NCR

PC386sx/MC Personal Computer
User's Manual

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May 1990

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All features, functions, operations described herein may not be marketed by NCR in all parts of the world. In some instances, photographs are of equipment prototypes. Therefore, before using this document, consult your NCR representative or NCR office for information that is applicable and current.

Safety Instructions

1. Read all these instructions.

2. Save these instructions for later use.

3. Follow all warnings and instructions marked on the product.

4. Clean the display and system periodically. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

5. Do not use this product near water.

6. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

7. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register or in direct sunlight. This product should be placed in an enclosed area slightly larger than the system only if proper ventilation is provided.

8. This product should be operated 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.

9. This product is equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug fits into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

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

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

- For International installation with a power source of 230 V ac, use a 18 AWG power cord and grounding plug rated 15 A, 250 V ac. The cord set should have safety approvals for the international installation and be marked HAR.

10. Do not permit anything to rest on the power cord. Do not locate this product where persons can walk on the cord.

11. If an extension cord is used with this product, 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 of all products plugged into the wall outlet does not exceed 15 amperes. Do not plug it into a circuit with radio or television receivers.

12. Never push objects of any kind into this product through cabinet slots because they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

13. Except as explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.

14. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- when the cord or plug is damaged or frayed

- if liquid has been spilled into the product

- if the product has been exposed to rain or water

- if the product does not operate normally when the operating instructions are followed

- if the product has been dropped or the cabinet has been damaged

- if the product exhibits a distinct change in performance, indicating a need for service

Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and often requires extensive work by a qualified technician to restore the product to normal operation.

15. Keep the area around the system free from static electricity and magnetic fields. Before you touch the system, discharge static electricity on your body by touching a metallic surface.

16. Do not turn the computer on and off in rapid succession. This may damage data in your configuration files and on your fixed disk.

17. When moving the system, insert an old diskette in the flexible disk drive(s), disconnect external peripheral devices, and handle the system and its cords carefully. The fixed disk drive has an automatic park feature. It does not require special preparation for moving.

Preface

Location of the Installation Instructions

A folded card containing instructions for installing the PC386sx/MC system is packed in the computer box. Refer to this card for information on how to connect external components.

If your system does not work properly after initial installation, refer to the troubleshooting section of this manual and try the suggestions listed there.

If your system still does not work, contact your dealer or service representative. The icon below tells you to call your service representative for assistance.

☎

What to Do After Basic Installation

If your system works properly after initial setup, choose one of the activities listed below.

- If you have optional features to install, turn to Chapter 4, "Upgrading the System." Return to this page when you have completed installation of options.

- If you do not have options to install, choose one of the activities listed below.

  - Read Chapter 1.

  - Use the software explained in Chapter 2 to make your system more useful.
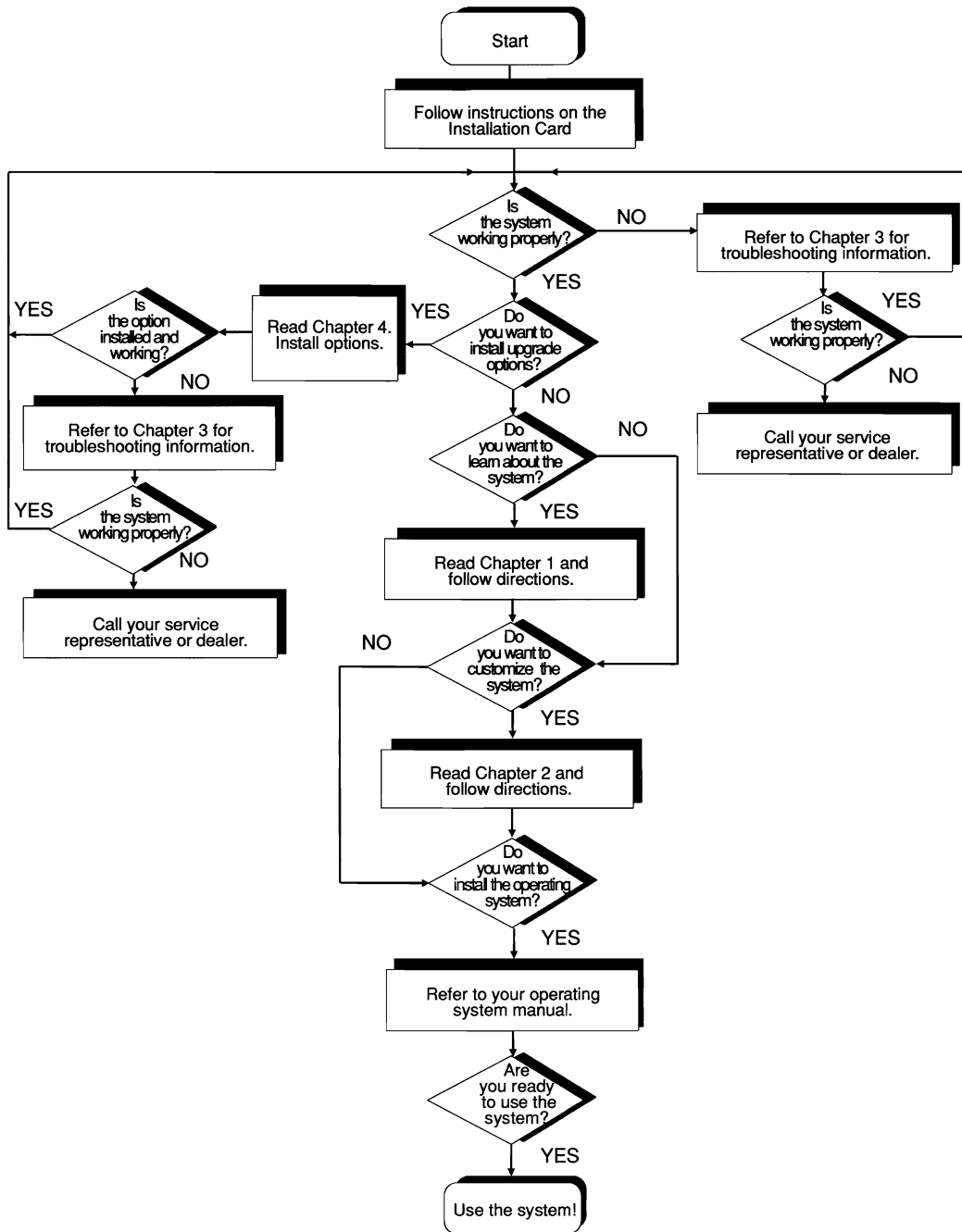
  - Install your operating system.

Start

Follow instructions on the Installation Card

Is the system working properly? — NO → Refer to Chapter 3 for troubleshooting information.

YES

Do you want to install upgrade options? — YES → Read Chapter 4. Install options. → Is the option installed and working? — YES

Is the system working properly? — YES

NO → Call your service representative or dealer.

Is the option installed and working? — NO → Refer to Chapter 3 for troubleshooting information. → Is the system working properly? — YES

NO → Call your service representative or dealer.

Do you want to learn about the system? — NO

YES → Read Chapter 1 and follow directions.

Do you want to customize the system? — NO

YES → Read Chapter 2 and follow directions.

Do you want to install the operating system? — YES

NO

Refer to your operating system manual.

Are you ready to use the system? — YES

Use the system!

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Chapter 2 — Using the *Reference Diskette*

Chapter 3 —Troubleshooting: System Messages and Diagnostics

Chapter 4 — Upgrading the System

Appendix A — Technical Data

Glossary

Index

Chapter 1   Learning About the PC386sx/MC

Overview

This chapter contains important information for proper operation of the PC386sx/M C. The topics covered are listed below:

- Location of external system features

- Information displayed on the screen by the power-on self-test (POST)

- Operating system installation procedures

- Type of diskettes to use

- Special features of the system

Identifying Front Panel Features

Use the illustration on the facing page to identify the following front panel features.

■ 3.5-inch, 1.44 MB flexible disk drive (drive A)

■ Bay for another 3.5-inch flexible diskette, tape, or fixed disk drive

■ Power switch

■ Indicator lights

    ■ The top indicator light, also called an LED, shows green when the computer is on.

    ■ The bottom indicator light shows amber when the fixed disk drive is in use.

■ Keylock to prevent access to the cabinet interior

Flexible Disk Drive

Power LED

Fixed Disk LED

Power Switch

Drive Bay

Keylock
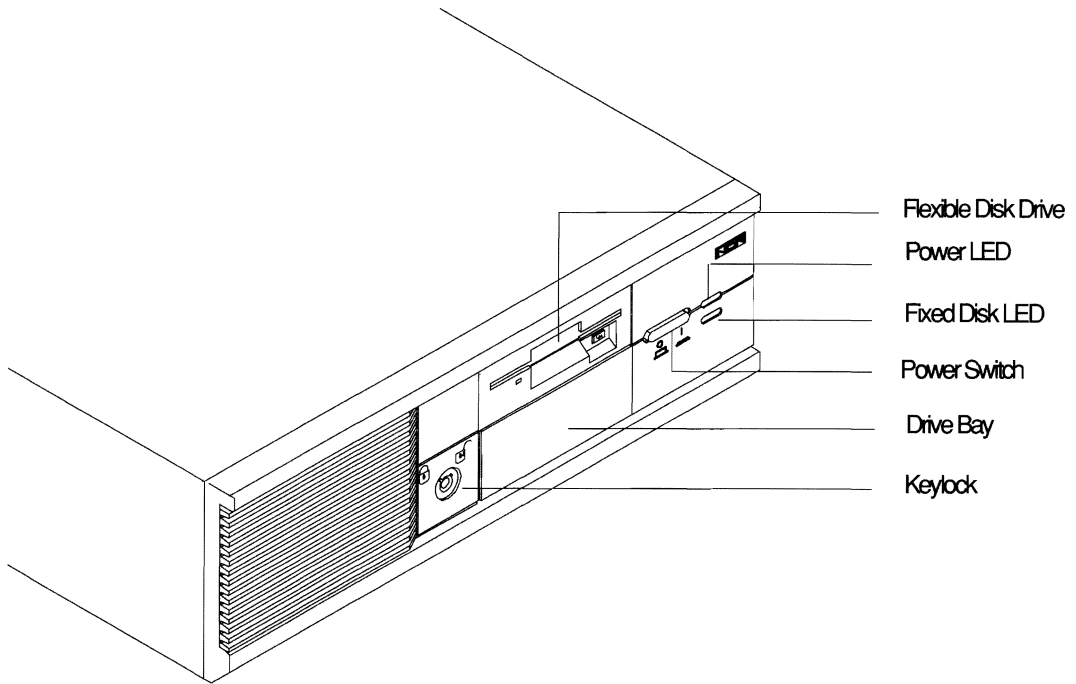
Front Panel Features

Identifying Back Panel Features

Use the illustration on the facing page to identify the following
back panel features.

- Fan vents

- Power cable connector

- 6-pin keyboard connector

- 6-pin, female, auxiliary device (pointing device/mouse)
  connector

- 25-pin, D-shell, male, serial (RS-232) connector for a printer,
  modem, or similar device

- 25-pin, D-shell, female, parallel (Centronics) connector for a
  printer

- 50-pin, Small Computer System Interface (SCSI) connector
  for external disk drives, tape drives, and other devices

- 15-pin Video Graphics Array (VGA) display connector

- Option adapter board cut-outs

Fan Vents

Power Cable Connector

Keyboard Connector

Auxiliary Device (Mouse) Connector

Serial Connector

Parallel Connector

SCSI Device Connector

VGA Connector

Option Adapter Board Cutouts
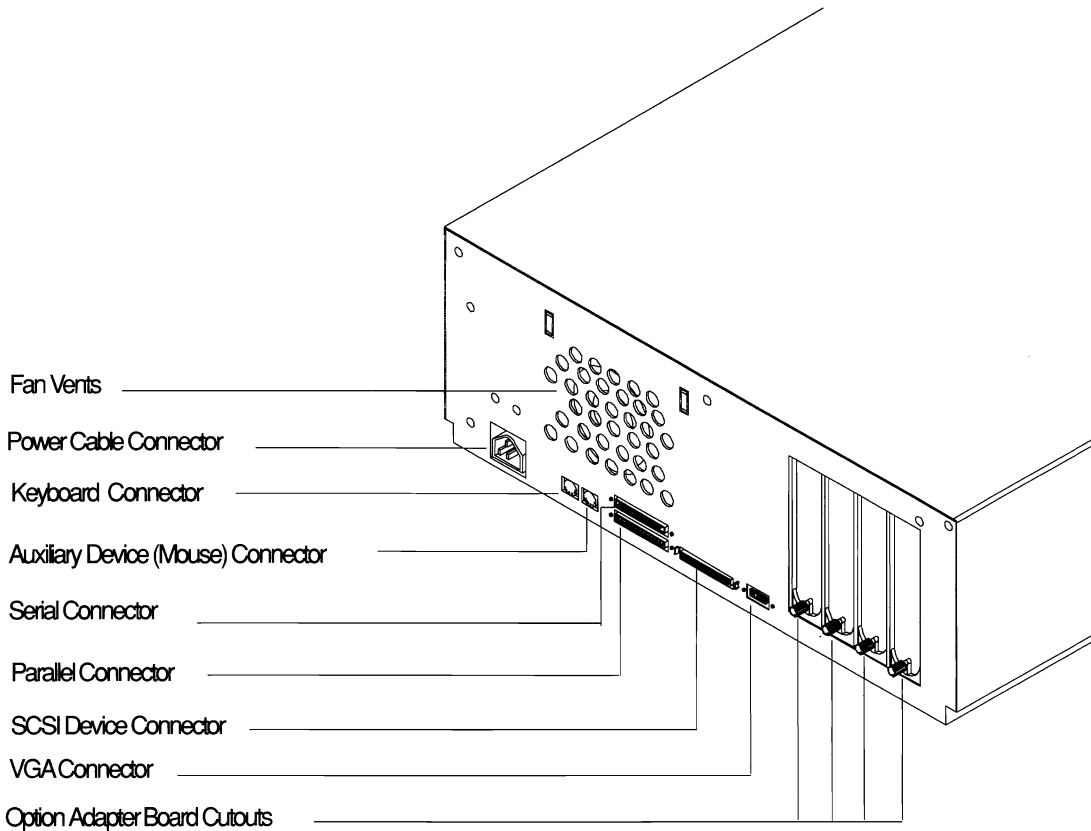
Back Panel Features

Starting the System

When you turn on the system, the power-on self-test (POST) checks that basic system components are working properly. Then the computer loads the operating system, if one is installed.

If there is an error during the POST, run the *Reference Diskette* SETUP Automatic Configuration utility explained in Chapter 2. If the system still doesn't work, refer to toubleshooting information in Chapter 3.

The POST

The POST tests components essential to proper operation of the system.

If a component fails before the VGA controller and display are tested, the system sounds a series of beeps to identify which component failed. Listen for the beep pattern and relay the information to your service representative.

After the VGA controller and display pass their tests, the name of each component appears as it is tested. If a component passes the test, the name of the next test appears. If a component fails, an error code appears on the screen. Refer to the "Using System Error Codes and Messages" section of Chapter 3 for the meaning of error codes and possible remedies.

When all tests are complete, a screen appears similar to the one shown below. Messages may vary slightly according to features installed in the computer.

```
Copyright Information

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LEVEL 0 DIAGNOSTICS
 DIAGNOSTICS COMPLETED, INCLUDING:
 CPU, PAGE REGISTERS, REFRESH, TIMER 0, BASE 64K
 DMA CONTROLLERS, INTERRUPT CONTROLLERS, IVT, KEYBOARD
 CONTROLLER, CMOS CHECKSUM, VGA, and VIDEO ROMS

TESTING:
 __KEYBOARD
 __AUXILIARY DEVICE
 640K BASE MEMORY, 01280K EXTENDED
 __FLEX DISK
 __FIXED DISK
SCSI Initialization
 . . . . . .
 __EXTERNAL ROMS
```

Sample POST Screen Display

Installing an Operating System

For the most efficient use of the operating system, install it on your fixed disk. Follow the steps listed below to copy the operating system from flexible diskette(s) to the fixed disk.

Copying

1. Place the operating system diskette in drive A with the label facing up. Push in the diskette until it clicks into position.

2. Turn on the computer and display. Watch for the system power-on self-test (POST) messages.

3. Watch for the system prompt (A>) on the display screen.

4. Follow the instructions displayed on the screen and in the operating system documentation.

Loading

After you have installed the operating system on your fixed disk, the computer loads it each time you turn the system on. Follow the steps listed below to start the system.

1. Turn on the computer.

2. Make sure there is no diskette in the flexible disk drive.

3. Watch for the system prompt (C>) on the display screen.

If you want to install more than one operating system on your fixed disk, divide it into several partitions. Check all operating system documentation for which system to install first.

Choosing Diskettes

Make sure you have appropriate diskettes for the drives installed in your system. The 1.44 MB drive accepts a 3.5-inch regular density (720 KB) or high density (1.44 MB) diskette.

A regular density diskette has one hole near the corner of the plastic casing. A high density diskette has two holes near the corners of the plastic casing and usually has HD printed on it.

To format 720 KB diskettes for use in the 1.44 MB disk drive, MS- DOS requires that you type the following format parameters.

FORMAT A:/T:80/N:9

You can write-protect the files on your diskette by moving the tab to open the hole on the lower left. If the diskette is write-protected, the computer can use data on it but cannot write new data. When the hole is closed, the diskette is write-enabled; this means the computer can write new data on the diskette.
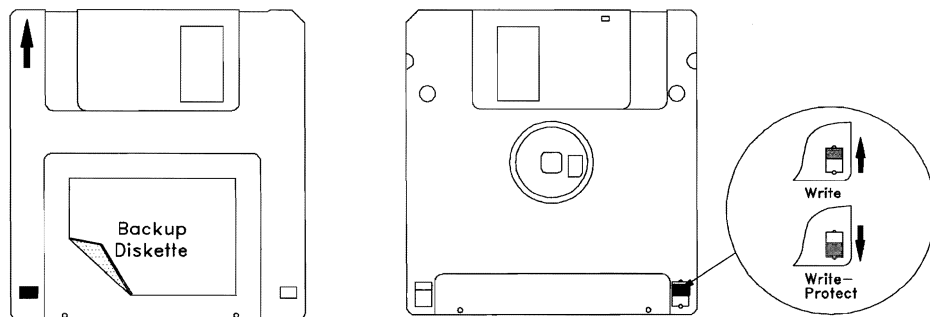
3.5-Inch, 1.44 MB, Write-Enabled Diskette

Understanding Special Features

The PC386sx/MC™ system has special features that make it fast and easy to use.

386SX™ Processor

The 386SX™ processor runs at 20 MHz. It transfers 16-bits of data and processes 32-bits of data at a time.

Micro Channel™- Compatible Bus

The Micro Channel-compatible bus is designed for high-speed transfer of data from the microprocessor to peripherals. It permits software configuration of hardware and use of multiple processors called bus masters.

Keyboard Speed Option

You can operate the keyboard at the default rate or set it to transmit data twice as fast.

Programmable Option Select (POS)

The software SETUP program stores configuration information from the adapter description files for the main processor board and installed option adapter boards in the battery-maintained memory.

When the system is turned on, configuration information is transferred from the battery-maintained memory to POS registers on the main processor board and adapters.

It eliminates the need to set hardware switches and jumpers.

Small Computer System Interface (SCSI) Controller

The SCSI connector on the main processor board connects one or two internal disk drives to the SCSI controller. The system also has an external connector for a SCSI cable which attaches additional devices to the unit.

SCSI Fixed Disk Drives

This system is available with a SCSI fixed disk drive. The cabinet can hold one additional SCSI drive. Other SCSI devices can be attached outside the cabinet.

Video Graphics Array (VGA) Controller

The VGA controller supports 16-bit data transfers for high performance. It supports higher resolution graphics than previous video standards and most software designed for those earlier standards.

Operating the System Safely

Good operating habits prevent damage to the system and loss of important files. The following suggestions will help insure trouble-free operation.

- Locate the system away from direct sunlight and heat ducts. Plug it into an electric circuit with no radio or TV receivers.

- Keep the area around the system free from static electricity and magnetic fields. These forces can scramble programs in the system memory and on diskette. Even jewelry can have magnetic properties.

- Before you touch the system, discharge static electricity on your body by touching a metallic surface.

- Keep food and drink away from the system.

- Don't smoke in the system area.

- Keep the system air circulation vents uncovered.

- Clean the display and cabinets periodically with a slightly dampened cloth. Dust that gets inside the system can adversely affect performance.

- Put diskettes away when not in use. Keep them away from excessive heat and humidity.

- When moving the system, insert an old diskette in the flexible disk drive(s), disconnect peripheral devices, and handle the system and its cords carefully.

■ For installation in the United States with a power source of 115 V ac, use an 18 AWG, type SVT or SJT, three conductor power cord with a maximum length of 15 feet and a parallel-blade grounding plug rated 15 A, 125 V ac.

■ For installation in the United States with a power source of 230 V ac, use an 18 AWG, type SVT or SJT, three conductor power cord with a maximum length of 15 feet and a tandem -blade grounding plug rated 15 A, 250 V ac.

■ For International installation with a power source of 230 V ac, use a 18 AWG power cord and grounding plug rated 15 A, 250 V ac. The cord set should have safety approvals for the international installation and be marked HAR.

Chapter 2 Using the Reference Diskette

Overview

This chapter explains how to use utility programs on the *Reference Diskette* and *Software Support Diskette* to set up and customize the system.

The *Reference Diskette* root (main) directory contains the following programs.

setup.exe   utility to configure the system, copy the diskette, and regulate special features

Adapter description files   permit the system to work properly with various devices. The *Reference Diskette* has adapter description files (ADF) for:

— Internal options
— ESDI fixed disk adapter
— Integrated fixed disk adapter
— ST506 fixed disk adapter
— NCR SCSI controller (on the main processor board)
— NCR SCSI adapter board
— PC network adapter
— IBM Multiprotocol Communication adapter
— IBM Dual Asynchronous adapter
— IBM Expanded Memory adapter
— IBM 32-Bit Expansion Memory adapter
— IBM 2 MB 16-Bit Memory adapter

mvga.exe   supports enhanced features of the VGA adapter

high_res.sys   allows the following modes to work
                        properly in this system:

                        — 80 column by 60 row text
                        — 100 or 132 column by 43 row text
                        — 800 by 600 resolution graphics

kp.com   MS-DOS memory-resident keyboard
                        password utility

Other files on the disk allow it to work properly and include
messages to help the user.

The *Software Support Diskette* contains the directories shown
below.

VGA <DIR>   a directory with device drivers which
                        permit software applications to use VGA
                        extended modes.

SCSI<DIR>   a directory with device drivers which
                        permit the following drives to work
                        properly with the system:

                        — More than two fixed disk drives
                        — One or more removable fixed disk drives
                        — One or more optical read/write disk
                            drives

Copying the Diskette

☞ **NOTE:** If you followed instructions on the *Installation Card*, you already made a backup copy of the *Reference Diskette* and can disregard these instructions.

To make a copy of the *Reference Diskette*, you need a blank 1.44 MB (high-density), 3.5-inch diskette.

Make a working copy of the diskette to keep the original in good condition so you can make another copy if the backup copy is damaged.

If you do not already have a backup copy, follow the procedures listed below.

1. Place the *Reference Diskette* in drive A.

2. Turn on the system and display.

3. When the SETUP Main Menu appears, select Utilities and press **Enter**.

4. When the Utilities Menu appears, select Backup Disk and press **Enter**.

5. Follow the screen prompts for the copy procedure. Be prepared to swap diskettes several times.

6. When the screen displays the message Backup Complete, your working copy of the *Reference Diskette* remains in drive A. Put the master diskette in a safe place.

Identifying SETUP Utilities

The *Reference Diskette* SETUP program has three basic screen menus.

- The Main Menu gives you a choice of the Configuration Menu and the Utilities Menu.

- The Configuration Menu allows you to set and maintain the system configuration.

- The Utilities Menu allows you to backup the *Reference Diskette* and customize the system for your needs.

MENU	PROGRAM	DESCRIPTION
Main	Configuration	Selects the Configuration menu.
	Utilities	Selects the Utilities menu.
Configuration	FileCopy	Copies third-party adapter description files to the *Reference Diskette*.
	Automatic	Configures the system based on information in the adapter description files.
	View	Displays current configuration settings.
	Change	Permits manual configuration of the system for new and existing adapters without changing the existing settings.
	Backup	Copies current configuration settings to a file on the *Reference Diskette*.
	Restore	Replaces configuration information saved with Backup.
Utilities	Date and Time	Sets the current date and time and stores them in the system battery-maintained memory.
	Backup Disk	Copies the *Reference Diskette* to another diskette to protect the original.
	Passwords	Sets passwords for system security.
	Keyboard Speed	Sets keyboard speed.

Using SETUP Menus

A *Reference Diskette* SETUP screen has five sections.

Section [1] shows the name of one of three basic menus:

- Main Menu

- Configuration (shown in the sample below)

- Utilities

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

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

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

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

When a SETUP utility 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 **Esc** as many times as necessary to go back through the sequence of menu screens.

When you press the **F1** key, usually a help screen appears with detailed information about the function in use. To erase the help message from the screen, press **Esc**. If help is not available for a function, a beep sounds when you press **F1**.

```
┌─────────────────────────────────────────────────────────────────────┐
│                          CONFIGURATION MENU                           │
├─────────────────────────────────────────────────────────────────────┤
│  FileCopy   Automatic   [View]    Change    Backup     Restore        │
├─────────────────────────────────────────────────────────────────────┤
│  View current settings                                                │
├─────────────────────────────────────────────────────────────────────┤
│  [Internal Options]                                                   │
│                                                                       │
│  Slot 1: Empty                                                        │
│                                                                       │
│  Slot 2: Empty                                                        │
│                                                                       │
│  Slot 3: Empty                                                        │
│                                                                       │
│  Slot 4: Empty                                                        │
│                                                                       │
│  Slot 5: NCR SCSI                                                     │
│                                                                       │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

SETUP Screen Fields

Setting the Date and Time

If the date and time are incorrect for your installation, change them using the Utilities Menu. To change the date and time, follow the directions below.

1. Place a working copy of the *Reference Diskette* in flexible disk drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select Utilities and press **Enter**.

3. Choose Date and Time from the Utilities Menu and press **Enter**.

4. Type the date in the prescribed format and press the down arrow key.

5. Type the current time in the prescribed format and press **Enter.**

6. Press **Esc** as many times as required to return to the MS-DOS prompt (A>).

```
                              UTILITIES MENU

    ┌──────────────────┐
    │ Date and Time    │    Backup Disk    Passwords    Keyboard Speed
    └──────────────────┘

 Change the date and time settings


         mm-dd-yyyy
         Current Date        ███████████

         hh:mm:ss
         Current Time        ███████████




 Use the ↑↓ keys to select, press ↵ to continue.    Esc = Quit
```

Date and Time Screen Menu

Using the Power-On Password

Why Use the Power-On Password?

The power-on password allows only authorized persons to use the system.

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

If a password exists, type it at the prompt. The system permits only three tries to enter the correct password. After that, it stops all operations. Turn the system off and on to try again.

☞ **NOTE:** Each password can have up to seven characters. The system does not distinguish between upper- and lower-case 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 exact same keys you used to set it.

CAUTION: *The power-on password prevents use of equipment
and files by persons who do not know the password.*

*Use a power-on password that is easy to remember.
Write it down and store it in a safe place. Tell a
co-worker where it is stored.*

*If the power-on password is not available, only a dealer
or service representative can remove the password.
Phone your dealer or service representative for help.*

☎

How to Install the Power-On Password

To install a power-on password, follow the steps outlined below:

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select `Utilities` and press **Enter**.

3. Select `Passwords` from the Utilities Menu and press **Enter**.

4. Select the `Set Power-on` option and press **Enter**. The illustration on the next page shows the screen display for `Set power-on`.

5. Type a password with no more than seven characters. If you make a mistake, use the backspace key to correct it. After you complete typing the password, press **Enter**.

CAUTION: *Use a power-on password that is easy to remember.*
Write it down and store it in a safe place.

6. At the message: `Is this correct? (Y/N)`, press **Y** and then **Enter**, if the password is correct.

When you turn the system off and on again, the power-on password prompt appears and you must type the correct password.

```
┌──────────────────────────────────────────────────────────────────┐
│                                                                    │
│                        PASSWORDS MENU                              │
│                                                                    │
├──────────────────────────────────────────────────────────────────┤
│ ███████████████  Change Power-on   Remove Power-on   Keyboard   Network │
│ █Set Power on █                                                    │
├──────────────────────────────────────────────────────────────────┤
│ Set power on password when none exists                            │
├──────────────────────────────────────────────────────────────────┤
│                                                                    │
│                                                                    │
│           Enter your power-on password                            │
│                                                                    │
│                                                                    │
│                    ████████████████                               │
│                                                                    │
│                                                                    │
│                                                                    │
│           Is this correct?  (Y/N)                                 │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
├──────────────────────────────────────────────────────────────────┤
│ Type password (1 - 7 characters), then ⏎ to continue.   Esc = Quit │
│                                                                    │
└──────────────────────────────────────────────────────────────────┘
```

Set Power-On Password Screen Menu

How to Change the Power-On Password

The Power-On Password Change and Remove utilities give instructions but do not actually change or remove the password.

Changing to a New Password

To change the password, turn the system off and on. After the power-on self-test completes, the power-on password prompt appears. At the prompt, type the current power-on password, a forward slash (/), and the new password. Press **Enter**.

For example, if your current password is OLD and you want NEW to be the password, type the following command and press **Enter**.

OLD/NEW

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

Changing to No Password

If you want no password, turn the system off and on. When the power-on password prompt appears, type the correct power-on password and a forward slash (/) and press **Enter**.

For example, if your current password is OLD and you want no password, type the following command and press **Enter**.

OLD/

After that, a password prompt will not appear.

How to Use Network Server Mode

☞ **NOTE:** This section is only for users who have a system that is a network file server. If your system is not a network file server, skip this section.

You must install a power-on password in order to use the network server mode.

Network server mode protects files on a system used as a network server. It allows the system to be turned on using the fixed disk as the "boot" device without input of a power-on password. It does not permit entry of any information, including the power-on password, from the keyboard.

In network server mode, other systems on the network can use unprotected files on the server but unauthorized persons cannot access system files through the server keyboard.

If the system is in network server mode and you want to use the keyboard, insert the *Reference Diskette* in drive A before you turn on the system. At the power-on password prompt, enter the password.

Setting the Password

To activate network server mode, follow the steps listed below:

1. After you install the power-on password, select `Network` from the Passwords Menu and press **Enter**.

2. At the message, `Set network server mode?`, press **Y** and **Enter**. The illustration on the facing page shows the screen display for network server mode.

Removing the Password

To remove the network server mode, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the prompt for the power-on password appears, type the password and press **Enter.**

If you remove the power-on password, network server mode is removed also.

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

```
┌──────────────────────────────────────────────────────────────────┐
│                                                                    │
│                          PASSWORDS MENU                            │
│ ──────────────────────────────────────────────────────────────── │
│ Set Power-on  Change Power-on  Remove Power-on  Keyboard  █Network█│
│ ──────────────────────────────────────────────────────────────── │
│ Network server mode password                                       │
│ ──────────────────────────────────────────────────────────────── │
│                                                                    │
│         Set network server mode?  (Y/N)                            │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
│ ──────────────────────────────────────────────────────────────── │
│      Type Y or N, then ↵ to continue.  Esc = Quit                 │
│                                                                    │
└──────────────────────────────────────────────────────────────────┘
```

Network Server Password Screen Menu

Using the Keyboard Password

Why Use the Keyboard Password?

The keyboard password utility allows you to lock the keyboard and mouse after you have turned on the system. This prevents unauthorized use of the system without having to turn it off. There is also an option which allows you to lock the keyboard and blank the screen for confidentiality.

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

■ From the *Reference Diskette*

■ From an MS-DOS partition on your fixed disk

How to Install the Keyboard Password Program

Flexible Diskette   If you are using the keyboard password program from the *Reference Diskette*, no special installation procedure is required.

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

Fixed Disk   If you are using the keyboard password program from your fixed disk, make sure you have an MS-DOS partition on the disk. The keyboard password utility works only with MS-DOS. Refer to your operating system manual 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 Utility menu.

- Copy file *kp.com* from the *Reference Diskette* to the root directory on the fixed disk.

Using the
Menu

To install the keyboard password on your fixed disk using the
SETUP Utility Menu, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and
   turn on the system and display.

2. When the SETUP Main Menu appears, select Utilities
   and press **Enter**.

3. Select Passwords from the Utilities Menu and press **Enter**.

4. Select Keyboard from the Passwords Menu and press
   Enter.

5. Select Installation from the Keyboard Menu and press
   Enter. After the screen message, Insert the Reference
   Diskette in Drive A , press **Enter**. The illustration on
   the facing page shows the screen for keyboard password
   installation.

6. The utility asks where you want to place the keyboard
   password program. The screen displays the default setting,
   C:\. If you press **Enter**, the program installs 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>).

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│                             KEYBOARD MENU                                     │
│ ───────────────────────────────────────────────────────────────────────────  │
│ ██Installation██                       Usage                                  │
│ ───────────────────────────────────────────────────────────────────────────  │
│ Copy the keyboard password program to the specified drive/path                │
│ ───────────────────────────────────────────────────────────────────────────  │
│                                                                               │
│                                                                               │
│          Enter the target path for KP.COM (max. 38 characters)                │
│                                                                               │
│                                                                               │
│                                                                               │
│             ██C:\██████████████████████████████████                           │
│                                                                               │
│                                                                               │
│                                                                               │
│                                                                               │
│ ───────────────────────────────────────────────────────────────────────────  │
│                                                                               │
│                                                                               │
└─────────────────────────────────────────────────────────────────────────────┘
```

Keyboard Installation Screen Menu

Using *kp.com*   To install the keyboard password on your fixed disk using the *kp.com* file, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. At the A prompt, type the following command and press **Enter**.

   KP

How to Set the 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. To set a keyboard password different from the power-on password, type: KP/C and press **Enter**. Type the new password at the screen prompt and press **Enter**.

With No Power-on Password

If you do not have a power-on password, each time you turn on the system and display or restart it by pressing **Ctrl-Alt-Del**, you must set a keyboard password, if you want one.

To set a keyboard password, type: KP and press **Enter**. Type your keyboard password at the screen prompt 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 chart below for keyboard password commands.

KEYBOARD PASSWORD PARAMETERS	
MEANING	COMMAND
Changes the password	KP/C
Keeps the keyboard password in memory (resident) while the power remains on	KP/R
Changes (uninstall) so the password is not memory-resident	KP/U
Blanks the screen when the keyboard is locked	KP/B

How to Lock and Unlock the Keyboard

Locking   There are two ways to *lock* the keyboard. When the keyboard is locked, you cannot enter any information.

■ From the MS-DOS root directory, type: kp and press **Enter.**

■ If the keyboard password is resident in memory, press **Alt** and **K** from the MS-DOS root directory or from an application program. You don't have to exit the application program and see a MS-DOS prompt (C>) to lock the keyboard.

Unlocking   To *unlock* the keyboard, type your keyboard password.

☞ **NOTE:** Each password can have up to seven characters. The system does not distinguish between upper- and lower-case 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 use the system, press the exact same keys you used to set the password.

To *unlock* the keyboard, type your keyboard password.

If you forget the keyboard password and it is *different* from the power-on password, turn the system off. This erases the keyboard password from memory.

If you forget the keyboard password and it is the *same* as the power-on password, only a dealer or service representative can remove the password.

How to Remove the Keyboard Password

To remove the keyboard password, choose one of the actions shown below.

- Turn the system off and on.

- Type: KP/U.

You must type: kp the next time you turn on the system 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.

Changing the Keyboard Speed

The keyboard speed setting regulates the transmission and repetition rate of a keystroke.

Keyboard speed is factory-set to normal but can be changed to fast. The new keyboard speed setting is saved in the battery-maintained memory until you change it again.

Set the keyboard speed to fast if you are a fast typist or you are typing lines of repeated characters.

- The normal setting transmits keystrokes at 10.9 characters per second and repeats a depressed key twice per second.

- The fast setting transmits keystrokes at 30 characters per second and repeats a depressed key four times per second.

To set the keyboard speed, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select `Utilities` and press **Enter**.

3. When the Utilities Menu appears, choose `Keyboard Speed` and press **Enter**.

4. Use the arrow keys to select `NORMAL` or `FAST` and press **Enter**.

```
┌──────────────────────────────────────────────────────────────────┐
│                          UTILITIES MENU                            │
├──────────────────────────────────────────────────────────────────┤
│ Date and Time   Backup Disk    Passwords    █Keyboard Speed█       │
├──────────────────────────────────────────────────────────────────┤
│ Change the speed at which keystrokes are recorded                  │
├──────────────────────────────────────────────────────────────────┤
│                                                                    │
│                                                                    │
│          Select keyboard speed                                     │
│                                                                    │
│                                                                    │
│                                                                    │
│                 █NORMAL█                                           │
│                                                                    │
│                                                                    │
│                                                                    │
├──────────────────────────────────────────────────────────────────┤
│  Use the ↑ ↓ keys to select, press ↵ to continue.   Esc = Quit     │
└──────────────────────────────────────────────────────────────────┘
```

Keyboard Speed Screen Menu

Configuring the System For Additional Components

Reconfigure the system if one of the following occurs.

■ You install additional components.

■ You change the placement of adapter boards on the main processor board.

■ The RTC/battery module fails causing loss of battery-maintained memory.

How to View the Current System Configuration

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

If there is no entry for an adapter board you installed in the system, check that you installed the adapter description file for that board. The adapter description file has the MS-DOS extension .*adf* after the name of the file.

Use the arrow keys to select Internal Options or a slot on which you want more information. Press **Enter** for information on the board in that slot.

You cannot change settings with View. If conflicts exist, they are noted on the screen by an asterisk. Use Change to manually change settings.

To use View, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select Configuration and press **Enter**.

3. When the Configuration Menu appears, select View and press **Enter**.

4. When the View Menu appears, select one of the following:

    ■   Internal options to view the values assigned to basic system components

    ■   A slot number with an adapter installed to view the configuration for that adapter

    The illustration on the facing page shows a typical screen display when you select Internal Options.

5. When you have reviewed the current configuration settings, press **Esc** as many times as needed to return to the MS-DOS prompt (C>) or (A>).

```
┌─────────────────────────────────────────────────────────────────────┐
│                          CONFIGURATION MENU                           │
├─────────────────────────────────────────────────────────────────────┤
│  File Copy    Automatic   ███View███   Change    Backup    Restore    │
├─────────────────────────────────────────────────────────────────────┤
│  View current settings                                                │
├─────────────────────────────────────────────────────────────────────┤
│  Installed memory            ███4096 KB (4.0 MB)███                    │
│                                                                       │
│  Available memory            3968 KB (3.9 MB)                         │
│                                                                       │
│  Disk Drive A Type           1.44MB 3.5 Inch                          │
│                                                                       │
│  Disk Drive B Type           Not Installed                            │
│                                                                       │
│  Math Coprocessor            Not Installed                            │
│                                                                       │
│  Serial Port                 SERIAL_1                                  │
│                                                                       │
│  Parallel Port               PARALLEL_1                                │
├─────────────────────────────────────────────────────────────────────┤
│         F1 = help,   ↓ ↑ = move highlight, Esc = Quit.                │
└─────────────────────────────────────────────────────────────────────┘
```

Configuration View Screen Menu

How to Install Configuration Files

The *Reference Diskette* includes adapter description files for the options listed below. You do not need a diskette with separate adapter description files to configure the system for these options. Adapter description files have the extension *.adf* after the name of the file so the system can easily recognize them.

- NCR SCSI controller on the main processor board

- NCR SCSI adapter board

- Internal options

- ESDI fixed disk adapter

- Integrated fixed disk adapter

- ST506 fixed disk adapter

- PC network adapter

- IBM Multiprotocol Communication adapter

- IBM Dual Asynchronous adapter

- IBM Expanded Memory adapter

- IBM 32-Bit Expansion Memory adapter

- IBM 2 MB 16-Bit Memory adapter

Diskettes with adapter description files accompany most third-party adapter boards for systems with Micro Channel architecture. These files specify all the possible configurations for that card.

The File Copy option on the SETUP Configuration utility copies adapter description files for third-party adapter boards to your *Reference Diskette*. To install an adapter description file, follow the steps listed below.

1. Turn on the system and display. When the operating system is loaded, place the diskette with the adapter description file in drive A and type: A:
Check that the adapter description file is in the root directory of the diskette.

Refer to your operating system documentation for information on viewing a directory.

2. Remove the diskette containing the adapter description file. Put a working copy of the *Reference Diskette* in Drive A and type: SETUP

3. When the SETUP Main Menu appears, select Configuration and press **Enter**.

4. When the Configuration Menu appears, select File Copy and press **Enter.**

5. When File Copy utility completes, press **Enter** to return to Configuration Menu.

6. Press **Esc** as many times as necessary to exit the SETUP program.

7. Press **Ctrl-Alt-Del** to restart the system.

8. When the SETUP Main Menu appears, select Configuration and press Enter.

9. Select Automatic and press **Enter**. It configures the system to enable the adapter that you installed.

CAUTION: *The Automatic option resets all adapter configurations to default values. If you previously set values using the Change option, use Change to install the new board.*

```
┌──────────────────────────────────────────────────────────────────────┐
│                                                                        │
│                         CONFIGURATION MENU                             │
│                                                                        │
├──────────────────────────────────────────────────────────────────────┤
│  ▐FileCopy▌  Automatic    View     Change    Backup    Restore         │
├──────────────────────────────────────────────────────────────────────┤
│  Copy new adapter description files to the reference diskette          │
├──────────────────────────────────────────────────────────────────────┤
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│            ┌──────────────────────────┐                               │
│            │      Instruction         │                               │
│            │                      ₹    │                               │
│            │   Reference Diskette in  │                               │
│            │        Drive A.          │                               │
│            │                          │                               │
│            │                          │                               │
│            └──────────────────────────┘                               │
├──────────────────────────────────────────────────────────────────────┤
│            Esc = Quit.   Enter = Continue.                             │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

Configuration File Copy Screen Menu

How to Change the System Configuration

There are two ways to change the system configuration.

- The Automatic Configuration utility attempts to find a combination of non-conflicting settings for adapter boards so that they all operate properly.

- The Change utility allows you to choose settings for adapter boards different from those specified by Automatic Configuration.

Using Automatic Configuration

Follow the steps listed below to use Automatic Configuration.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select Configuration and press **Enter**.

3. When the Configuration Menu appears, choose Automatic and press **Enter**.

4. When the message Run Automatic Configuration? appears, type **Y**. The illustration on the facing page shows the screen display for Automatic Configuration.

5. When the utility reconfigures the system, press **Esc** as many times as necessary to leave the SETUP program and restart the system.

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│                        CONFIGURATION MENU                             │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│                                                                       │
│ FileCopy    ▐Automatic▌   View     Change     Backup     Restore      │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│ System configures automatically                                       │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                   Run Automatic Configuration?                        │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│                                                                       │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

Automatic Configuration Screen Menu

☞ **NOTE**: The Automatic Configuration option sets Micro Channel adapters to their default memory addresses, I/O addresses, and interrupt levels. It installs the adapters in consecutive order by the number of the expansion slot occupied. The utility denotes a conflict in settings for boards by placing an asterisk next to the name of the board with the conflict.

When there is a conflict, the computer does not recheck the boards installed in lower number slots. Installing the adapter boards in a different order may resolve the conflict.

If, after boards are repositioned, Automatic Configuration cannot find a combination of settings with no conflicts, turn off the system and remove one of the boards with the conflict.

Micro Channel architecture allows interrupt sharing. If an 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 option to set a different interrupt level for one of the conflicting adapters.

Using Change Configuration

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

☞ **NOTE**: You can use the Change option to install a new adapter board without changing the configuration settings for other adapter boards.

Use the defaults shown or select custom settings for the board and save them by pressing **F10**. If there are no conflicting settings, a message appears asking if the board should be enabled. Type **Y**.

To change a setting and store it in the battery-maintained memory, follow the steps listed below:

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select Configuration and press **Enter**.

3. When the Configuration Menu appears, choose Change and press **Enter**. The screen shows all installed options for that adapter and their settings.

4. Select one of the following options and press **Enter**.

   ■ `Internal options` to view the values assigned to basic system components

   ■ A slot number with an adapter installed to view the configuration for that adapter

5. Select the setting you want to change and press **Enter.**

6. A box appears with allowed choices for that setting. Use the arrow keys to select one of the choices and press **Enter**.

7. Press **F10** to save the new settings.

8. Press **Esc** as many times as necessary to leave the SETUP program and restart the system.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                        CONFIGURATION MENU                                 │
├─────────────────────────────────────────────────────────────────────────┤
│  FileCopy   Automatic    View   ▐Change▌   Backup    Restore              │
├─────────────────────────────────────────────────────────────────────────┤
│  View current settings                                                    │
├─────────────────────────────────────────────────────────────────────────┤
│  ▐Internal Options▌                                                       │
│                                                                           │
│  Slot 1: Empty                                                            │
│                                                                           │
│  Slot 2: Empty                                                            │
│                                                                           │
│  Slot 3: Empty                                                            │
│                                                                           │
│  Slot 4: Empty                                                            │
│                                                                           │
│  Slot 5: NCR SCSI                                                         │
│                                                                           │
│                                                                           │
├─────────────────────────────────────────────────────────────────────────┤
│                 Esc = Quit.   Enter = Continue.                           │
└─────────────────────────────────────────────────────────────────────────┘
```

Configuration Change Screen Menu

How to Backup Configuration Files

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

To backup configuration files, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select `Configuration` and press **Enter**.

3. When the Configuration Menu appears, choose `Backup` and press **Enter**. Follow the screen prompts. The illustration below shows the Backup Configuration Menu.

4. Press **Esc** as many times as necessary to return to the MS-DOS prompt (`C>`) or (`A>`).

```
┌──────────────────────────────────────────────────────────────────────┐
│                                                                        │
│                         CONFIGURATION MENU                             │
│  ────────────────────────────────────────────────────────────────     │
│      FileCopy    Automatic    View     Change    ▉Backup▉   Restore    │
│  ────────────────────────────────────────────────────────────────     │
│   Copy configuration settings to the reference diskette                │
│  ────────────────────────────────────────────────────────────────     │
│                                                                        │
│                                                                        │
│                                                                        │
│         ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░                                   │
│         ░ Instruction ░░░░░░░░░░░░░                                    │
│         ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░                                   │
│         ░ Reference Diskette in ░░░                                    │
│         ░░░░░░░ Drive A. ░░░░░░░░░░░                                   │
│         ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░                                   │
│         ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░                                   │
│  ────────────────────────────────────────────────────────────────     │
│              Esc = Quit.   Enter = Continue.                           │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

Configuration Backup Screen Menu

How to Restore Configuration Files

The Configuration Restore utility copies configuration settings from the *Reference Diskette* to the battery-maintained memory. This is useful if the RTC/battery module fails and configuration settings are lost.

To restore configuration files, follow the steps listed below.

1. Place a working copy of the *Reference Diskette* in drive A and turn on the system and display.

2. When the SETUP Main Menu appears, select Configuration and press **Enter**.

3. When the Configuration Menu appears, choose Restore and press **Enter**. Follow the screen prompts. The illustration below shows the Configuration Restore Menu.

4. Press **Esc** as many times as necessary to return to the MS-DOS prompt (C>) or (A>).

CONFIGURATION MENU

FileCopy   Automatic   View   Change   Backup   Restore

Restore configurations settings previously saved on the reference diskette

Instruction

Reference Diskette in
Drive A.

Esc = Quit.   Enter = Continue.

Configuration Restore Screen Menu

Changing Video Display Modes

The video graphics array (VGA) controller on the main processor board supports a color or monochrome VGA display.
It automatically configures itself to operate the monitor attached at power-on.

The MVGA utility on the *Reference Diskette* permits you to change display modes without setting switches.

If the system has two display adapter boards, the MVGA utility works only when VGA is set as the primary display adapter.

Why Use the MVGA Utility?

The utility is useful if you have software that uses the enhanced video modes explained below. Do not install the MVGA utility or VGA device drivers unless you plan to use the enhanced video modes.

- Enhanced text modes enable the screen to show one of the following configurations on any standard display.

  - 25 or 43 rows with 100 or 132 columns

  - 60 rows with 80 columns

- Enhanced graphics mode supports 800 by 600 resolution in sixteen simultaneous colors on multi-frequency displays.

These modes allow you to have much more information on the screen than with the standard VGA modes. They require specific software files (drivers) to take advantage of their capabilities in software applications.

Refer to the next section, "How to Install VGA Device Drivers for Applications," for information on installing software for use with VGA enhanced modes.

How to Install the MVGA Utility

You can use the MVGA utility in the following ways:

- from the *Reference Diskette*

- from an MS-DOS partition on your fixed disk

The *config.sys* file must include a *high_res.sys* statement for the MVGA utility to operate. Follow directions on the facing page to add that statement to your *config.sys* file.

If you are using the utility from the *Reference Diskette*, skip to "How to Use the MVGA Utility" now.

Follow instructions listed on the facing page to copy the utility to the fixed disk root directory. Experienced users can install a special directory for MVGA. Refer to your MS-DOS user's manual for more complete information on how to make and use a subdirectory for the utility.

1. Make sure you have MS-DOS on your fixed disk. The utility is not compatible with other operating systems. Refer to your operating system manual for information on setting up and using MS-DOS. Make sure you have a *config.sys* file.

2. Turn on the system or restart it by pressing the **Ctrl-Alt-Del** key combination. Watch for the MS-DOS prompt (C>).

3. Place a working copy of the *Reference Diskette* in drive A.

4. At the MS-DOS prompt (C>), type: COPY A:MVGA.EXE and press **Enter**.

5. At the prompt, type: COPY A:HIGH_RES.SYS and press **Enter**.

6. Use the MS-DOS EDLIN editor or retype the *config.sys* file to add the following command to that file:

DEVICE = C:\HIGH_RES.SYS

7. Press **Ctrl-Alt-Del** to restart the system.

☞ **NOTE:** The screen may not react properly when using the 80x60, 100x25, 100x34, 100x43, 132x25, 132x43 modes. If you want to use these modes and you have an *ansi.sys* statement in your *config.sys* file, delete the *ansi.sys* statement. There may be a conflict between the *high_res.sys* statement and the *ansi.sys* statement.

How to Use the MVGA Utility

You can use the MVGA utility from your MS-DOS fixed disk directory or from the *Reference Diskette*.

To use this utility, the *high_res.sys* device driver file must be copied to the root directory of the flexible or fixed disk that has your operating system(the "boot" diskette). The command `DEVICE = C:\HIGH_RES.SYS` must be placed in your *config.sys* file of the "boot" diskette.

1. Turn on the computer or restart it using the **Ctrl-Alt-Del** key combination. If you were using the SETUP utility, press **Esc** as many times as necessary to reach the MS-DOS prompt (A>) or (C>).

2. If you are using the utility from the *Reference Diskette*, put the diskette in drive A, type: `A:MVGA,` and press **Enter**.

   If you are using the utility from the fixed disk, type: `C:MVGA` and press **Enter**.

3. A screen will appear similar to the one below. Use the arrow keys to change video modes and press **Enter** to record your choice. The utility automatically changes the display mode and exits to the DOS prompt.

4. To set the display mode back to 80x25, enter the MVGA menu and select `EXIT to DOS`. This restores the screen to 80x25 mode.

```
        MVGA Utility

        ┌─────────────────────────────────┐
        │                                 │
        │   Exit to DOS                   │
        │   Switch to VGA Color           │
        │   Switch to VGA Monochrome      │
        │   Switch to 132 x 25 Mode       │
        │   Switch to 132 x 43 Mode       │
        │   Switch to 100 x 25 Mode       │
        │   Switch to 100 x 34 Mode       │
        │   Switch to 100 x 43 Mode       │
        │   Switch to  80 x 60 Mode       │
        │                                 │
        └─────────────────────────────────┘


Use the UP and DOWN arrows to move around
and the [ENTER] key to select an item.
```

VGA Screen Menu

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

The specified MVGA mode remains in effect until an application program invokes a new display mode or you perform one of the following activities.

■ Select another mode from the MVGA menu.

■ Type another MVGA command at the MS-DOS prompt (C>) or (A>).

■ Re-start the system by pressing **Ctrl-Alt-Del.**

■ Turn the system off and on again.

You can also type MVGA and the mode you want to use without using the menu. The commands are shown below.

MENU OPTION	DESCRIPTION	MS-DOS COMMAND
——	Displays the MVGA menu	MVGA
Exit to DOS	Switches to a C> or A> prompt	——
Switch to VGA Color	Switches to color mapping	MVGA COLOR
Switch to VGA Monochrome	Switches to monochrome mapping	MVGA MONO
Switch to 80x60 Mode	Switches the board to 80 column/60 line text mode.*	MVGA 8060
Switch to 100x25 Mode	Switches the board to 100 column/25 line column text mode.*	MVGA 10025
Switch to 100x34 Mode	Switches the board to 100 column/34 line column text mode.*	MVGA 10034
Switch to 100x43 Mode	Switches the board to 100 column/43 line text mode.*	MVGA 10043
Switch to 132x25 Mode	Switches the board to 132 column/ 25 line text mode.*	MVGA 13225.
Switch to 132x43 Mode	Switches the board to 132 column/ 43 line text mode.*	MVGA 13243

* This feature is useful with certain application programs only.

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

■ the *read.me* files on your *Reference Diskette*

■ your MS-DOS and application manuals

Installing VGA Device Drivers for Applications

Current versions of many applications contain device drivers that allow the application to be used with VGA advanced modes.

If a VGA driver is included with the application software, follow instructions in the software manual to install the application for advanced VGA modes.

The *Software Support Diskette* contains device drivers that allow you to use extended VGA modes with older versions of some popular application programs.

Load the operating system in one of the following ways.

■ Load MS-DOS and type A: to access drive A (A>).

■ Use the *Reference Diskette* to reach the prompt, as listed in steps 1 to 3 below.

1. Place a working copy of the *Reference Diskette* in drive A.

2. Turn on the system, if it is not already on.

3. If you turned on the system with the *Reference Diskette* in drive A, wait for the SETUP program to appear.

   If the system was already on, and you were not already using the SETUP program, type A: and wait for an MS-DOS prompt (A>).

   If you were already using SETUP, press **Esc** until you exit the SETUP program and reach the MS-DOS prompt (A>).

To use the *readme.doc* file, follow the steps listed below.

4. Place the *Software Support Diskette* in drive A.

5. To display the *readme.doc* file, type the following commands. Press **Enter** after each.

`CD\VGA`

`README`

When the file appears, use the **Pg Up** and **Pg Dn** keys to view the entire file.

5. To print the file, type the following command and press **Enter**.

`COPY\VGA\README.DOC LPT1`

Installing SCSI Device Drivers

The *Software Support Diskette* contains device drivers that allow you to use the following SCSI devices with this system.

- More than two fixed disk drives

- Removable disk drives

- Read/write optical disk drives

Load the operating system in one of the following ways.

- Load MS-DOS and type A: to access drive A (A>).

- Use the *Reference Diskette* to reach the prompt, as listed in steps 1 to 3 below.

1.   Place a working copy of the *Reference Diskette* in drive A.

2.   Turn on the system, if it is not already on.

3.   If you turned on the system with the *Reference Diskette* in drive A, wait for the SETUP program to appear.

   If the system was already on, and you were not already using the SETUP program, type A: and wait for an MS-DOS prompt (A>).

   If you were already using SETUP, press press **Esc** until you exit the SETUP program and reach the MS-DOS prompt (A>).

A *readme.doc* file in the SCSI directory explains how to install the SCSI device drivers. To use the *readme.doc* file, follow the steps listed below.

4. Place the *Software Support Diskette* in drive A.

5. To display the *readme.doc* file, type the following commands. Press **Enter** after each.

`CD\SCSI`

README

When the file appears, use the **Pg Up** and **Pg Dn** keys to view the entire file.

6. To print the file, type the following command and press **Enter**.

`COPY\SCSI\README.DOC LPT1`

Chapter 3 Troubleshooting: System Messages and Diagnostics

Overview

This chapter includes information to help you correct problems with your system. The problem-solving information is organized by the following categories.

■ Problem description

■ Error number

■ Screen message

Each listing includes the possible cause of the problem and possible remedies.

Perform the activities listed under POSSIBLE REMEDY in the order 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 activity 2. If you cannot correct the error, phone your service representative for assistance. The symbol of a telephone shown below tells you to phone for help.

Also, if information about how to remedy the problem does not appear in this manual, the telephone symbol appears telling you to phone your service representative for help.

☎

The *User's Manual* contains the following information which is useful in diagnosing and correcting problem(s).

- How to run utility programs on the *Reference Diskette* (Chapter 2)

- How to install or replace options (Chapter 4)

- How to run user diagnostics (Chapter 3)

If you suspect there may be a problem but can't identify it, run the diagnostics tests. The "Running User Diagnostics" section of this chapter explains how to run the tests.

Also, refer to your software documentation if you have problems using particular software on this system.

What to Check if the System Doesn't Work

PROBLEM	POSSIBLE REASON	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	☎
No prompt at power-on	Display not connected correctly.	Insert display cable snugly into computer and power cord snugly into wall 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 REASON	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 system	Replace the keyboard with a 101-key Workstation keyboard.
	File server password set. Power-on password set. Keyboard password set.	Type in password required.
	System set for network server mode.	Turn system off. Put *Reference Diskette* in drive A; turn on the system; type in power-on password.
	Forgot power-on password.	☎
	NumLock, **Scroll Lock**, or **Caps Lock** is set incorrectly.	Reset keys.
	Keyboard buffer full.	Wait until present operation is complete.
	Internal system problem	☎

PROBLEM	POSSIBLE REASON	POSSIBLE REMEDY
Unable to read from/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.
	Internal system problem	☎

PROBLEM	POSSIBLE REASON	POSSIBLE REMEDY
Unable to read from/write to fixed disk.	No operating system installed.	Install operating system on disk according to operating system manual.
	Internal problem with fixed disk drive	1. Run the Initialize Fixed Disk utility from the *User Diagnostics* diskette for the type of fixed disk you have. 2. Phone the 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 the service representative; it may be necessary to replace the main processor board.
		☎

PROBLEM	POSSIBLE REASON	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	Check that the type of printer installed on your system is correctly identified in your software installation program.
System does not recognize all installed adapter boards.	1. The *Reference Diskette* does not have an ADF for an adapter board installed in the system. 2. There are conflicts in the adapter boards.	1. Install the ADF for the adapter board on the *Reference Diskette*. 2. Run the SETUP Change Configuration utility on the *Reference Diskette*. Change attributes so they do not conflict.

PROBLEM	POSSIBLE REASON	POSSIBLE REMEDY
Undefined problem — unable to continue any processing.	Problem with operating system or application	Reinstall operating system.
	System not configured properly.	Use the SETUP Automatic Configuration utility on the *Reference Diskette*.
	Cables and cords not tightly connected.	Check all internal and external cables and cords.
	System overheating.	1. Reposition unit so there is sufficient airflow around it. Refer to the *Site Preparation* manual. 2. Check that the fan is working properly. 3. Phone your service representative; it may be necessary to replace the fan.
		☎
	Internal system problem	☎

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), runs. POST diagnostic programs test basic
system components.

Failure of a basic system component may cause the system to
stop. If the system does not stop, a beep code relays the type of
error. Write down the pattern of the beep code and give the
information to your service representative.

☎

After the VGA adapter and display pass their tests, the name of the component tested appears on the screen as it is tested. An illustration of the POST screen display showing the name of all components tested appears in Chapter 1.

If one of these components fails, an error code appears on the screen next to the name of the component. If there is an error, the message `Press the F1 key to continue` appears after all the POST completes all its tests. This allows you to put the *Reference Diskette* in drive A and read, from the display screen, the meaning of the error code. You may be able to run the *Reference Diskette* SETUP Automatic Configuration utility 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

All error codes for this system appear here in numerical order. If the error occurs during the POST, it is noted below the error code.

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 activity 2.

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

☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
102 (POST Error)	System Board Failure	Timer 0 or 2 failed during Power-On Self-Test (POST).	Phone your service representative; it may be necessary to replace the main processor board.
			☎
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 main processor board.
			☎
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 main processor board.
			☎
108 (POST Error)	System Board Failure	Timer 2 failed during POST.	Phone your service representative; it may be necessary to replace the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
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 main processor board and all installed devices for proper operation 2. Reseat the RAM modules, if any are installed on the board. 3. Phone your service representative; it may be necessary to replace the failing device(s) or the main processor board.
			☎
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 main processor board and all installed devices for proper operation 2. Phone your service representative; it may be necessary to replace the failing device(s) or the main processor board.
			☎

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. Start the system again. 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 main processor board and all installed devices for proper operation. 4. Phone your service representative; it may be necessary to replace the failing devices or the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
114 (POST Error)	Option ROM Checksum Failure — XXXX:0	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.	1. Phone your service representative; it may be necessary to replace the failing adapter board.
			☎
130 (POST Error)	A Shutdown Failure Has Occurred During POST	A failure occurred during POST which caused the system to halt.	Phone your service representative; it may be necessary to replace the main processor board.
			☎
131 (POST Error)	System Board Failure	Gating of the A20 address line failed when entering/exiting protected mode.	Phone your service representative; it may be necessary to replace the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
161	Real-Time Clock Failure (Battery). Please Reconfigure and Retry.	The system backup battery failed.	1. Run the *Reference Diskette* SETUP Automatic Configuration utility. 2. Phone your service representative; it may be necessary to replace the RTC/battery module or main processor board.
			☎
162 (POST Error)	Real-Time Clock Failure (CRC). Please Reconfigure and Retry.	The checksum for the battery-maintained memory is incorrect.	1. Run the *Reference Diskette* SETUP Automatic Configuration utility. 2. Phone your service representative; it may be necessary to replace the RTC/battery module or main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
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 *Reference Diskette* SETUP Date and Time utility. Set the correct date and time. 2. Phone your service representative; it may be necessary to replace the RTC/ battery module or main processor board.
			☎
164 (POST error)	Invalid Configuration Information (Memory). Please Reconfigure and Retry.	The amount of memory found in the system does not match the amount of memory specified in the configuration information saved by the backup battery.	1. Run the *Reference Diskette* SETUP Automatic Configuration utility. 2. Phone your service representative; it may be necessary to replace the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
165	Invalid Configuration Information (Adapter). Please Reconfigure and Retry.	A plug-in option adapter board configured by the *Reference Diskette* SETUP Configuration utility does not exist in the correct slot in the system.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Run the *Reference Diskette* SETUP FileCopy utility to copy the ADF for the plug-in board to the *Reference Diskette*; run the Automatic or Change Configuration utility again.
166	Invalid Configuration Information (Adapter). Please Reconfigure and Retry.	A plug-in option adapter board configured by the *Reference Diskette* SETUP Configuration utility does not exist in the slot specified or the adapter is not responding.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Run the *Reference Diskette* SETUP FileCopy utility to copy the ADF for the plug-in board to the *Reference Diskette*; run the Automatic or Change Configuration utility again. 3. Replace the plug-in adapter board.

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
167 (POST error)	Invalid Configuration Information (diskette).	Diskette controller does not exist or is not responding.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Phone your service representative; it may be necessary to replace the main processor board.
			☎
168 (POST error)	CMOS System Board Configuration Error.	Math coprocessor either not operating, missing, or just installed.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Replace or remove the coprocessor; run the Automatic Configuration utility again.

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
201 (POST error)	Memory Failure at xxxx:yyyy. Read aa Expecting bb.	A read/write error has occurred in memory at the address specified by xxxx:yyyy. The test value written to the memory location is shown by aa and the value read from the memory location is shown by bb.	**1.** If you have a main processor board only, phone your service representative; it may be necessary to replace the main processor board. ☎ **2.** If upgrade RAM modules are installed, remove them one at a time starting with the module in the connector marked SIMM3. Remove the modules in connectors marked SIMM 2 and SIMM 1 in that order. Reboot the system after each module is removed until the memory failure message does not appear. When you isolate the RAM module that caused the failure message, test it in another connector to determine if the module or the connector failed. The system operates properly only when RAM modules are installed in sockets 1, 2, 3 consecutively. If a RAM module failed, replace it. If the connector on the main processor board failed, phone your service representative; it may be necessary to replace the main processor board. ☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
202 (POST error)	Memory Failure at xxxx:yyyy. Read aa Expecting bb.	A read/write error has occurred in memory at the address specified by xxxx:yyyy. The test value written to the memory location is shown by aa and the value read from the memory location is shown by bb.	**1.** If you have a main processor board only, phone your service representative; it may be necessary to replace the main processor board. ☎ **2.** If upgrade RAM modules are installed, remove them one at a time starting with the module in the connector marked SIMM3. Remove the modules in connectors marked SIMM 2 and SIMM 1 in that order. Reboot the system after each module is removed until the memory failure message does not appear. When you isolate the RAM module that caused the failure message, test it in another connector to determine if the module or the connector failed. The system operates properly only when RAM modules are installed in sockets 1, 2, 3 consecutively. If a RAM module failed, replace it. If the connector on the main processor board failed, phone your service representative; it may be necessary to replace the main processor board. ☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
203 (POST error)	Memory Failure at xxxx:yyyy. Read aa Expecting bb.	A read/write error has occurred in memory at the address specified by xxxx:yyyy. The test value written to the memory location is shown by aa and the value read from the memory location is shown by bb.	1. If you have a main processor board only, phone your service representative; it may be necessary to replace the main processor board. ☎ 2. If upgrade RAM modules are installed, remove them one at a time starting with the module in the connector marked SIMM3. Remove the modules in connectors marked SIMM 2 and SIMM 1 in that order. Reboot the system after each module is removed until the memory failure message does not appear. When you isolate the RAM module that caused the failure message, test it in another connector to determine if the module or the connector failed. The system operates properly only when RAM modules are installed in sockets 1, 2, 3 consecutively. If a RAM module failed, replace it. If the connector on the main processor board failed, phone your service representative; it may be necessary to replace the main processor board. ☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
301 (POST error)	Keyboard Failure	The keyboard controller failed during POST.	1. Check that the keyboard is installed properly. 2. Replace the keyboard. 3. Phone your service representative; it may be necessary to replace the main processor board.
			☎
304 (POST error)	Keyboard Failure	The clock line on the keyboard controller failed during POST.	1. Check that the keyboard is installed properly. 2. Replace the keyboard. 3. Phone your service representative; it may be necessary to replace the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
306 (POST error)	Keyboard Failure	The data line on the keyboard controller failed during POST.	1. Check that the keyboard is installed properly. 2. Replace the keyboard. 3. Phone your service representative; it may be necessary to replace the main processor board. ☎
307	A Stuck Key Has Been Detected on the Keyboard	1. Something is resting on the keyboard. 2. There is a stuck key on the keyboard.	1. Remove the object from the keyboard. Reboot the system. 2. Replace the keyboard.
601 (POST error)	Diskette Drive Failure	The reset function failed on the flexible disk drive subsystem.	1. Check that the flexible disk drive data cable and power cable are connected properly to the drive and the main processor board. 2. Phone your service representative; it may be necessary to replace the main processor board. ☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
602 (POST error)	Diskette Drive x Failure.	The seek function failed on flexible disk drive x.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Phone your service representative; it may be necessary to replace the flexible disk drive.
			☎
901 (POST error)	Parallel Port Failure	The parallel port on the system board failed.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Phone your service representative; it may be necessary to replace the main processor board.
			☎
1101 (POST error)	Serial Port Failure	The serial port on the system board failed.	1. Run the *Reference Diskette* SETUP Automatic or Change Configuration utility. 2. Phone your service representative; it may be necessary to replace the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
1780 (POST error)	Hard Disk Drive 0 Failure	Fixed (hard) disk drive 0 is not ready or the recalibration function failed during initialization.	1. Check all fixed disk drive connections. 2. Phone your service representative; it may be necessary to replace the fixed disk drive, an adapter board, or main processor board.
			☎
1781 (POST error)	Hard Disk Drive 1 Failure	Fixed (hard) disk drive 1 is not ready or the recalibration function failed during initialization.	1. Check all fixed disk drive connections. 2. Phone your service representative; it may be necessary to replace the fixed disk drive, an adapter board, or main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
1782 (POST error)	Hard Disk Reset Failure	The reset function failed on the fixed (hard) drive subsystem.	1. Check all fixed disk drive connections. 2. Phone your service representative; it may be necessary to replace the fixed disk drive, an adapter board, or main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
1784 (POST error)	Mode Sense Failure	1. The SCSI data cable is not connected properly to the drive or the connector on the main processor board. 2. There is no SCSI drive installed. 3. The drive is not receiving power. 4. Two drives have the same SCSI ID number. 5. The only SCSI drive has the drive ID set at the same ID number as the main processor board SCSI controller. 6. A third-party board has an I/O address conflict with the SCSI controller. 7. No SCSI drive is installed and you used Automatic Configuration to set up your system.	1. Reconnect the SCSI data cable to the drive and the connector on the main processor board. 2. Install an approved SCSI drive. 3. Check that the power cable to the drive is properly connected. Check that the drive power cable is properly connected to the main processor board. Check that the main processor board is receiving power. 4. Change the SCSI drive ID number on one drive. 5. Reset the SCSI drive ID number to 06 6. Use the *Reference Diskette* SETUP Change utility to resolve the I/O address conflict. 7. Use the *Reference Diskette* SETUP Change utility to record that no drive is installed.

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
1787 (POST error)	The Random Access Memory (RAM), located on the SCSI adapter, has failed during system access.	1. The memory address of the SCSI RAM has been mapped to the same address as another adapter. 2. A memory chip on the adapter is bad. This is only relevant to systems with a SCSI host adapter board installed.	Use the *Reference Diskette* Configuration Change utility and perform the following actions. 1. Change the memory address of the SCSI adapter. a. Use the Configuration View utility to find which adapter address conflicts with the SCSI adapter. b. Go back to the SCSI controller board settings in the Change utility. c. Use the Configuration Change utility to change the address for the SCSI controller board so that it does not conflict with another board. d. Follow screen messages to save the setting and exit the utility. 2. Replace the SCSI adapter board.

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
1790 (POST error)	Hard Disk Drive 0 Failure	The verify function has failed on fixed (hard) disk drive 0.	1. Check all fixed disk drive connections. 2. Phone your service representative; it may be necessary to replace the fixed disk drive, an adapter board, or main processor board.
			☎
1791 (POST error)	Hard Disk Drive 1 Failure	The verify function has failed on fixed (hard) disk drive 1.	1. Check all fixed disk drive connections. 2. Phone your service representative; it may be necessary to replace the fixed disk drive, an adapter board, or main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
2401 (POST error) You won't see this code because the video failed. It must be read by your service representative.	Video Failure	The main processor board video controller or VGA adapter board failed during POST.	Phone your service representative. Special tools are required to read the error code. It may be necessary to replace the display or the main processor board. ☎
3001 (POST error) You won't see this code because the video failed. It must be read by your service representative.	Video Failure	The main processor board video controller or VGA adapter board failed during POST.	Phone your service representative. Special tools are required to read the error code. It may be necessary to replace the display or the main processor board. ☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
7000 (POST error)	CMOS Failure	Bad battery or bad battery-maintained memory.	1. Phone your service representative; it may be necessary to replace the RTC/battery module or main processor board.
			☎
7001 (POST error)	Shadow RAM Failure	ROM not shadowed to RAM.	1. Run the *Reference Diskette* SETUP Configuration utility. 2. Phone your service representative; it may be necessary to replace the main processor board.
			☎

ERROR CODE	MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
7002 (POST error)	Bad Configuration Information in CMOS	The battery-maintained memory (CMOS) has incorrect information.	1. Run the Reference Diskette SETUP Configuration utility. 2. Phone your service representative; it may be necessary to replace the RTC/battery module or main processor board.
			☎
8601 (POST error)	Pointing Device Interface Failure	The pointing device (auxiliary device/mouse) was detected but did not accept a command.	1. Check the mouse auxiliary/pointing device) for proper operation. 2. Phone your service representative; it may be necessary to replace the mouse or main processor board.
			☎

ERROR CODE	MESSAGE	POSSSIBLE CAUSE	POSSIBLE REMEDY
8602 (POST error)	Pointing Device Interface Failure	The pointing device (auxiliary device/mouse) was detected but an interface error occurred while 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 main processor board.
			☎
8603 (POST error)	Pointing Device Failure	The pointing device (auxiliary device/mouse) was detected but an interface error occurred while testing.	1. Check the mouse (pointing/auxiliary device) for proper operation. 2. Replace the device. 3. Phone your service representative; it may be necessary to replace the main processor board.
			☎

How to Use System Start-Up (Boot) Messages

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

MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
Not a Boot Diskette	The flexible diskette in drive A does not have an operating system or "bootable" program.	Replace the diskette in drive A with one which has an operating system and try again. The operating system on the *Reference Diskette* "boots" the system.
No Boot Device Available	The flexible disk 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. Check that the flexible disk drive data cable and power cable are connected properly to the drive and the main processor board. 3. Phone your service representative; it may be necessary to replace the flexible disk drive or the main processor board.
		☎

MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
Fixed Disk Read Failure	The system could not load data from the fixed disk.	1. Try to start the system 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. Check that the fixed disk drive data cable and power cable are connected properly to the drive and the main processor board. 4. Phone your service representative; it may be necessary to replace the fixed disk drive or the main processor board.
		☎
Strike the **F1** key to continue	The power-on self-test found an error.	Put the *Reference Diskette* in drive A and press the **F1** key to continue loading the system.

How to Use Memory Messages

These messages may appear when you are using the system. They give you information and do not report a specific error.

MESSAGE	MEANING
Hex-value Base Memory	The amount of conventional memory that tested successfully.
Hex-value Extended Memory	The amount of extended memory that tested successfully.
Decreasing available memory	This message immediately follows any memory error message. It tells you memory chips are failing. 1. Run user diagnostics for information about what chips are failing. 2. If you have a main processor board only, phone your service representative; it may be necessary to replace the main processor board. ☎ 3. If upgrade RAM modules are installed, remove them one at a time starting with the module in the connector marked SIMM3. Remove the modules in connectors marked SIMM 2 and SIMM 1 in that order. Reboot the system after each module is removed until the memory failure message does not appear. When you isolate the RAM module that caused the failure message, it may be necessary to test it in another connector to determine if the module or the connector failed. The system operates properly only when RAM modules are installed in sockets 1, 2, 3 consecutively. If a RAM module failed, replace it. If the connector on the main processor board failed, phone your service representative; it may be necessary to replace the main processor board. ☎

How to Use Interrupt Messages

These messages may appear when you are using the system.
They give you information and prompt you to restart the system.

MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
Unexpected SW Interrupt XX at YYYY. Type R(eboot), other keys to continue.	There is an error in the software program. XX is the interrupt number and YYYY is the address where the interrupt occurred.	1. Turn the computer off and on. 2. Load the software program again. 3. Check the software program.
Unexpected HW Interrupt XX at YYYY. Type R(eboot), other keys to continue.	There is a hardware-related error. XX is the interrupt number and YYYY is the address where the interrupt occurred.	1. Run user diagnostics to find hardware errors. 2. Phone your service representative.
		☎

How to Use 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 system.	Enter the correct 1-7 character password.
Password Ok	The password typed into the computer 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 system.
System halted! Must power down	The password typed into the computer is incorrect. The system will process no more information. Start the system again.	1. Use the correct password. 2. If you do not know the password, only a dealer or service representative can remove the password.
		☎
Password is incorrect	The password typed into the computer is incorrect. After three tries the system 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.

How to Use SCSI Messages

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

MESSAGE	POSSIBLE CAUSE	POSSIBLE REMEDY
SCSI — Capacity Too Large or Invalid Sector Size	The SCSI drive is not compatible with this system.	1. Verify the drive is certified for use in this system. 2 Reformat the disk using Initialize SCSI Fixed Disks on the Utilities menu of the *User Diagnostics* diskette. 3. Replace the drive with a certified drive.
SCSI Read Capacity Failure	The SCSI drive is not compatible with this system.	1. Verify the drive is certified for use in this system. 2. Replace the drive with a certified drive.

Running User Diagnostics

The *User Diagnostics* diskette contains programs which identify system 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 whether the component passed or failed.

It is helpful to use diagnostics programs when you:

■ set up the system

■ 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.

How to Run User Diagnostics

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

1. Insert the original disk into drive A and turn on the computer.

2. Follow the screen messages to copy the diskette.

3. Run diagnostics only from the copy diskette in drive A.

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

Press the **PgDn** key to see if the Main Menu has another screen. A typical Main Menu display appears as shown on the following page.

Select the test you want to run by entering its number and pressing **Enter**.

☞ **NOTE:** When using choice 6, Small Computer System Interface (SCSI) Test, the time required to complete the Send Diagnostics 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.

```
Personal Computer        Copyright
Common Diagnostics Version x.xx

                         MAIN MENU
                         Page 1 of x

Available Tests (highlighted)   Completed Cycles 0

1. Memory Test
2. Main Processor Board
3. Keyboard
4. Math Coprocessor
5. Serial and Parallel Port
6. Small Computer System Interface (SCSI) Test
7. Video Graphics Array
8. Flex Disk

<F1> Main Menu Help      <F7> Run All Tests Once
<F6> Utilities           <F8>Run All Tests Continuous
<F9> Edit Main Menu      <PgUp> Previous Page
<F10> Exit to DOS        <PgDn> Next Page

Select Tests and <⅃ >  for running test(s) once  OR
Select Tests and <F8> for continuous run of test(s)
                    (<F4> to stop)

SELECTION =
```

Typical User Diagnostics Main Menu (1 of 2)

How to Interpret Diagnostic Error Messages

After a diagnostics test has been completed, a PASSED/FAILED message appears 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 displays PASSED next to the name of the test. If the module has detected one or more errors, it displays FAILED. A blank next to the name of a test means that the test was not 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, probably a temporary condition caused the error. If the error continues to occur, call your dealer or representative for advice.

☎

How to Use Diagnostics Utilities

Press the **F6** key from the main menu screen to access the utilities menu screen. The utilities program gives you the choices shown below.

```
Personal Computer        Copyright
Common Diagnostics Version x.xx

                    UTILITIES

Available Utilities (highlighted)  Page 1 of x

1. Error Log Maintenance
2. Initialize ST506 Fixed Disks
3. Initialize SCSI Fixed Disks
4. Initialize ESDI Fixed Disks
5. Serial/Parallel Printer Test

<F1> Utilities Menu Help  <PgUp> Previous Page
<F9> Return to Main Menu <PgDn> Next Page
<F10> Exit to DOS

Press selection and <⏎ > to choose from Available
Selections

SELECTION =>
```

Typical Utilities Screen Display

Initialize Fixed Disks

Each Initialize Fixed Disks utility prepares a different type of fixed disk for MS-DOS operations. The factory-installed SCSI disk drive uses the Initialize SCSI Fixed Disks utility.

Use an Initialize 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

CAUTION: *The Initialize Fixed Disk utility destroys all data stored on the fixed disk.*

Follow screen prompts to initialize the disk. The process can take up to 40 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 system.

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   Upgrading the System

Overview

You can upgrade the computer system by installing a variety of optional components available in kit form.

Instructions specific to the option are packed with the option. Instructions for installing the option in this computer are explained in this chapter.

For a complete explanation of how to install the option in this computer, read and follow instructions in both documents.

Popular options available from NCR to upgrade the system are listed below.

- 2 MB random access memory (RAM) module

- 20 MHz 387SX™ coprocessor

- 80 MB tape drive

- 1.44 MB flexible disk drive

- 100 MB fixed disk drive with data cable

- Adapter for external SCSI devices

- Communications interface hardware

Preparing For Installation

Read all installation instructions before you begin. Separate the parts for each kit you are installing. Check off each installation procedure as you perform it for each kit.

Follow the warnings and cautions listed below. They can protect you and your computer system.

WARNING!

To avoid electric shock, TURN OFF THE POWER SWITCH and unplug the power cord before you begin work.

Only disconnect components as directed by installation instructions.

CAUTION:

Only install kits or options which have been approved for use with this computer. The installation of non-approved kits 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 kits and options.

Wear an electrostatic discharge (ESD) strap and touch a metal surface to ground yourself before you handle 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 rooms with static-inducing carpet.

Remove the flexible diskette(s) from flexible disk drive(s) before you install options.

Do not handle printed-circuit boards more than necessary.

Hold option adapter boards by the edge and do not touch the components.

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

Opening and Closing the Cabinet

Opening   To open the cabinet, follow the steps listed below. Refer to the illustrations on the facing page for more information.

1. Make sure the computer power is off and the system is unplugged from an electric outlet.

2. Unlock the keylock on the front of the cabinet.

3. Unscrew the thumbscrews on the cabinet back panel.

4. Slide the cabinet top forward and lift it away.

Closing   When you finish installing options, reassemble the computer. Follow the instructions listed below.

1. Replace the cabinet top. Put it on top of the slides on each side of the cabinet almost at the back panel. Make sure both sides are sitting properly on the metal slide. Push the top back to meet the cabinet back panel.

2. Fasten the back-panel thumbscrews that secure the cabinet top.

3. Relock the cabinet.

4. Reconnect the power cord to an electric outlet.

☞ **NOTE:** Turn directly to installation instructions for the options you want to install.
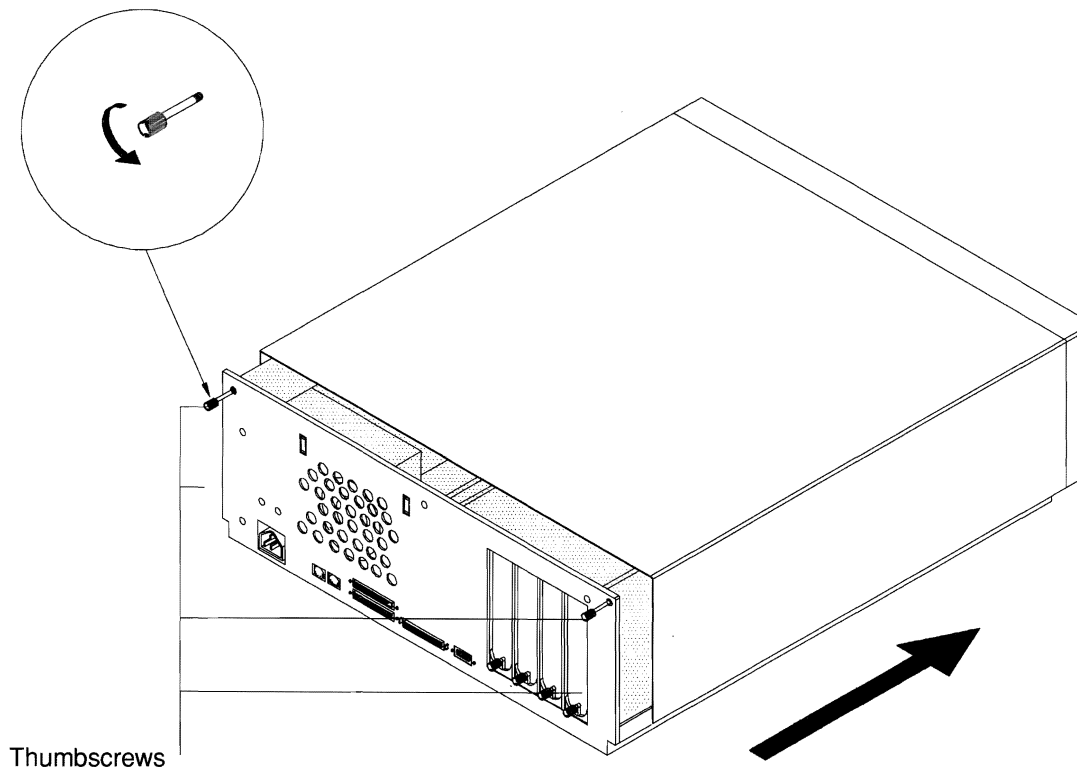
Thumbscrews

Opening the Cabinet

Installing the Coprocessor

The 20 MHz 387SX™ coprocessor is a square chip with connectors on the side rather than pins protruding from the bottom. The design allows you only one way to install it correctly in its socket.

CAUTION: *Install the coprocessor only when you are certain you know what to do. If you install it incorrectly, it may damage the chip. Do not force it into the socket.*

How to Prepare for Installation

Before you install the coprocessor chip, follow the steps listed below.

1. Read the warnings and cautions at the beginning of this chapter.

2. Make sure the computer power is off and the system is unplugged from an electric outlet.

3. Unlock the cabinet and loosen the back-panel thumbscrews that secure the cabinet top.

4. Slide the cabinet top forward and lift it away.

5. Identify the main processor board at the base of the cabinet.

6. Turn the cabinet on an angle with the back towards you.

Coprocessor
Socket
Main Processor
Board
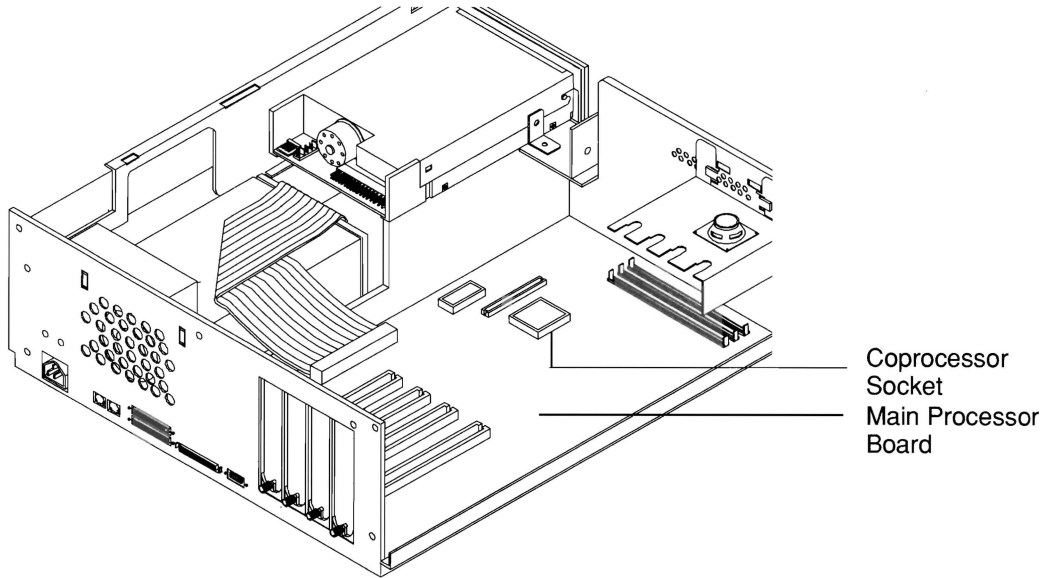
Cabinet Orientation for Coprocessor Installation

How to Install the Coprocessor

1. Find the square socket labeled coprocessor near the front middle of the main processor board. If adapter boards cover the socket, remove the boards; follow instructions in the section on "Installing and Removing Option Controller Boards."

2. Touch a metallic object to ground yourself before installing the coprocessor.

3. Make sure the corner of the coprocessor which has a depressed dot matches the slanted corner printed on the white line around the coprocessor socket.

4. Place the chip into the socket. If it does not go in easily, check that it is positioned correctly.

5. Replace any adapter boards you removed in order to reach the coprocessor socket.

6. If you have no more options to install, replace the cabinet top; fasten the thumbscrews; relock the cabinet; and reconnect the power cord. Follow instructions in the "Opening and Closing the Cabinet" section of this chapter.

7. Run the SETUP Automatic or Change Configuration utility on the *Reference Diskette* to prepare the system. Refer to the section on "How to Change the System Configuration" in Chapter 2.

☞ **NOTE:** If you need to remove the coprocessor, remove any adapter boards covering the socket. Use a chip puller to remove the coprocessor chip.

Dot on
Coprocessor

Socket

Slanted Corner on
Main Processor
Board
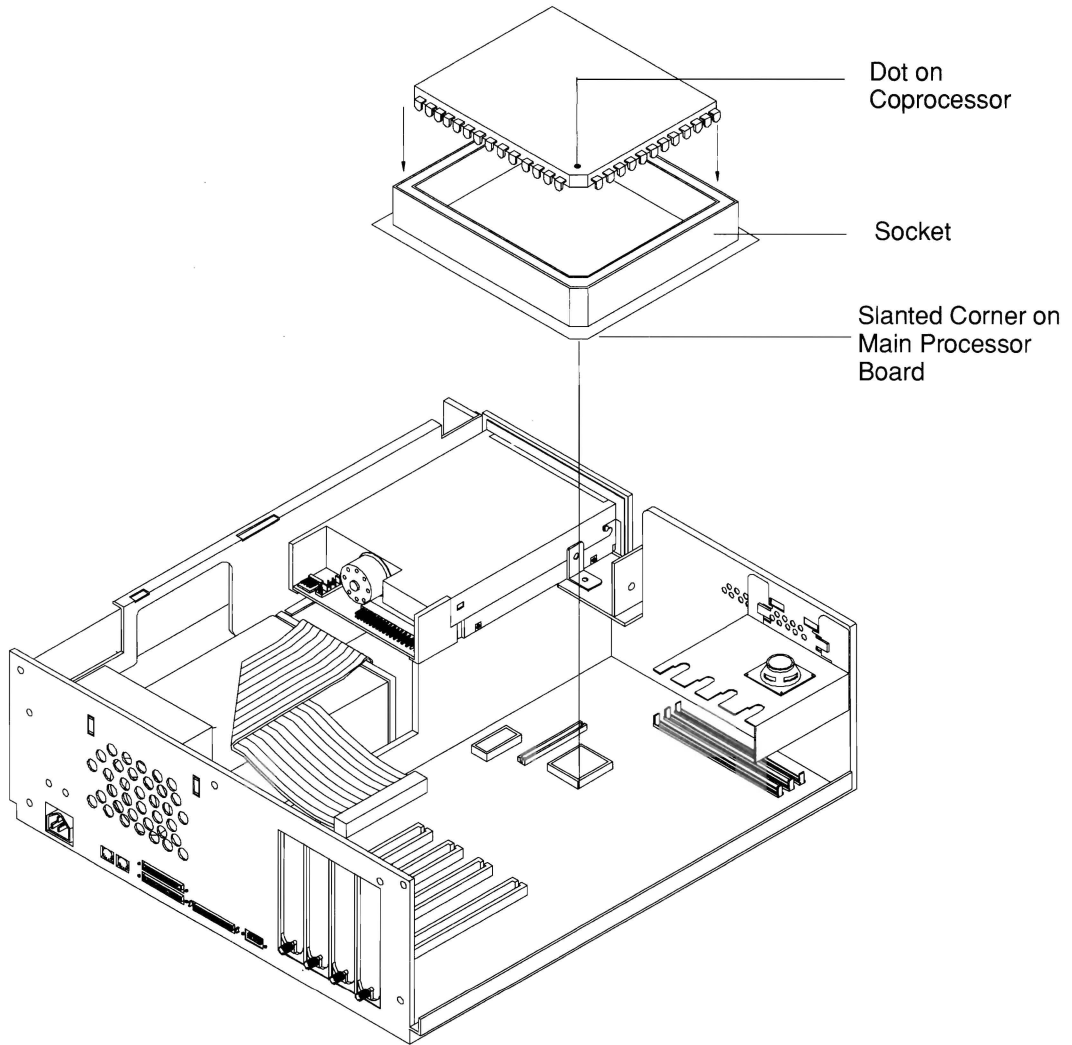
Installing the Coprocessor

Installing and Removing Plug-In Boards

This section explains how to install and remove most plug-in boards for this system. Refer to the instructions that come with your board for specific information about requirements of that board.

What Slots to Use

You can install adapter boards in four main processor board expansion slots and an i486 upgrade processor board in a dedicated slot. The locations of these slots are shown on the facing page.
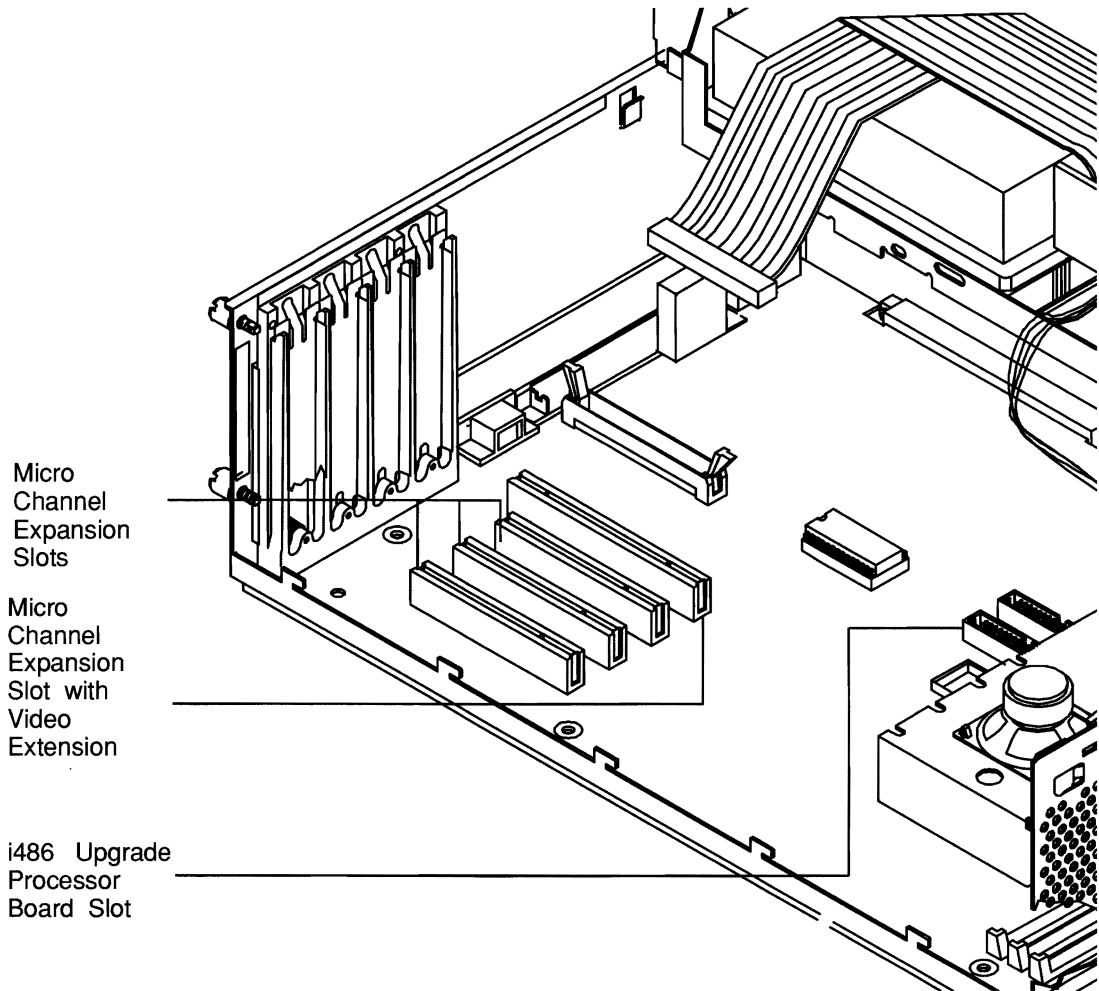
Micro
Channel
Expansion
Slots

Micro
Channel
Expansion
Slot with
Video
Extension

i486 Upgrade
Processor
Board Slot

Main Processor Board Slots

What to Do Before Installation

1. Read all instructions and the warnings and cautions at the beginning of this chapter.

2. Make sure the computer power is off and the system is unplugged from an electric outlet.

3. Place the board next to the computer. Leave it in the protective plastic envelope.

4. Unlock the cabinet and loosen the back-panel thumbscrews that secure the cabinet top.

5. Slide the cabinet top forward and lift it away.

6. Loosen a thumbscrew on an empty support brace and remove the blanking plate from the back of the computer, if appropriate.

7. Touch a metallic surface to ground yourself before you slide the board out of its envelope.

Cabinet
Thumbscrews

Plug-In Board
Thumbscrew

Blanking Plate
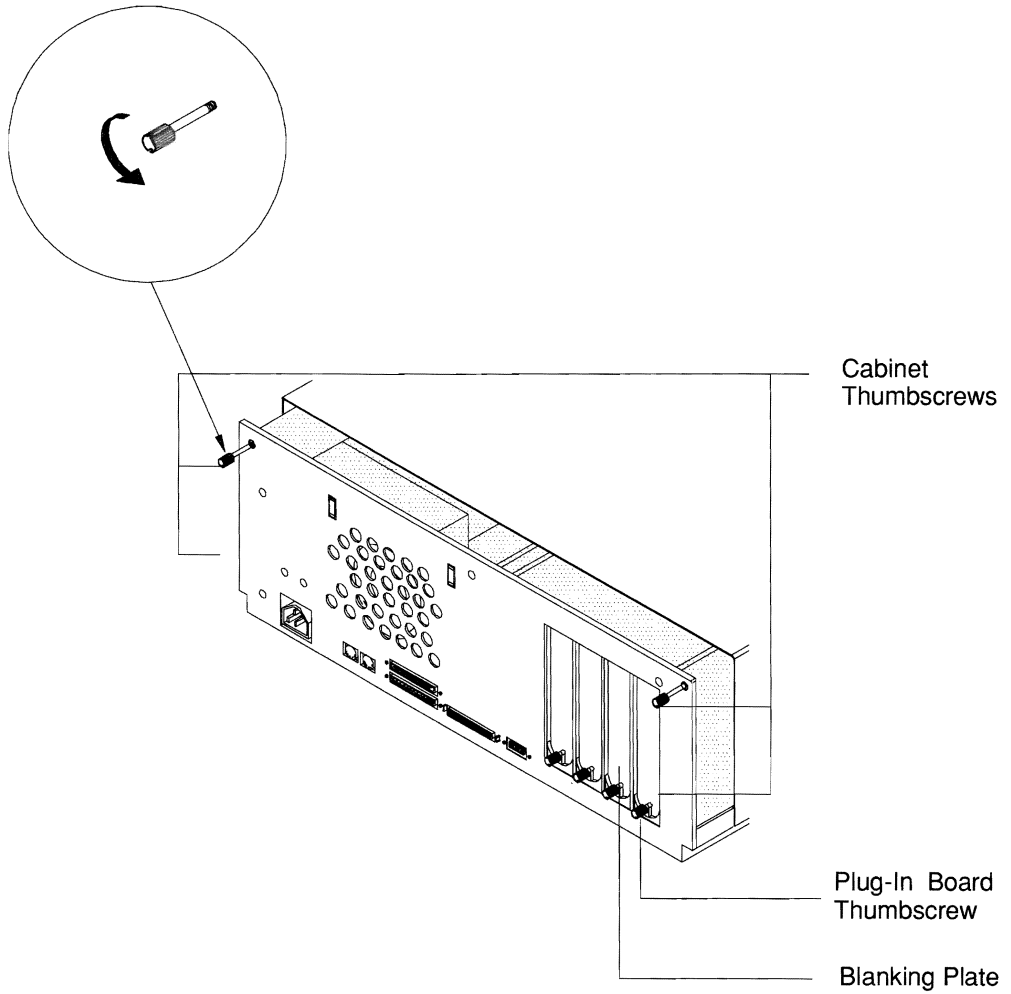
Preparing the Cabinet for Installation

How to Install a Plug-In Board

To install a plug-in board in the computer, follow the instructions listed below.

1. Make sure the computer power is off and the system is unplugged from an electric outlet.

2. Unlock the cabinet and loosen the back-panel thumbscrews that secure the cabinet top.

3. Slide the cabinet top forward and lift it away.

4. Loosen the board-retaining screw on the back panel behind an adapter board expansion slot, if appropriate. Slide the blanking plate up to remove it.

5. Hold the board by the plastic board guides. Place the board perpendicular to the main processor board with the exit-bracket facing the back of the computer.

6. Push in the board using gentle but firm pressure on the top corners. Make sure the board exit-bracket fits securely between the cabinet back-panel board guides. Make sure the data connector on the board fits snugly in the main processor board expansion slot.

7. Turn the exit-bracket screw clockwise to tighten it, if required.

8. If there is an external connector, attach cables for options located outside the computer cabinet to it. If the connector has retaining screws, install them.

9. If you have no more options to install, replace the cabinet top, fasten the thumbscrews, relock the cabinet, and reconnect the power cord.

10. Run the SETUP Automatic or Change Configuration utility on the *Reference Diskette* to prepare the system. Refer to the section on "How to Change the System Configuration" in Chapter 2.

Plastic Board Guide

Main Processor Board Expansion Slot

Plug-In Board Thumbscrew

Blanking Plate
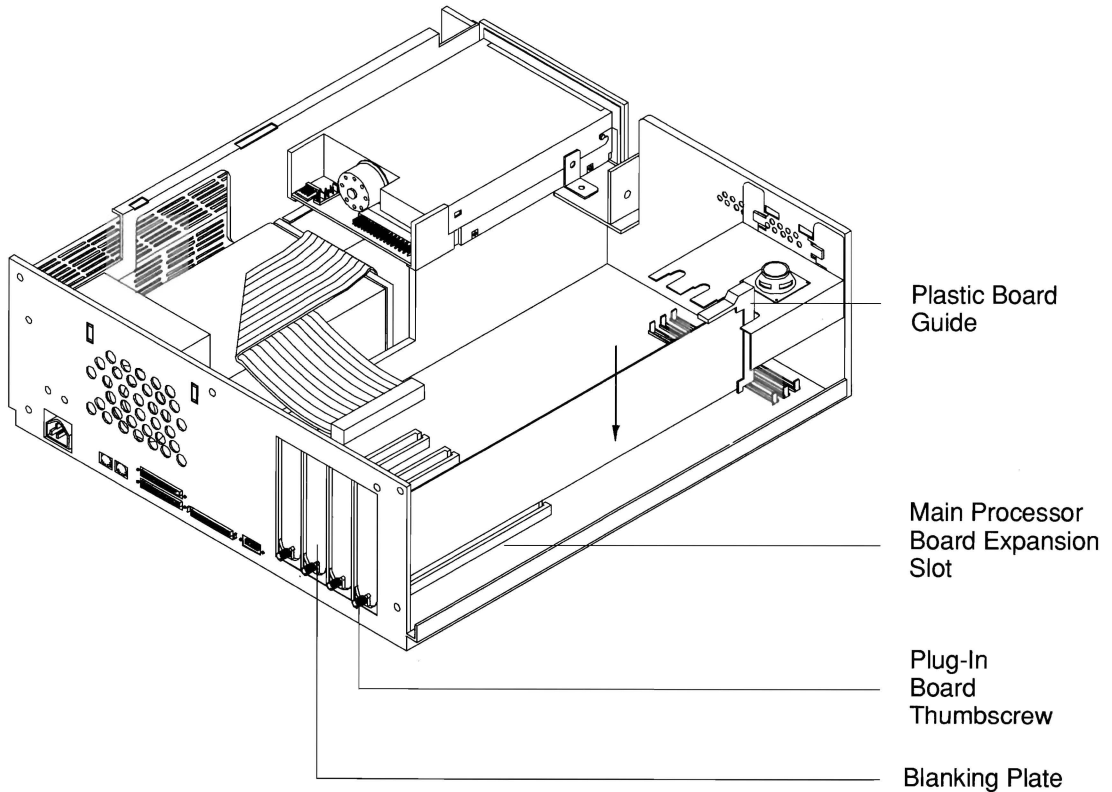
Installing Plug-In Boards

How to Remove a Plug-In Board

You may need to remove a plug-in board in order to install another option, replace the board, or add components. To remove a plug-in board, follow the steps listed below.

1. Read the warnings and cautions at the beginning of this chapter.

2. Make sure the computer power is off and the system is unplugged from an electric outlet.

3. Unlock the cabinet and loosen the back-panel thumbscrews that secure the cabinet top.

4. Slide the cabinet top forward and lift it away.

5. Loosen the thumbscrew holding the exit bracket to the back frame, if appropriate.

6. If there are cables connected from the board to any options, remove them. Note their relative positions before moving components.

7. Grasp the board by the plastic guide at each end and pull up so the data connector is no longer in the main processor board expansion slot.

8. Put the board away in the original packaging or an anti-static envelope to protect it.

9. If you have no more options to install, replace the cabinet top; fasten the thumbscrews; relock the cabinet; and reconnect the power cord.

10. Run the SETUP Automatic or Change Configuration utility
on the *Reference Diskette*. Refer to the section on "How to
Change the System Configuration" in Chapter 2.

Plastic Board
Guide

Main Processor
Board Expansion
Slot

Plug-In
Board
Thumbscrew

Blanking Plate
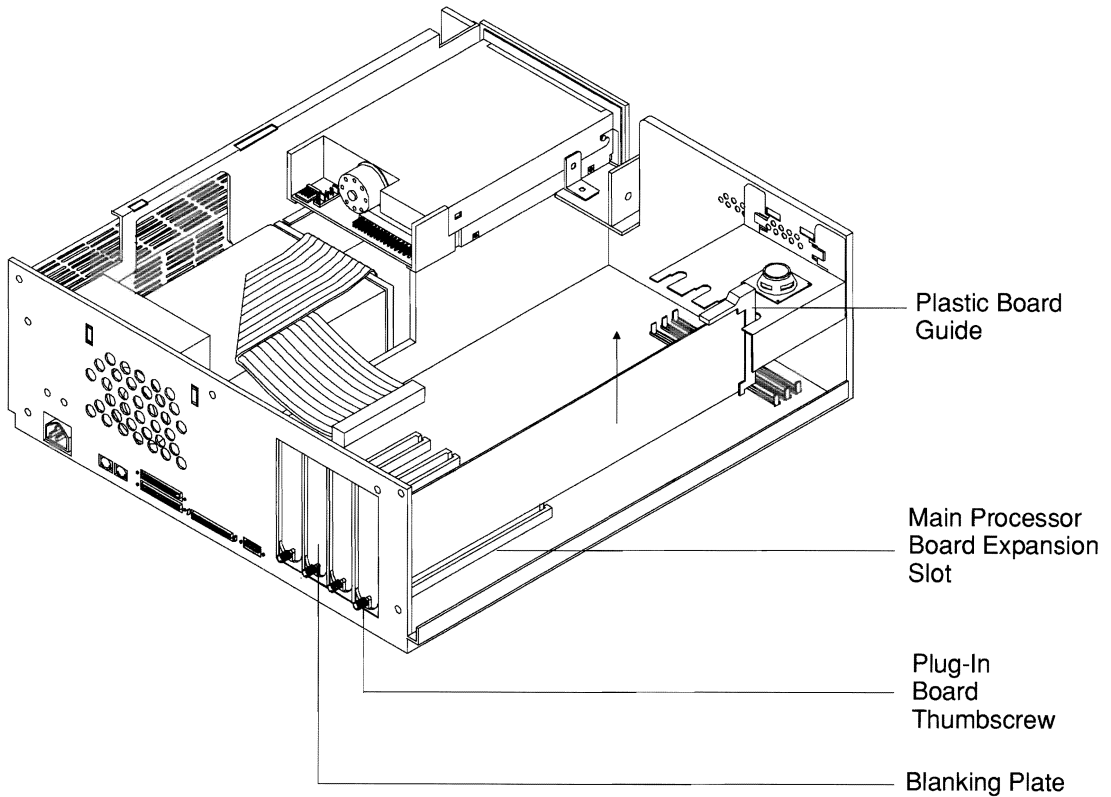
Removing a Board

Connecting Data Cables

In-line pin connectors connect option cables to the main processor board or plug-in adapter boards. To connect in-line pin connectors, follow the steps listed below.

1. Read the warnings and cautions at the beginning of this chapter.

2. Line up the pins on the main processor board or adapter board connector and the sockets on the data cable connector. Some pins or the connector housing may have been cut (keyed) to help with positioning.

3. Push the pins into the sockets. Make sure all pins fit securely in their holes.

4. If the data cable connects to a adapter board, install the adapter board according to the directions in "How to Install a Plug-In Board."
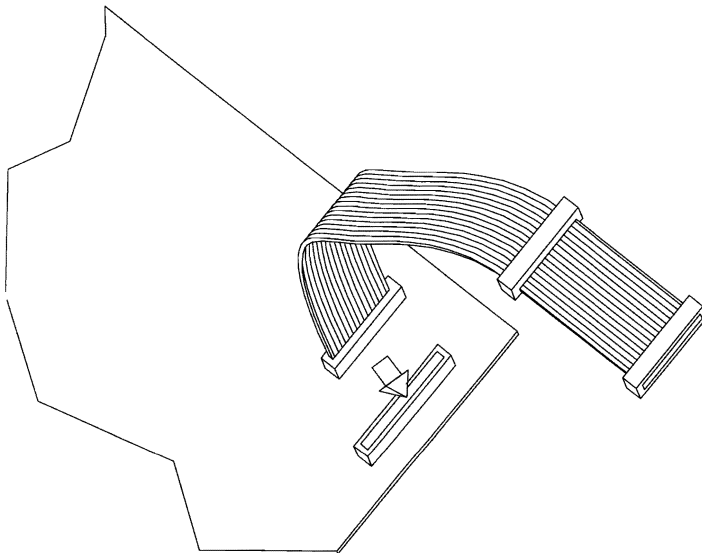
In-Line Pin Connector

Installing Upgrade Memory

The main processor board contains 2 MB of memory. You can add three random access memory (RAM) modules in 2 MB increments for a total of 8 MB.

To install the upgrade memory modules, follow the steps listed below.

1. Read the warnings and cautions at the beginning of this chapter.

2. Make sure the computer power is off and the system is unplugged from an electric outlet.

3. Unlock the cabinet and loosen the back-panel thumbscrews that secure the cabinet top.

4. Slide the cabinet top forward and lift it away.

5. Touch a metallic object to ground yourself before sliding the board out of its protective container.

6. Place the upgrade memory module(s) next to the computer. Leave the anti-static envelope(s) on the module(s) until you are ready to install them.

7. Remove any boards installed in the system Micro Channel expansion slots. Refer to the section of "Removing Plug-In Boards" for more information.

8. Remove the board-retaining bracket from the front of the computer.

9. Remove a memory module from the anti-static envelope and hold it by the edges. Place the first 2 MB upgrade memory module over the main processor board connector marked SIMM1.

   To position the module correctly, make sure the key is facing away from the power supply and the module connector is held at about an 70-degree angle to the main processor board connector. Rotate the module to a 90-degree angle while pushing it into place.

10. Install the second memory module in the connector marked SIMM2 and the third module in the connector marked SIMM3. Follow the instructions listed above to install these modules.

11. If you have no more options to install, replace the board-retaining bracket, adapter boards, and the cabinet top; fasten the thumbscrews; relock the cabinet; and reconnect the power cord.

12. Run the SETUP Automatic or Change Configuration utility on the *Reference Diskette*. Refer to the section on "How to Change the System Configuration" in Chapter 2.

Key

RAM Module

Socket

Main Processor Board
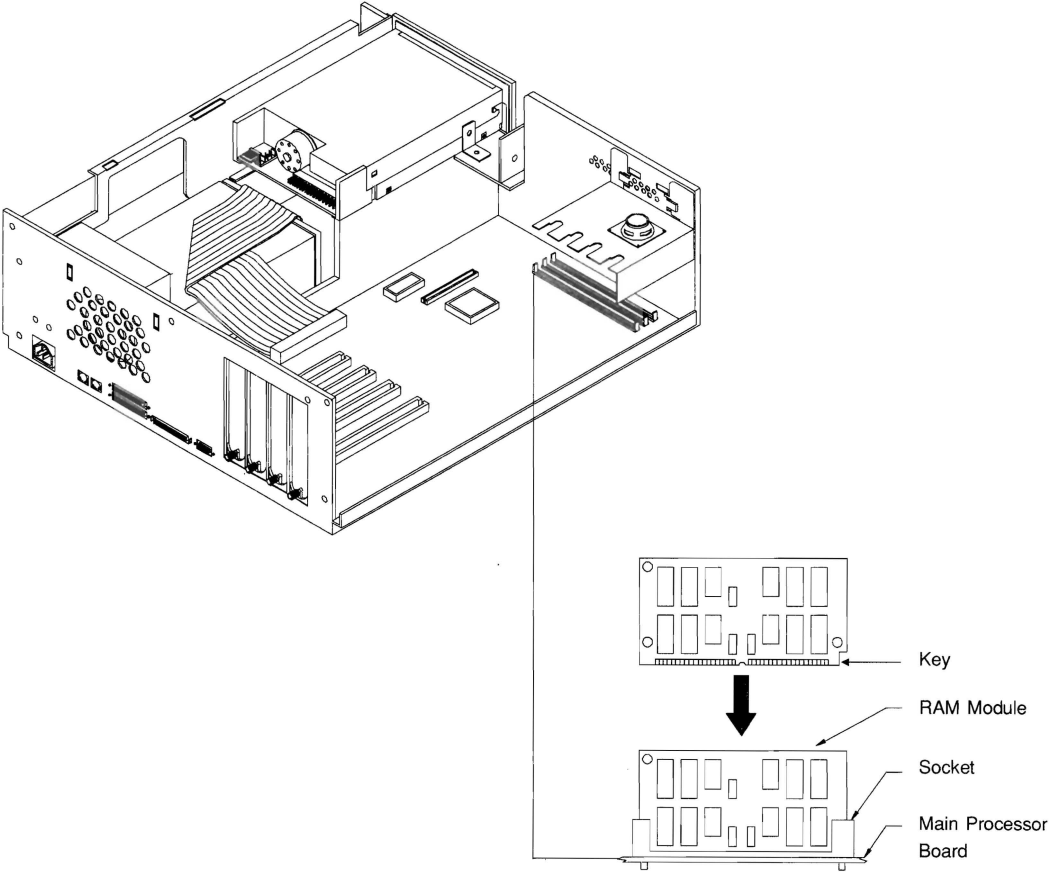
Installing Upgrade Memory Modules

Installing and Removing Drives

This section is divided into several subsections. Check at the beginning of each subsection for a note about whether it pertains to the type of drive you are installing.

How to Determine Drive Positions

☞ **NOTE**: Follow instructions in this section for all types of drives.

A flexible disk drive (drive A) is installed at the top right of the cabinet. There is a bay for another 3.5-inch drive directly below (bay 2) and one behind drive A (bay 3).

The chart on the facing page lists possible combinations of flexible and fixed disk drives and tape drives inside the computer and recommended locations. Before you work inside the computer, decide where to place the drive you are installing.

Additional SCSI devices can be installed outside the cabinet.

The physical drive positions shown on the facing page have no relation to the drive identification (ID) settings discussed in "How to Prepare the Drive."

Drive Combinations		
Drive Bay 1	Drive Bay 2	Drive Bay 3
Flex		—
Flex	Fixed	—
Flex	Flex	—
Flex	Flex	Fixed
Flex	—	Fixed
Flex	Tape	Fixed
Flex	Fixed	Fixed

Drive Bay 3

Drive Bay 1
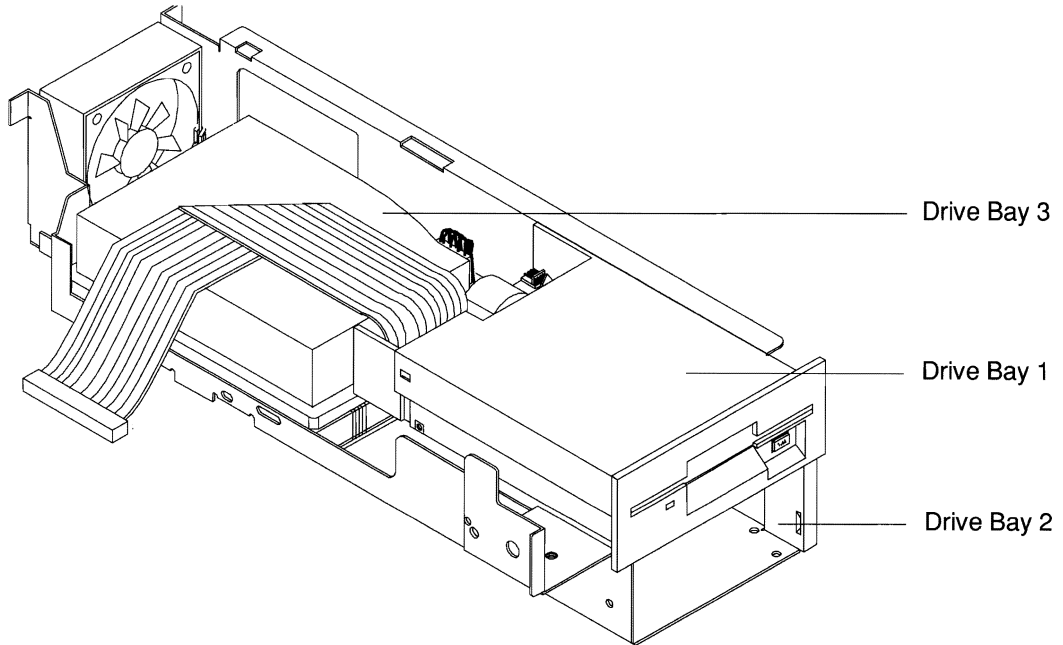
Drive Bay 2

Location of the Drive Bays

4-23

How to Prepare the Drive

Check the following settings before you install the drive.

- Drive-select jumper (also called the drive address or drive identification jumper)

- Terminating resistor(s) on SCSI drives

Flexible Disk Drives and Tape Drives

☞ **NOTE:** This section is for installation of a flexible disk drive or tape drive only. Skip this section if you are installing a fixed disk drive.

Before you read this section, make sure you have read the information under "Installing and Removing Drives."

Skip to "How to Prepare the Cabinet" when you complete this section.

Always set the jumper or switches at the second setting depending on the design of the drive.

- Drive Select 1 (DS1) if the settings start at DS0

- Drive Select 2 (DS2) if the settings start at DS1

The system automatically assigns the appropriate drive address for each flexible disk drive or tape drive according to the drive's position on the cable.

Refer to your drive documentation for specific information on the drive-select jumper location and procedures for setting jumpers on that drive. If you cannot position the jumper with your fingers, use a long-nose pliers or tweezers.

Factory-installed drives are already set on the correct drive-select jumpers.

EXAMPLE
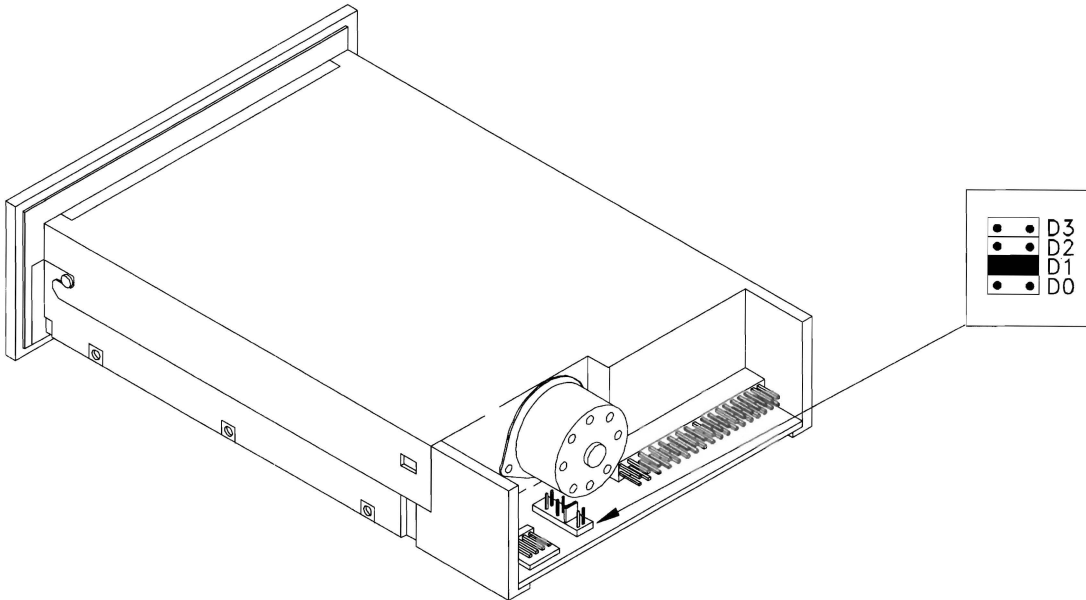
Example Flexible Disk Drive Address Location

SCSI drives

☞ **NOTE:** This section is for installation of a SCSI fixed disk
drive only. Skip this section if you are installing a flexible
disk drive or tape drive.

Before you read this section, make sure you have read the
information under "Installing and Removing Drives."

Follow directions in "How to Prepare the Cabinet" when you
complete this section.

Drive
Identification

This system can support two internal SCSI drives.

■ The factory sets the first fixed disk drive (drive C) in the
system to ID number 00. If you are replacing drive C, set the
new drive ID number to 00.

■ Assign the second SCSI drive ID number 06.

■ The SCSI adapter board in this system is assigned ID
number 07.

To set the drive ID number, position the jumpers on the drive ID
jumper block as shown in the illustration on the facing page.
The ID number is usually set according to the binary numbering
system.

Refer to your drive documentation for the location of the drive
ID jumper block and how to set jumpers on that particular
jumper block.

If you cannot position the jumper with your fingers, use a
long-nose pliers or tweezer.

EXAMPLE

	ID Number
	0 (First Device)
	1 (Second Device)
	2 (Third Device)
	3 (Fourth Device)
	4 (Fifth Device)
	5 (Sixth Device)
	6 (Seventh Device)
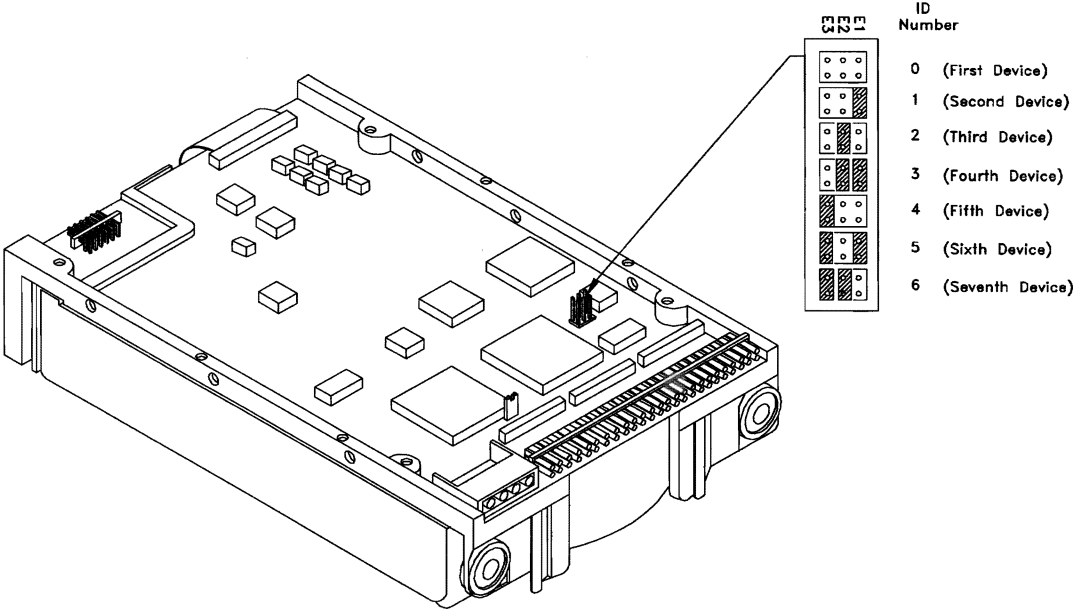
Example SCSI Drive Identification Jumper Location and Setting

Use the chart on the facing page to record the ID number you set for each SCSI device attached to your system.

The factory sets the SCSI controller to ID 07. You can change the ID number to 06 through the *Reference Diskette* Configuration Change utility.

The factory sets the first fixed disk ("boot") drive to 00. You can set the ID number of the "boot" drive from 00-06 through the Change utility. If you change the ID number through the software, also change the placement of ID jumpers on the drive to the new number.

Be sure no two SCSI devices are set to the same ID number.

You can also use the Change utility to designate the drive with the lowest ID as the "boot" drive or choose "no boot device" if the system has no fixed disk drive.

SCSI ID TABLE	
ID Number	Device
00	First Fixed Disk Drive
01	
02	
03	
04	
05	
06	
07	SCSI Controller

Terminating Resistor

The *last* drive on an internal or external SCSI cable *must have* terminating resistor(s) installed.

If more than one drive is attached to an internal or external SCSI cable, the drive attached to the *middle connector* must *not* have terminating resistor(s) installed.

If internal and external SCSI devices are attached to the computer, the *main processor board* must *not* have terminating resistors installed.

- If you replace the factory-installed drive only, leave the terminating resistor(s) on the new drive.

- If you leave the factory-installed drive in the same drive bay and add another disk drive, remove the terminating resistor(s) from the factory-installed drive and leave the terminating resistor(s) on the new drive.

- If there is no internal SCSI drive and you add an external disk drive, leave the terminating resistors on the main processor board and on the new drive.

- If there is an internal SCSI drive and you add an external disk drive, remove the terminating resistors from the main processor board and leave the terminating resistors on the last internal and external drives or devices.

The illustration shows which drives or devices require terminating resistor(s).

Refer to the documentation packaged with the drive or device for the location of its terminating resistor(s). Remove the terminating resistors with a long-nose pliers or tweezers. Save the terminating resistors in case you change the configuration of the SCSI devices in your system.

External SCSI
Data Cable

Last External SCSI Device —
Terminating Resistor Installed

R

No Termininating Resistors on
Main Processor Board

First Internal SCSI Device —
No Terminating Resistor Installed

R

Main Processor Board

Second Internal SCSI Device —
Terminating Resistor Installed

Internal SCSI Data
Cable
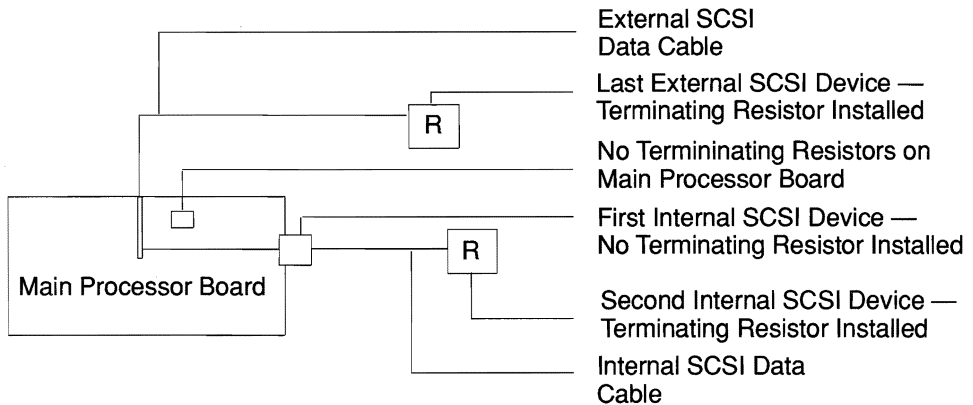
Internal and External Fixed Disk Drive Resistor Placement

Termininating Resistors on
Main Processor Board

First Internal SCSI Device —
No Terminating Resistor Installed

R

R

Main Processor Board

Second Internal SCSI Device —
Terminating Resistor Installed

Internal SCSI Data
Cable
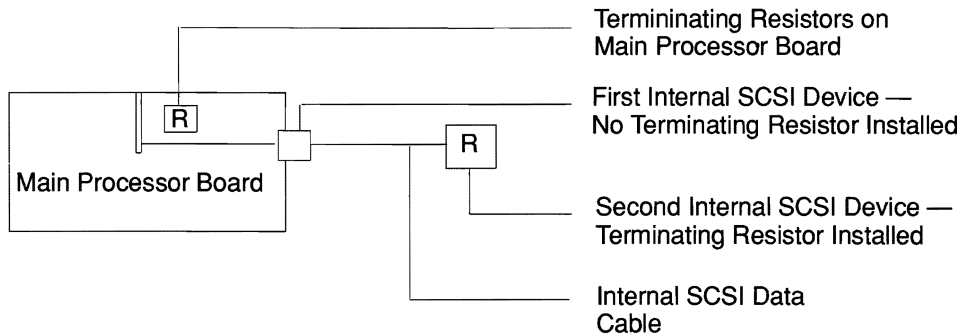
NOTE: Terminating resistors should be on only two devices in any
configuration. They should be installed on the devices on the extreme
ends of the SCSI cable. The main processor board is considered a SCSI
device.

Internal Fixed Disk Drive Resistor Placement

How to Prepare the Cabinet for Installation

☞ **NOTE:** Follow directions below to install any type of drive.

1. In the preparation section, you removed the cabinet cover.

2. Grasp the drive platform by the sides and lift it part way out of the cabinet. Rest it on top of the power supply.

3. Remove the power cable from connector J3 on the main processor board.

4. Detach the disk drive data cables from the main processor board.

5. Put the drive platform on the work surface next to the system.

Fixed Drive
Data Cable

Drive Platform
Side

Flexible Drive
Data
Connector

Drive Power
Cable
Connector

SCSI Fixed
Drive Connector
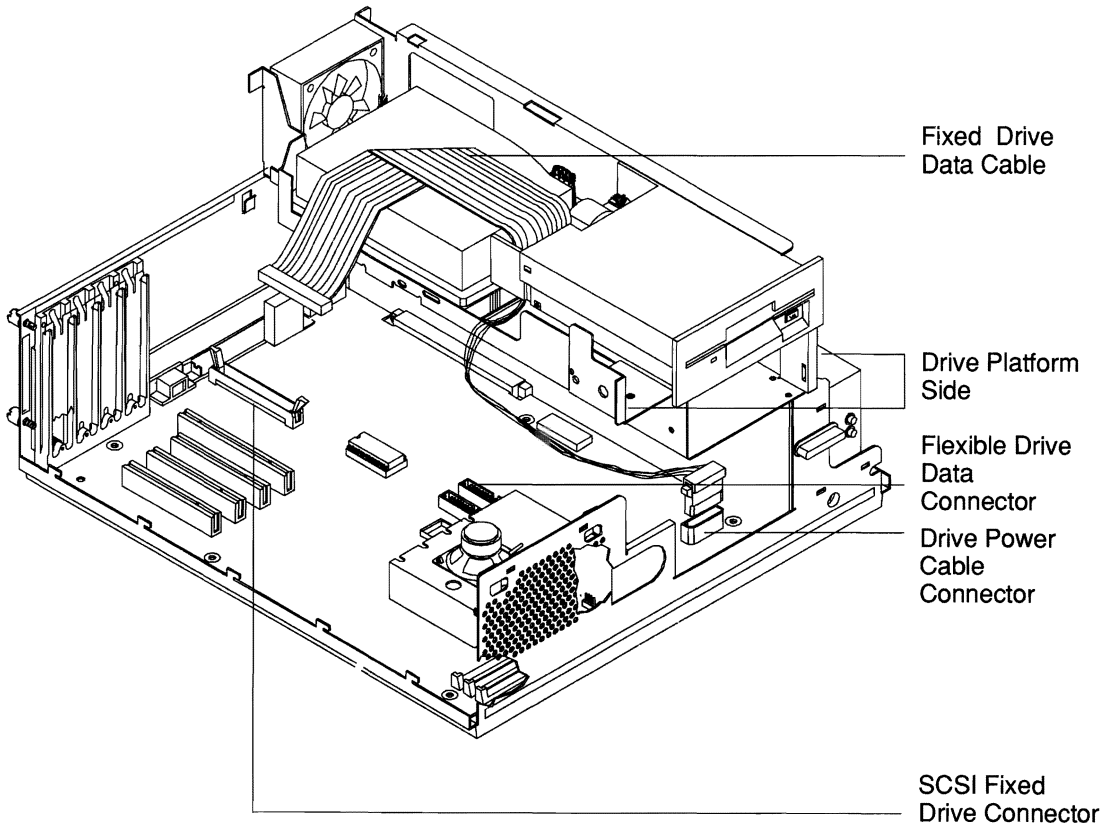
Placement of Disk Drive Cables

How to Position the Drive

Flexible Disk Drives and Tape Drives

    ☞   **NOTE:** If you are replacing or installing a flexible disk drive or tape drive, refer to the section below.

When you complete this section, go to the section on "How to Complete Installation."

Before you read this section, make sure you have read the information under "Installing and Removing Drives."

1. In the preparation section, you removed the cabinet cover, and placed the drive platform on the work surface. If you are replacing drive A, remove the existing flexible disk drive according to the instructions in "How to Remove a Drive."

2. Locate the following connectors on the drive you are installing. *Refer to the documentation delivered with the drive.*

   - Connector for the data cable

   - Connector for the power cable

3. If you are replacing drive A, put the new drive in drive bay 1. Rest the drive on the metal tabs that separate drive bay 1 from drive bay 2.

   If you are adding a drive, slide it through the front of the drive platform into drive bay 2.

4. The factory-delivered flexible disk drive data cable supports two flexible disk drives or a flexible disk drive and a tape drive. Attach the data cable to the data cable connector on the new disk drive. You may find it easier to turn the drive platform on its side to connect the cable to the drive. Be sure to hold the drive in place and turn the platform carefully. Return the platform to an upright position. Tighten the screws for the drives.

Fixed Drive
Power Cable
Connector

Flexible Drive
Power Cable
Connector

Drive Bay 3

Drive Bay 1

Drive Bay 2

Disk Drive
Power Cable
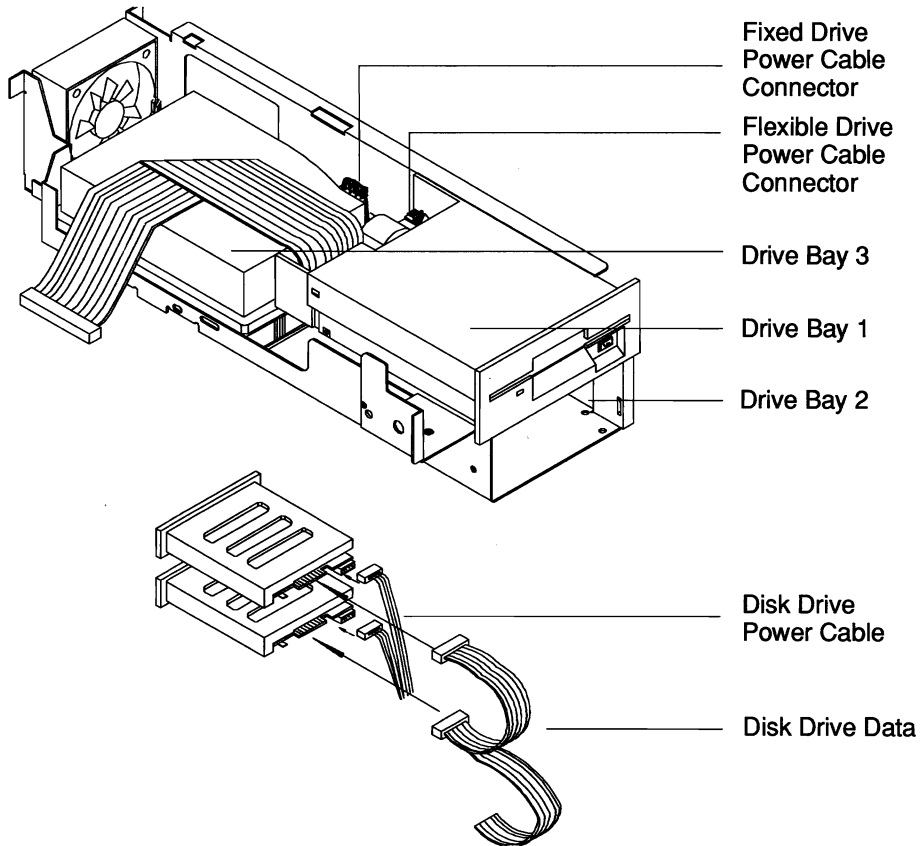
Disk Drive Data

Flexible Disk Drive Cables

SCSI Fixed Disk Drive

☞ **NOTE:** If you have a SCSI fixed disk drive, refer to the section below.

When you complete this section, go to the section on "How to Complete Installation."

You can add a SCSI fixed disk drive to your system or replace the existing drive.

1. In the preparation section, you removed the cabinet cover, and placed the drive platform on the work surface.

2. Locate the following connectors on the disk drive you are installing. *Refer to the documentation delivered with the drive.*

    ■ Connector for the data cable

    ■ Connector for the power cable

3. Remove the factory-installed 50-pin SCSI data cable from the installed drive. Put the cable aside.
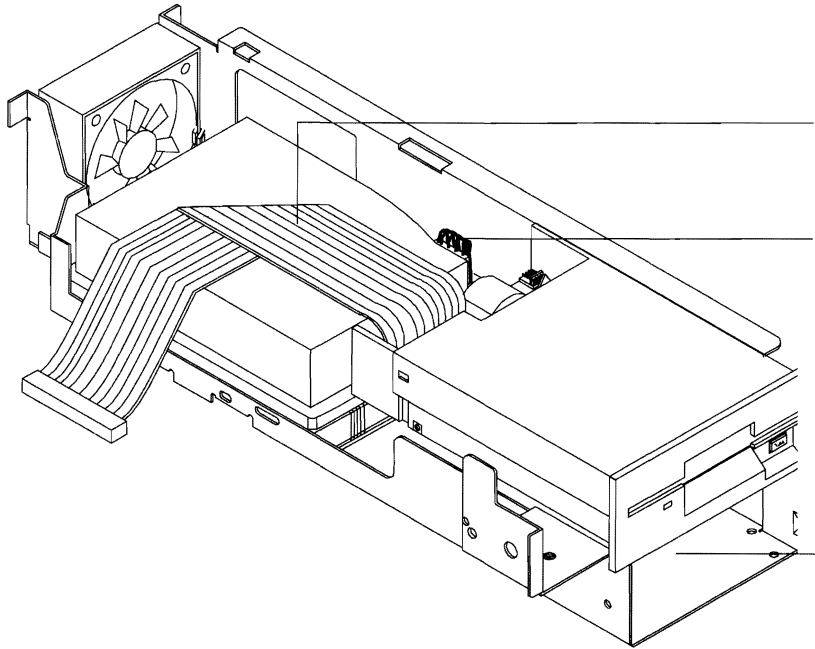
Fixed Disk Drive
Data Cable to
Controller Board

Fixed Disk Drive
Power Cable
Connector

Space for
Additional
Drive
(Fixed or Flex)

Positioning the SCSI Fixed Disk Drive

4. Position the drive in the cabinet. Make sure the drive circuit board is facing down. The data cable connector on a drive in drive bay 2 should face the back of the cabinet. The data cable connector on a drive in drive bay 3 should face the front of the cabinet.

- If you are adding a second SCSI drive, slide the drive into drive bay 2. Attach the middle connector on the new data cable with two drive connectors to the factory-installed fixed disk drive. Attach the connector on the end of the cable to the new drive placed in drive bay 2. Make sure you leave the terminating resistor(s) on the new drive. Remove the terminating resistors from the factory-installed fixed disk drive.

- If you want the new drive to be the first fixed disk drive, also called the "boot drive", replace the factory-installed drive in drive bay 3 with the new drive. Follow directions in "How to Remove a Drive". Place the factory-installed drive in drive bay 2. Attach the new drive, with terminating resistor(s) removed, to the middle connector on the drive cable. Install terminating resistor(s) on the factory-installed drive and connect it to the end connector on the new SCSI cable.

- If you are replacing the factory-installed fixed disk drive, remove it from drive bay 3. Follow directions in "How to Remove a Drive". Attach the new drive to the end connector on the factory-installed or new cable. Make sure the new drive has terminating resistor(s).

5. Rest the SCSI data cable on top of the drive and drive platform until the drive platform is positioned in the cabinet.

How to Complete Installation

☞ **NOTE:** Follow directions listed below for all types of drives.

1. Leave the drive platform on the work surface. Attach the four-wire power cable to any disk drive you installed or moved.

2. Align the holes on the side of the drive with the slots on the disk drive holder. Tighten the drive-retaining screws for the new disk drive. If you are replacing drive A, position the screwdriver through the hole in the boxed bracket as shown below. Screws for the new disk drive are packed in the drive kit.

Drive Retaining
Screws

Hole in Boxed
Bracket
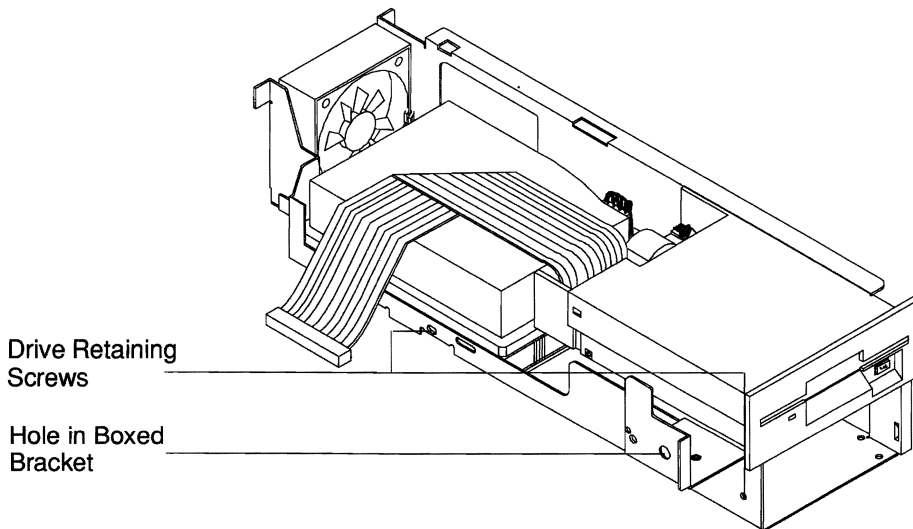
Drive Connectors and Drive-Retaining Screws

3. Place the drive platform on top of the power supply.

4. Attach the four-wire power cable to the drive power cable connector on the main processor board.

5. Attach the flexible and fixed disk drive data cables to their respective connectors on the main processor board. Match the keys on mating connectors.

6. Reposition the drive platform in the cabinet. Make sure the drive platform tabs engage the clips on the cabinet back panel. Make sure the tabs on the front of the drive platform are positioned on the outside of the cabinet front panel.

Back Panel
Clip

Rear Drive
Platform Tabs

SCSI Fixed
Drive Data
Cable

Front Drive
PlatformTab

Flex Drive
Connector

Drive Power
Cable
Connector

SCSI Fixed
Drive
Connector
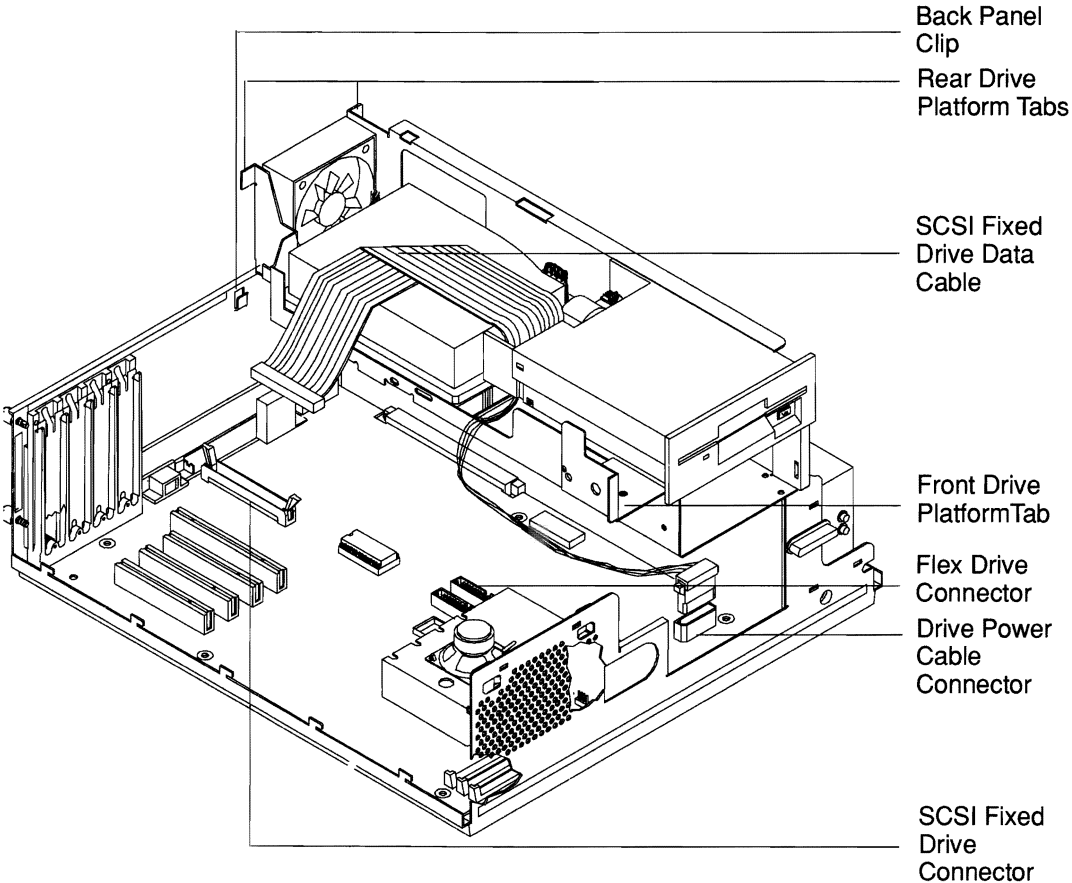
Replacing the Drive Platform

7. If you installed a second flexible disk drive or tape drive, push out the drive bay cover panel on the front panel of the computer. Place the cabinet top upside down on a table. Unsnap the part of the front panel with the hole for the power button. You may have to pry it loose with a screwdriver. Remove the drive bay cover and replace the end part of the panel.

Hole for Power Button
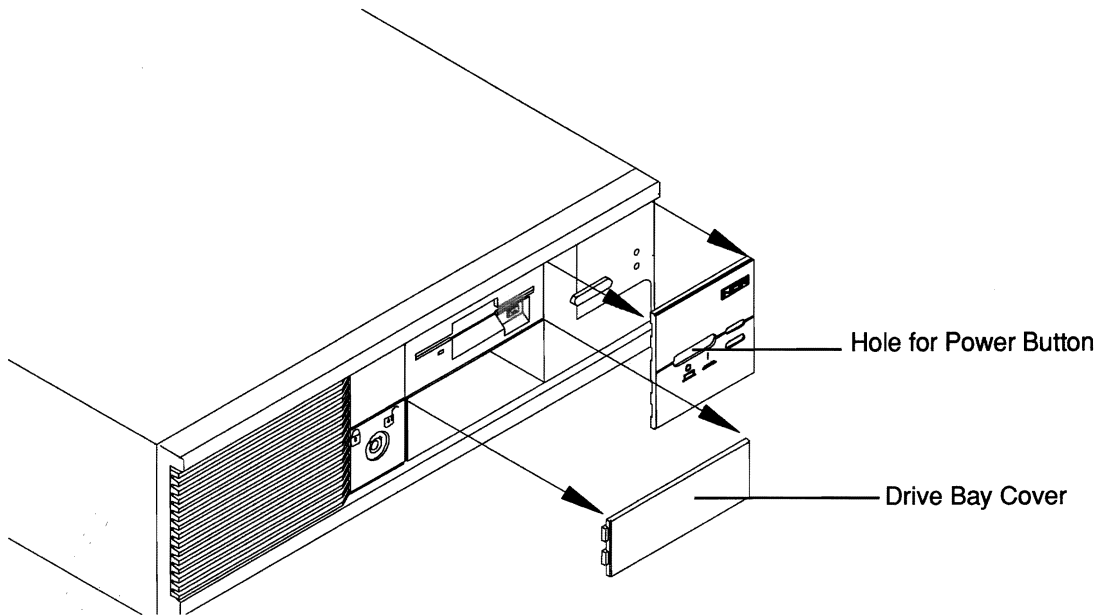
Drive Bay Cover

Removing the Drive Bay Cover

8. If you have no more options to install, replace the cabinet top; fasten the thumbscrews; relock the cabinet; and reconnect the power cord.

9. Run the SETUP Automatic or Change Configuration utility on the *Reference Diskette*. Refer to "How to Change the System Configuration" in Chapter 2.

10. Format the drive media, if necessary. Refer to your operating system documentation for how to prepare fixed disks for your system.

How to Remove a Drive

1. Read the warnings and cautions at the beginning of this chapter.

2. Make sure the computer power is off and the system is unplugged from an electric outlet.

3. Unlock the cabinet and loosen the back-panel thumbscrews that secure the cabinet top.

4. Slide the cabinet top forward and lift it away.

5. Lift the drive platform part way out of the cabinet. Rest it on top of the power supply.

6. Detach the flexible and fixed disk drive data cables from the main processor board.

7. Detach the power cable from the drive power cable connector on the main processor board. Refer to the illustration below for location of the connectors.

SCSI Fixed
Drive Data
Cable

Flex Drive
Connector

Drive Power
Cable
Connector

SCSI Fixed
Drive
Connector
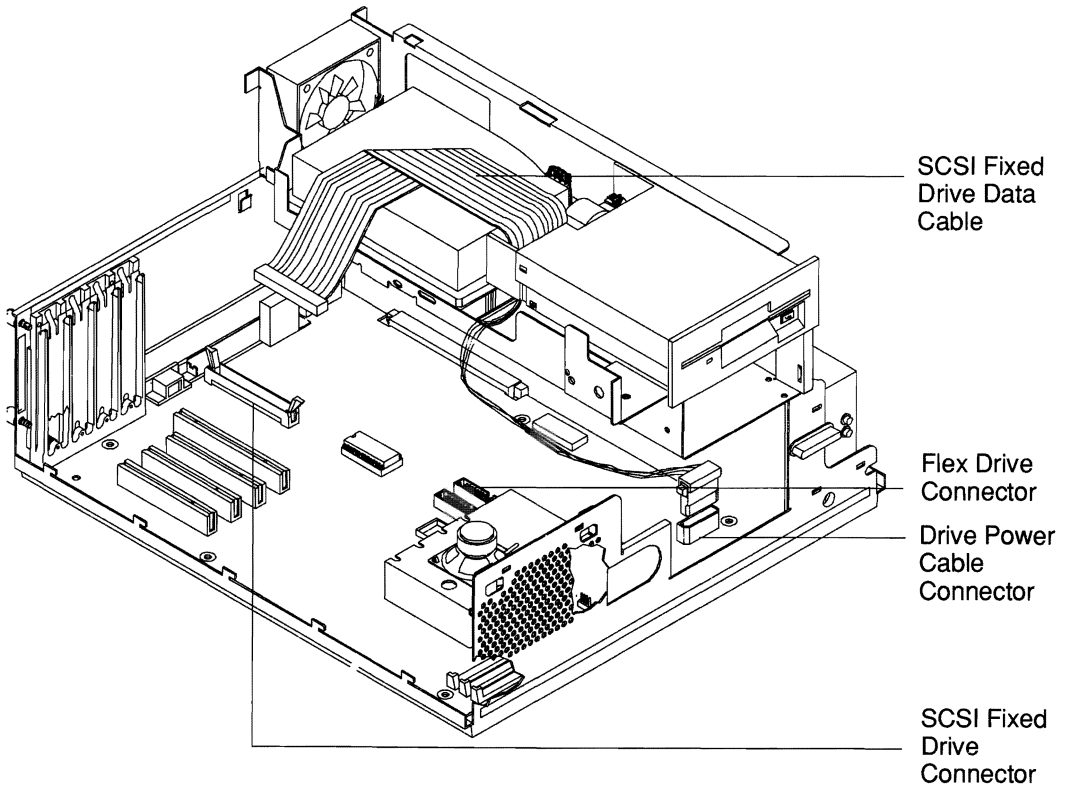
Location of Drive Cable Connectors

8. Put the drive platform on the work surface next to the system.

9. Disconnect the data cable from the drive you are removing.

10. Disconnect the power cable from the drive you are removing.

11. Remove the drive-retaining screws that go through the drive holder into the drive you are removing. If you are removing drive A, place the screwdriver through the hole in the box bracket into the drive-retaining screw. Refer to the illustration below for location of the hole and screw.

Fixed Drive Power
Cable Connector

Fixed Drive Data
Cable

Flex Drive Power
Cable Connector

Drive-Retaining Screw

Hole for Screwdriver
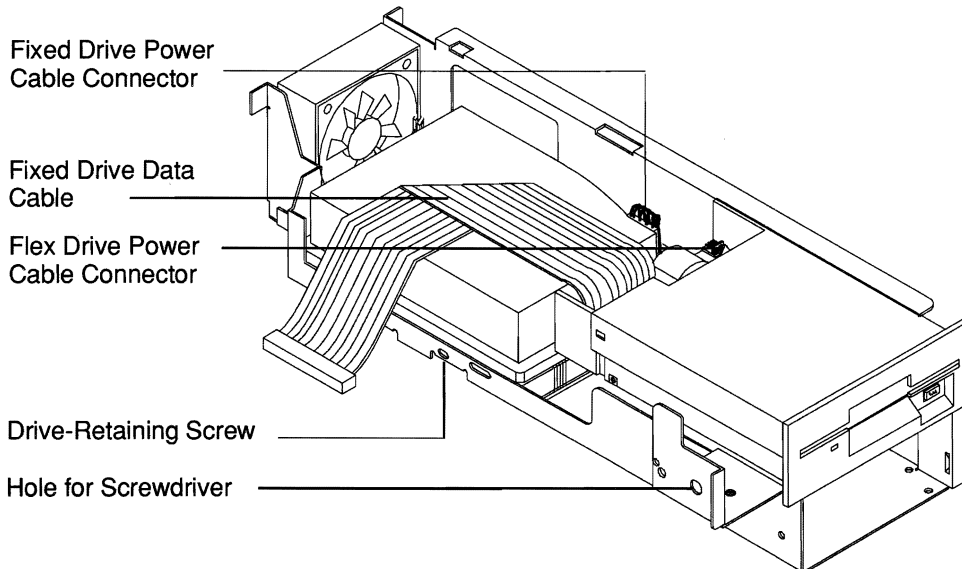
Cable Locations and Drive-Retaining Screw Access

12. Remove the drive from the drive platform. If you are replacing a drive, refer to the section "Installing a Drive."

13. Reposition the drive platform in the cabinet. Make sure the drive platform tabs engage the clips on the cabinet back panel. Make sure the tabs on the front of the drive platform are positioned on the outside of the cabinet front panel.

14. If you have no more options to install, replace the cabinet top; fasten the thumbscrews; relock the cabinet; and reconnect the power cord. Follow instructions in the "Opening and Closing the Cabinet" section of this chapter.

15. Run the SETUP Automatic or Change Configuration utility on the *Reference Diskette*. Refer to the section on "How to Change the System Configuration" in Chapter 2.

Appendix A Technical Data

Technical Data

DIMENSIONS	
Width	37.9cm (14.9 inches)
Depth	43.3cm (17 inches)
Height	15.0cm (5.9 inches)
Weight with one flexible disk drive and one fixed disk drive	10.7 kg (23.5lb)

AIRFLOW AND CIRCULATION CLEARANCES	
Sides	50.8mm (2 inches)
Top	25.4mm (1 inch)
Back	101.6mm (4 inches)
Bottom	6mm (.25 inches)

☞ **NOTE:** The computer should be installed so that, at a minimum, the front and the top or back side are free of all restrictions. Review

other installation environments with a site preparation specialist.

MAIN PROCESSOR BOARD	
Central Processing Unit	386SX-20 microprocessor
Coprocessor	387SX

Random Access Memory
    Standard
    Upgrade
	2 MB*
	4, 6, or 8 MB*

Real-Time Clock/CMOS RAM	4 KB **
DMA Channels	8

☞ **NOTES**:
* If an auxialiary device (mouse) is installed, it uses 1 KB of memory which cannot be used for applications.
** The 4 KB CMOS RAM memory cannot be used for applications.

ENVIRONMENTAL REQUIREMENTS		
Temperature Range	**Relative Humidity**	**Barometric Pressure**
Operating 10°C to 40°C (50°F to 104°F) with 10°C (18°F) change per hour **Derated** 3.3°C (5.9°F) per 1000 m (3280 ft) between 500m (1640 ft) and 3000m (9850 ft)	20% to 80% 10% change per hour	105 to 69000 Pascals up to 3002 m (9850 ft)
Storage -10°C to +50°C (14°F to 122°F) for three months 15°C (27°F) change per hour	10% to 90% with no condensation	Same
Transit -40°C to +60°C (-40°F to +140°F) 20°C (36°F) change per hour	5% to 95% with no condensation	Same

POWER REQUIREMENTS			
NOMINAL SOURCE VOLTAGE	**VOLTAGE RANGE**	**FREQUENCY RANGE**	**MAXIMUM CURRENT**
115 Vac (U.S.)	90 to 137 Vac	**47 to 63 Hz**	**4.0 Aac**
230 Vac (International)	180 to 265 Vac	**47 to 63 Hz**	**2.0 Aac**

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

STORAGE MEDIA AVAILABLE FROM THE MANUFACTURER	
Flexible Disk Drives	1.44 MB, 3.5-inch
Fixed Disk Drives	44 MB, 100 MB, 3.5-inch SCSI
Tape Drives	80 MB, 3.5-inch, flexible disk drive interface

I/O INTERFACES	
Type	Features
Serial	Male, 25-pin D-shell, RS 232-C
Parallel	Female, 25-pin D-shell, bi-directional, TTL
Keyboard and Auxiliary	6-pin,IBM PS/2-compatible, bi-directional, TTL
Flexible disk drive	34-pin industry-standard FDD interface, CMOS

SCSI
    Internal
    External
	50-pin single-ended interface
	    2x25 header unshielded
	    2x25 shielded D-Shell
	Fused termination power supplied

Keyboard and Auxiliary (Mouse) Connectors
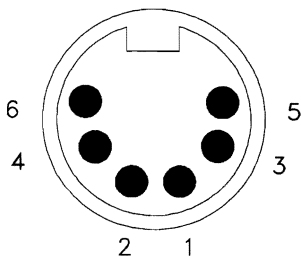
1	○	+DATA
2	○	RESERVED
3	○	GROUND
4	○	+5 Vdc
5	○	CLOCK
6	○	RESERVED

Parallel Port Connector

```
                           1 ◄───►14

           STROBE/    1  ○
         DATA BIT0    2  ○  ○14    AUTO FEED XT/
         DATA BIT1    3  ○  ○15    ERROR/
         DATA BIT2    4  ○  ○16    INIT/
         DATA BIT3    5  ○  ○17    SLCT IN/
         DATA BIT4    6  ○  ○18    GROUND
         DATA BIT5    7  ○  ○19    GROUND
         DATA BIT6    8  ○  ○20    GROUND
         DATA BIT7    9  ○  ○21    GROUND
             ACK/    10  ○  ○22    GROUND
             BUSY    11  ○  ○23    GROUND
               PE    12  ○  ○24    GROUND
             SLCT    13  ○  ○25    GROUND

                          13◄───►25
```

Serial Port Connector

```
                             1 ◄───►14

                NC    1  ○
     TRANSMIT DATA    2  ○  ○14    NC
      RECEIVE DATA    3  ○  ○15    NC
   REQUEST TO SEND    4  ○  ○16    NC
     CLEAR TO SEND    5  ○  ○17    NC
    DATA SET READY    6  ○  ○18    NC
     SIGNAL GROUND    7  ○  ○19    NC
    CARRIER DETECT    8  ○  ○20    DATA TERMINAL READY
                NC    9  ○  ○21    NC
                NC   10  ○  ○22    RING INDICATOR
                NC   11  ○  ○23    NC
                NC   12  ○  ○24    NC
                NC   13  ○  ○25    NC

                          13◄───►25
```

External SCSI Port Connector

```
              1 ◄──────► 26
    GND   │  1  ○ ○  26 │  DB0/
    GND   │  2  ○ ○  27 │  DB1/
    GND   │  3  ○ ○  28 │  DB2/
    GND   │  4  ○ ○  29 │  DB3/
    GND   │  5  ○ ○  30 │  DB4/
    GND   │  6  ○ ○  31 │  DB5/
    GND   │  7  ○ ○  32 │  DB6/
    GND   │  8  ○ ○  33 │  DB7/
    GND   │  9  ○ ○  34 │  DBP/
    GND   │ 10  ○ ○  35 │  GND
    GND   │ 11  ○ ○  36 │  GND
    OPEN  │ 12  ○ ○  37 │  OPEN
    OPEN  │ 13  ○ ○  38 │  TRMPWR
    OPEN  │ 14  ○ ○  39 │  OPEN
    GND   │ 15  ○ ○  40 │  GND
    GND   │ 16  ○ ○  41 │  ATN/
    GND   │ 17  ○ ○  42 │  GND
    GND   │ 18  ○ ○  43 │  BSY/
    GND   │ 19  ○ ○  44 │  ACK/
    GND   │ 20  ○ ○  45 │  RST/
    GND   │ 21  ○ ○  46 │  MSG/
    GND   │ 22  ○ ○  47 │  SEL/
    GND   │ 23  ○ ○  48 │  C/D/
    GND   │ 24  ○ ○  49 │  REQ/
    GND   │ 25  ○ ○  50 │  I/O/
             25 ◄──────► 50
```
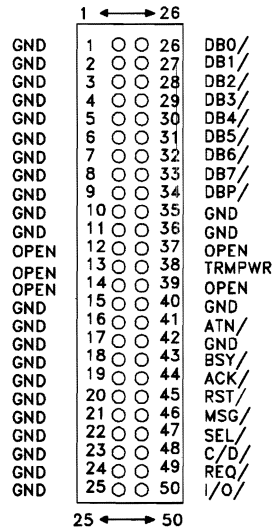
VGA Connector
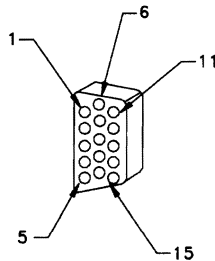
1 Red	6 Red RTN	11 Monitor ID 0
2 Green	7 Green RTN	12 Monitor ID 1
3 Blue	8 Blue RTN	13 Hsync
4 Reserved	9 Plug	14 Vsync
5 Digital Gnd	10 Digital Gnd	15 Reserved

A-7

Glossary

Glossary

386SX™

An Intel microprocessor which transmits 16 bits of data and processes 32 bits of data at a time. It operates in real, virtual real, and protected modes.

A

ac

Abbreviation for alternating current. It is usually measured in Hertz (Hz). The standard ac value in the U.S. is 120 volts (V) at 60 Hz. The standard international ac value is 240 V at 50 Hz.

acronym

A word formed from the first letter or letters of the words in a name, term, or phrase.

adapter

The interface between the computer main processor board and peripheral devices. The term also can be used to indicate a board which acts as an interface. It is also called a plug-in board, controller board, circuit board.

address

Each accessible location within a device is assigned a number, which is known as an address. 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 or diskette drives, the address may include a track number and a sector number. Your computer is able to locate data using these addresses.

alphanumeric

A character set that contains letters, numbers, and punctuation.

ampere

One ampere (amp) is the basic unit for measuring electrical current.

application program

A software program that performs a specific job; these programs include spreadsheets, data bases and word processors.

ASIC

Acronym for application specific integrated circuit. It is a computer chip designed to perform a specific function

autoexec.bat

An MS-DOS batch file that automatically executes a set of commands when you turn on the computer.

automatic head parking

A feature of some fixed disk drives. It automatically moves the drive read/write heads to an unused track when the computer is turned off. This is especially important when you are moving the computer since it reduces the chance of the head contacting the data area on the disk and damaging it.

B

back up

The process of copying data from one storage medium to another (i.e., diskette to diskette, or fixed disk to diskette) to prevent total information loss should the original record be lost or damaged.

bad sector

A disk sector that does not reliably hold data because of a problem with the disk or incorrect format parameters.

bad track table

Record of which tracks on the fixed disk are damaged and cannot hold data.

batch file

An MS-DOS file that contains a series of commands which execute automatically when the file is called up. The file must have a .BAT extension.

binary code

A system of numbering which uses only two values, zero and one. For example, the ASCII letter D is represented as 01000100.

BIOS

Acronym for the Basic Input-Output System. It controls the interaction of the main processor board and peripheral devices such as the disk drives, keyboard, and display.

bit (binary digit)

One unit of computer data represented by the characters 0 or 1. Bits are grouped to form bytes.

block

A physical unit of data that can be conveniently stored by a computer on an input or output device. The term is synonymous with physical record of information.

boot

To load an operating system program into the computer memory. You can cold-boot the computer by turning it on or warm-boot the computer by pressing the Ctrl-Alt-Del keys at the same time.

bootable

A disk that has been formatted and contains an operating system.

buffer

A part of memory which holds information until the computer or peripheral device is ready to process it.

byte

A group of bits which form a computer-readable unit which usually represents one character. In your computer, each byte consists of eight bits.

C

card

The term used to indicate a board which acts as an interface. Also called adapter, plug-in board, controller board, circuit board.

central processing unit (CPU)

The computer's CPU contains the memory, the arithmetic logic (ALU), and the input/output (I/O) control for the system.

CGA™

Color Graphics Adapter is a type of display adapter and a display. CGA supports monochrome, color, text, and graphic applications.

chip

An integrated circuit etched into the surface of a wafer, or chip, of silicon. Chips are usually placed in a plastic or ceramic carrier which has pins to make electrical connections with controller board circuits.

circuit

A complete electronic path.

circuit board

A card or board which contains printed circuits. The board is made of an insulating material and components are mounted and interconnected by the circuit conductors.

CMOS

Acronym for Complementary Metal Oxide Semiconductor. A type of chip that requires little power. In computers, this chip is often battery-powered and stores configuration data.

coding

The writing of a list of instructions which causes a computer to perform specified operations.

command

An instruction which tells the operating system what you want to do.

computer system

The equipment and instructions used as a unit to process data. It includes the central processing unit (CPU), operating system, and peripheral equipment and programs.

config.sys

A file that tells MS-DOS what parameters are required to run the system and loads programs called device drivers into memory. It operates as soon as the computer loads the operating system.

controller

A group of circuits etched into a board to send signals from the main processor board to a peripheral. The term also can be used to indicate a board which acts as an interface. Also called adapter, plug-in board, controller board, circuit board.

CPU

See central processing unit.

cursor

A moving, sliding, or blinking symbol on a display screen which indicates where the next character will appear.

crash

A malfunction that brings the system to a halt.

D

daisy chain

An adapter interface where the data passes from one peripheral device to another. Most disk drives are connected in daisy chain fashion.

data

Any information (letters, numbers, symbols) input to, or output from, the computer for storage or manipulation.

debug

To detect, trace, and eliminate mistakes in computer programs or in other software or hardware.

default

A value or option automatically selected by the computer program when none has been specified.

device driver

A program loaded into memory by the system configuration file, config.sys, so a particular device can work with the system.

diagnostics

Procedures used to identify and isolate problems within the computer or its peripherals.

directory

Names of files or groups of files stored on a fixed disk, flexible diskette, or tape cartridge.

disk drive

The physical unit that reads and writes data from and to a flexible diskette or fixed disk.

diskette

A thin, flat, round piece of flexible plastic which is coated with magnetic material and placed in a paper or plastic casing. Data is recorded and stored on diskette. Flexible disk, floppy disk, disk, flexible diskette, floppy diskette, floppy, mini disk are all common names used to refer to a removable diskette.

DMA

Abbreviation for Direct Memory Access. A circuit which provides high-speed transfer of data between a device and system memory.

DOS (MS-DOS)

Microsoft's Disk Operating System which allows the computer to store data and work with information in memory.

drive A

The flexible disk drive that holds the "boot" diskette.

E

edit

To rearrange, add, and delete data or programmer's code or change formats.

EGA™

Enhanced Graphic Adapter is both a type of display adapter and a display. EGA supports text, color, and graphic applications in varied resolutions. It can emulate previous graphics modes including CGA.

electronics

Pertaining to the application of that branch of science which deals with the motion, emission and behavior of currents of free electrons, especially in vacuum, gas or photo tubes and special conductors or semiconductors. Electronics is contrasted with electricity which pertains to the flow of large currents in wires only.

EPROM

Acronym for Erasable Programmable Read Only Memory. Data etched on an EPROM chip can be erased with ultraviolet light and reprogrammed with special equipment.

erase

To remove data from a medium, leaving the medium available for recording new data.

error message

A message which tells the user what type of error occurred.

extension

A one-, two-, or three-letter addition to an MS-DOS file name generally used to identify what type of data file it is.

F

file

A set of related records; the records in a file may be sequenced according to a key contained in each record.

file name

The name applied to a data file to identify it so that the computer can locate and recall it from a storage device. It can have up to 8 letters and a 3 letter extension.

fixed disk

Several thin, flat, circular pieces of rigid plastic or aluminum coated with a magnetic material for data storage. Fixed disks store more data than flexible diskettes and cannot be removed like flexible diskettes.

flexible diskette

A thin, flat, circular piece of flexible plastic coated with a magnetic material for data storage. Flexible diskettes can be removed from the drive.

formatted disk(ette)

A disk(ette) on which track and sector control information has been written by an operating system like MS-DOS.

function keys

Keys on the keyboard that can be programmed to perform specific functions.

H

hard disk

See fixed disk.

hardware

Physical equipment used in data processing. Used with software, it creates a complete computer system.

head

A device that reads, records, or erases data on a storage medium, e.g., a small electromagnet used to read, write, or erase data on a magnetic disk.

head parking

A procedure where the fixed disk drive read/write heads are moved to an unused track when the computer is turned off. This is especially important when you are moving the computer since it reduces the chance of the head contacting the data area on the disk and damaging it. Disks with automatic head parking do this automatically.

hexadecimal number

A whole number in the hexadecimal numeral system (using base 16 notation). A hexadecimal digit can be expressed as any one of sixteen different characters:
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, a, b, c, d, e, f.

I

illegal character

A character or combination of bits which is not accepted as a valid or known representation by the computer.

indicator

A device which registers a condition in the computer such as an LED which indicates that the power is on.

initialize

To set counters, switches, and addresses to zero or other starting values in a computer routine. Also, initialize refers to a method of preparing a fixed disk. See low-level format.

I/O

Abbreviation for input and output. Input is the data received by the CPU from devices connected to it. Output is data sent from the CPU to other devices.

interface

A common link between two or more electronic devices or software programs which enables them to transfer information.

interleave

To arrange a sequence of memory addresses or disk sectors to reduce access time. This allows the system to work efficiently.

interrupt

A mechanism in the computer for reporting changes in the states of hardware and software resources. These changes cause current processes to be interrupted so the system can give new assignments to meet work-load demands.

J

jumper

A small mechanical device used to connect/disconnect pairs of
pins on a printed circuit board. Jumper settings control specific
circuit board operations.

K

kilobyte (KB)

A kilobyte is 1024 bytes. It is commonly abbreviated as K, and
used as a suffix when describing memory size in computers.
Thus, 24K really means a 24 x 1024 = 24,576 byte memory
system.

L

language

A set of characters, conventions, and rules used to convey
information. COBOL, BASIC, and FORTRAN are some common
computer languages

light-emitting diode (LED)

An electronic device that can emit visible light. LEDs are often
used as indicator lamps.

load

To enter data or programs into storage or working registers of
the computer.

low-level format

A program that divides the tracks on the fixed disk into sectors. Low-level format sets the disk interleave factor and identifies tracks and sectors that are damaged and should not have data stored on them.

M

MB

See megabyte.

MCA

See Micro Channel™ Architecture.

MHz

See megahertz.

main processor board

A printed circuit board that contains the central processing unit and other key elements that form the basis of the computer.

medium

The material on which data is recorded for input into memory. This includes paper tape, diskettes, disks and magnetic tape. The plural is media.

megabyte

A unit of information storage. One megabyte equals 1,048,576 bytes.

megahertz

A measurement of cycles per second.

memory

Any device which stores data until needed. In a digital computer, this can include Random Access Memory (RAM) and Read-Only Memory (ROM) chips or magnetic storage media (disks and tapes).

memory caching

A method of copying the most recently used information into fast memory chips for quick access by the CPU.

menu

A list of possible functions the computer can perform or programs the computer can use. Menu items can be selected by using the arrow keys, a mouse, or another pointing device.

Micro Channel™

A computer system expansion bus which provides improved reliability, performance, and ease of option installation.

microprocessor

A central processing unit (CPU) placed on a single chip.

module

A self-contained unit that can be integrated into a system.

multitasking

The ability to run several programs at once.

O

operating system

A software program which controls the overall operation of a computer. It is available to the computer at all times from a fixed or flexible disk drive.

operation

An action specified by a computer instruction or high level language statement.

OS/2 (MS-OS/2)

An operating system developed by Microsoft that supports simultaneous use of multiple programs.

output

Data transferred from a computer's internal storage unit to some storage or output device.

P

parallel port

A connector for the data cable of an external device using parallel data transmission. Typically, a printer or plotter uses the parallel port.

park

A program that sets the read/write head on the fixed disk drive to an unused cylinder so it won't damage data when the computer is moved.

password

A unique string of characters that a program, computer operator, or user must supply to meet security requirements before gaining access to data.

peripheral

A device which is separate from the computer but works with it, such as a printer, keyboard, or disk drive.

pixel

The smallest unit of video display that is accessible by computer software.

POS

See Programmable Option Select.

power-on self-test (POST)

A series of diagnostic tests the computer runs to check that basic components are working properly.

processor

A device or system capable of manipulating data; e.g., CPU (hardware) or compiler (software). A compiler is sometimes referred to as a language processor.

processor frequency

The speed at which the processor runs. Normally, the higher the frequency, the faster the computer processes data.

program

A set of sequenced instructions that direct a computer to perform particular operations.

Programmable Option Select

A method of configuring computer hardware in which hardware switches and jumpers are replaced by programmable registers controlled by system firmware and software.

R

RAM

See Random Access Memory.

Random Access Memory.

The type of internal memory of a computer in which data can be written to, read from, erased, or stored in any order. RAM is maintained by electrical current and makes up much of the internal memory.

Read Only Memory

Non-erasable, permanently programmed memory used to store I/O drivers, interpreters, or special application functions. It is not possible to write into ROM memory.

Reference Diskette

A flexible diskette containing all files required to set up the computer and customize it for specific options.

register

A storage area in the central processing unit which holds data of a specified size and intended for a special purpose.

restore

Procedure used to recover data from a storage device such as a tape cartridge and transfer it back to the disk from which it was originally copied.

ROM

See Read-Only Memory.

root directory

The main directory of a fixed disk or flexible diskette. It is created by formatting the disk(ette).

routine

A set of machine instructions for carrying out a specific processing operation. Sometimes used as a synonym for program.

S

scroll

To roll lines up or down a display screen to review text or information. Most screens display 25 lines at a time; scrolling is useful in viewing large files of information.

SCSI

See Small Computer System Interface.

sector

A section of one track on a disk surface.

serial port

A connector for the data cable of an external device using serial data transmission. Typically, a printer or modem uses the serial port.

Small Computer System Interface

A high performance interface that distributes data among peripherals independent of the computer. SCSI permits efficient use of the computer.

software

Programs that control the operation of the computer. Software programs are read into the computer memory from diskette.

source diskette

A diskette that holds information to be copied to another (target) diskette.

storage capacity

The amount of data a storage device can hold. Frequently defined in terms of computer words, bytes, or characters.

strapping

Setting switches or jumpers to enable or disable certain system features.

streaming tape drive

A tape drive which backs up information as quickly as the fixed disk can transmit it. It is also called a streamer tape drive.

subdirectory

A directory for programs stored inside another directory.

system

See computer system.

system prompt

The symbol that appears on the display screen to show that the computer is waiting for an action from the user.

T

target diskette

A diskette that receives data copied from the source diskette.

tracks

A series of concentric magnetic rings on a disk or diskette. Data can be be written to or read from the tracks by the read-write head.

U

update

To incorporate new data into a file.

utility routines

Software used to perform some frequently required process in the operation of a computer system.

V

variable

A quantity that can assume any of a given set of values.

verify

To determine whether an operation has been accomplished accurately or to check if data is valid.

VGA™

Video Graphics Array is both a type of display adapter and a display. It is an analog display which supports text, color, and graphic applications in a variety of resolutions.

W

write

The process of copying data from the computer to a storage or output device.

write-inhibit tab

Tape or tab which covers the write-enable notch on a diskette to prevent changing the data already on the diskette.

write-protect

A form of memory protection where a computer program can read data from any area in memory or on a flexible diskette but cannot record data on the protected area.

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