 Hz
Maximum Current	5.0 A	2.6 A

NOTE: *Refer to "Safety Instructions" at the beginning of the manual for information on the correct power cord to use for your installation.*

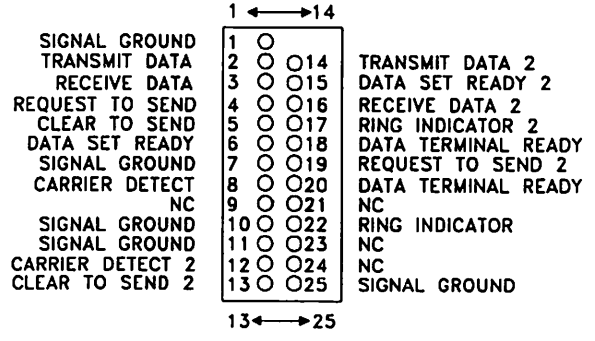
SCSI Connector (Internal)



SCSI Port (External)



Serial Port

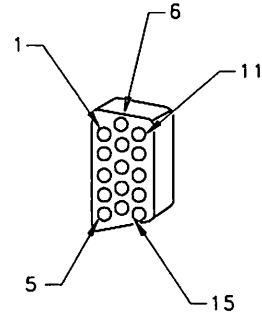


Storage Media

To order any of the storage media listed below, contact your NCR representative.

Medium	Associated Drive	Order Number
720 KB, 135 tpi 2S/DD diskette	1.44 MB flexible diskette	280697
1.44 MB, 135 tpi 2S/HD diskette	1.44 MB flexible diskette	280684
80 MB, 0.25-inch, 205-foot Rhomat mini data cartridge	80/120 MB tape drive	279925
120 MB, 0.25-inch, 205-foot Rhomat mini data cartridge	80/120 MB tape	279967
200 MB digital data cassette	200 MB SCSI tape	279970
1.3 GB, 4 mm, 60 m tape cassette	1.3/2.0 GB DAT	280024
2.0 GB, 4 mm, 90 m tape cassette	1.3/2.0 GB DAT	Special order
600 MB CD-ROM disk	600 MB CD-ROM	Special order

VGA Port



1 Red	6 Red RTN	11 Reserved
2 Green	7 Green RTN	12 Reserved
3 Blue	8 Blue RTN	13 HSYNC
4 Reserved	9 Plug	14 VSYNC
5 Digital GND	10 Digital GND	15 Reserved

Appendix B

Documentation Concordance

NCR 3350 Documentation

Information Product Set

The following manuals and guides for the NCR 3350 are available to customers:

Class 3350 Online Technical Reference
D2-0978-A

This reference provides detailed specifications regarding the NCR 3350 to application programmers, NCR support personnel, system administrators, and dealer service representatives. Topics covered include the computer architecture, SCSI, BIOS, options, and the video subsystem. The reference requires that Windows 3.1 be installed on the host computer.

Class 3350 Service Information
D2-0997-A

This manual provides system-specific servicing information regarding the NCR 3350 to NCR support personnel, dealer service representatives, and system administrators.

Updates to the manual are included in its cost.

NCR Makes It Easy brochures

This series of brochures discusses key functions and architectural features of the NCR computer series, explaining benefits of these to the client.

Contact Multimedia Publishing for titles in this series and their order numbers.

System 3300 and 3400 Service Module Library bookset

S1-0268-A

This bookset provides NCR support personnel and system administrators with detailed servicing information for system components that are shared across NCR computer lines. Components discussed include drives, power supplies, diagnostics, software diskettes, keyboards, monitors, and communication features.

Updates to the bookset are available by subscription.

Ordering Information

To order any of these information products, use one of the following methods. Please include your NCR customer number with your order.

- Telecopy (fax) your order to NCR Multimedia Publishing at (513) 445-7791.
- Mail a purchase order to the following address:

  NCR Corporation
  Multimedia Publishing
  Bldg. EMD-4
  Brown and Caldwell Streets
  Dayton, OH 45479 USA
- Call Multimedia Publishing toll free at 1-800-543-2010 (outside Ohio) or 1-800-543-6691 (within Ohio) between 8:00 a.m. and 4:30 p.m. Eastern Standard Time. (Invoices for telephone orders include a surcharge.)

Appendix C

Abbreviations

A	Amperes
ADF	Adapter description file
ASIC	Application-specific integrated circuit
BIOS	Basic input/output system
CGA	Color Graphics Adapter
CMOS	Complementary metal-oxide semiconductor
CPU	Central processing unit
CROM	Channel read-only memory
DMA	Direct memory access
DOS	Disk operating system
EDAC	Error detecting and correcting
EGA	Enhanced Graphics Array
EPROM	Erasable programmable read-only memory
FPU	Floating point unit
I/O	Input/output
KB	Kilobyte
LED	Light-emitting diode
MB	Megabyte
MHz	Megahertz
MIPS	Millions of instructions per second
POS	Programmable option select
POST	Power-on self-test
RAM	Random-access memory
ROM	Read-only memory
SCSI	Small Computer System Interface
Vac	Volts of alternating current
Vdc	Volts of direct current
VGA	Video Graphics Array
VLSIC	Very large-scale integrated circuit

Glossary

A

ac The abbreviation for alternating current. Alternating current is measured in Hertz (Hz). The standard ac value in the U.S. is 120 volts (V) at 60 Hz. Some international countries set their standard ac value as 240 V at 50 Hz.

Adapter The interface between the computer processor and peripheral devices. The term may also be used to indicate a board that acts as an interface. An adapter board may also be called a plug-in board, controller board, circuit board, or card.

Adapter description file (ADF) A file that the automatic configuration program uses to prepare the system for a new application or device. The *Reference/BIOS Diskette* contains adapter description files for many common devices. Other devices may be delivered with diskettes containing their adapter description files.

Address A number assigned to an accessible location within a device. In internal memory, the address is a specific byte number. In external memory, the address is a unit number (for example, drive A) and, for disk drives, the address may include track and sector numbers. The computer locates data using these addresses.

Application-Specific Integrated Circuit (ASIC) A computer chip designed to perform a specific function.

autoexec.bat An MS-DOS batch file that automatically executes a set of commands when the computer is turned on.

B

Bad sector A portion of a disk that will not reliably store data. A bad sector may be caused by damage to a disk or by incorrect formatting parameters.

Bad track table A record of tracks on a fixed disk drive that will not reliably hold data. The operating system uses the table to avoid writing to defective areas of the disk.

Basic input/output system (BIOS) A controller for the interaction of the baseboard and peripheral devices.

Batch file An MS-DOS file that contains a series of commands that are automatically executed when power is applied to the computer.

Bay A space in the computer's cabinet designed to hold a disk drive or similar device.

Boot To load an operating system into computer memory. A computer may be cold-booted by having its power switch turned on or warm-booted by having the key combination **Ctrl-Alt-Del** entered.

Bootable A disk or diskette that contains the computer instructions to load an operating system. A bootable disk may also be called a start-up disk or diskette.

Bus A communication path used for transmitting addresses or data between or within devices as electrical signals.

C

Cache A temporary, high-speed memory used to store active parts of a program or anticipated data. Cache may significantly increase computer performance by minimizing accesses of slower memory.

Also to store data temporily in high-speed memory.

Card *See* Adapter.

Central processing unit (CPU) The part of the computer that contains its memory and control routines for arithmetic, logic, and input/output operations.

Chip An integrated circuit that is etched into the surface of a wafer of silicon. A chip is usually housed in a plastic or ceramic package that has pins used to electrically connect the integrated circuit to a controller.

Complementary metal oxide semiconductor (CMOS) A type of chip that uses only a small amount of power. A CMOS chip usually stores configuration data and receives its power from a battery.

Config.sys An MS-DOS file that specifies computer operating parameters and loads device drivers into memory. The *config.sys* file is executed as soon as the computer loads the operating system.

Configuration A set of data that an application or operating system uses to run software and peripheral devices. The configuration information must be updated through the *Reference/BIOS Diskette* when a device is added to or removed from the computer. *See also* Adapter description file.

Also the specific hardware and software that comprise a computer system.

Configuration file The file in which an application or operating system stores configuration data. MS-DOS uses the file *config.sys* to store this information.

Controller *See* Adapter.

D

Daisy chain A connection by which data passes serially from one peripheral device to another. Most disk drives connect in daisy-chain fashion. The SCSI system also uses a daisy-chain arrangement.

Also to connect devices serially.

Default A preset value or option that the computer automatically selects if other information is not specified.

Device driver A program that the system configuration file loads into computer memory so that a particular peripheral or computer component may function with the computer.

Diagnostics Programs that locate and identify problems with the computer or its peripherals.

Directory A group of files that are stored together on a disk or tape cartridge. The term may also denote a listing of the files themselves.

Direct memory access (DMA) A circuit that allows high-speed transfer of data between a device and the computer memory.

Also the transfer of data between memory and a device.

Driver A memory-resident program, usually loaded from the system configuration file, that controls a particular device or set of devices such as a printer, mouse, or set of expanded memory boards.

Input/output (I/O) A circuit path that allows independent communication between the processor and external devices. Also, the data received by the computer (input) or sent to a peripheral by the computer (output).

Intelligent SCSI A SCSI adapter with a coprocessor that executes the SCSI commands, freeing the central processing unit for other work. *See also* Small Computer System Interface.

Interleave To arrange memory addresses or disk sectors to reduce access time, allowing the system to operate more efficiently.

Interrupt A mechanism in the computer that reports changes in the resources and demands of hardware and software. When an interrupt occurs, the computer reassigns time in the central processing unit to meet demands in order of importance.

J

Jumper A small mechanical device used to electrically connect or disconnect pairs of protruding pins on a circuit board. The presence or absence of jumpers controls specific operations of the board. A jumper is sometimes called a strap or shunt.

M

Memory caching A method of copying the most recently used information into high-speed memory chips for quick access by the CPU.

Micro Channel™ A computer system expansion bus that provides improved reliability, performance, and ease of option installation.

P

Parallel port A connector for the data cable of an external device that uses parallel data transmission. A printer or plotter usually plugs into the parallel port.

Peripheral A device that works with the computer but is not actually a part of it, such as a disk drive or a printer.

Power-on self-test (POST) A series of diagnostic tests that the computer runs on basic components every time it is booted.

Programmable option select (POS) A method of configuring circuits with programmable registers controlled by system hardware and software.

R

Random-access memory (RAM) A type of internal memory that the computer can read, write, or erase at any time and in any order. Turning off the computer power erases data stored in RAM.

Register A set of memory addresses in the central processing unit that holds data intended for a special purpose.

Read-only memory (ROM) Non-erasable internal memory that stores I/O drivers, interpreters, and some special applications. Users cannot alter ROM.

S

Serial port A connector for the data cable of an external device that uses serial data transmission. A printer or modem may use the serial port, which is sometimes designated as COM1 or COM2.

Shadow To copy data from a section of ROM into RAM to allow for faster access.

Small Computer System Interface (SCSI) A high-efficiency, industry-standard interface for peripheral devices.

Strap To set jumpers to enable or disable certain system features.

Streaming tape drive A tape drive that backs up data as quickly as the fixed disk transmits it.

V

Video Graphics Array™ (VGA) An analog display that supports text, color, and graphic applications in a variety of resolutions. The term may also refer to the type of adapter required by a VGA display.

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