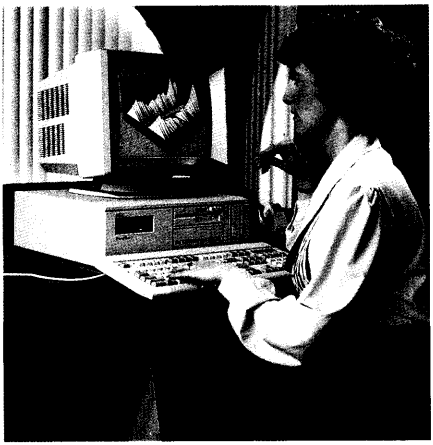
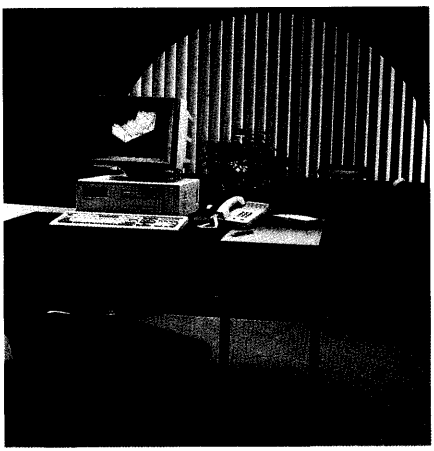
APC IV PowerMate 1™
Owner's Guide





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(2) The policy of NEC being that of continuous product improvement, the contents of this manual are subject to change, from time to time, without notice.

(3) All efforts have been made to ensure that the contents of this manual are correct; however, should any errors be detected, NEC would greatly appreciate being informed.

(4) NEC can assume no responsibility for errors in this manual or their consequences.

First Printing—February 1987

NEC Corporation
Tokyo,JAPAN

Printed in Japan.

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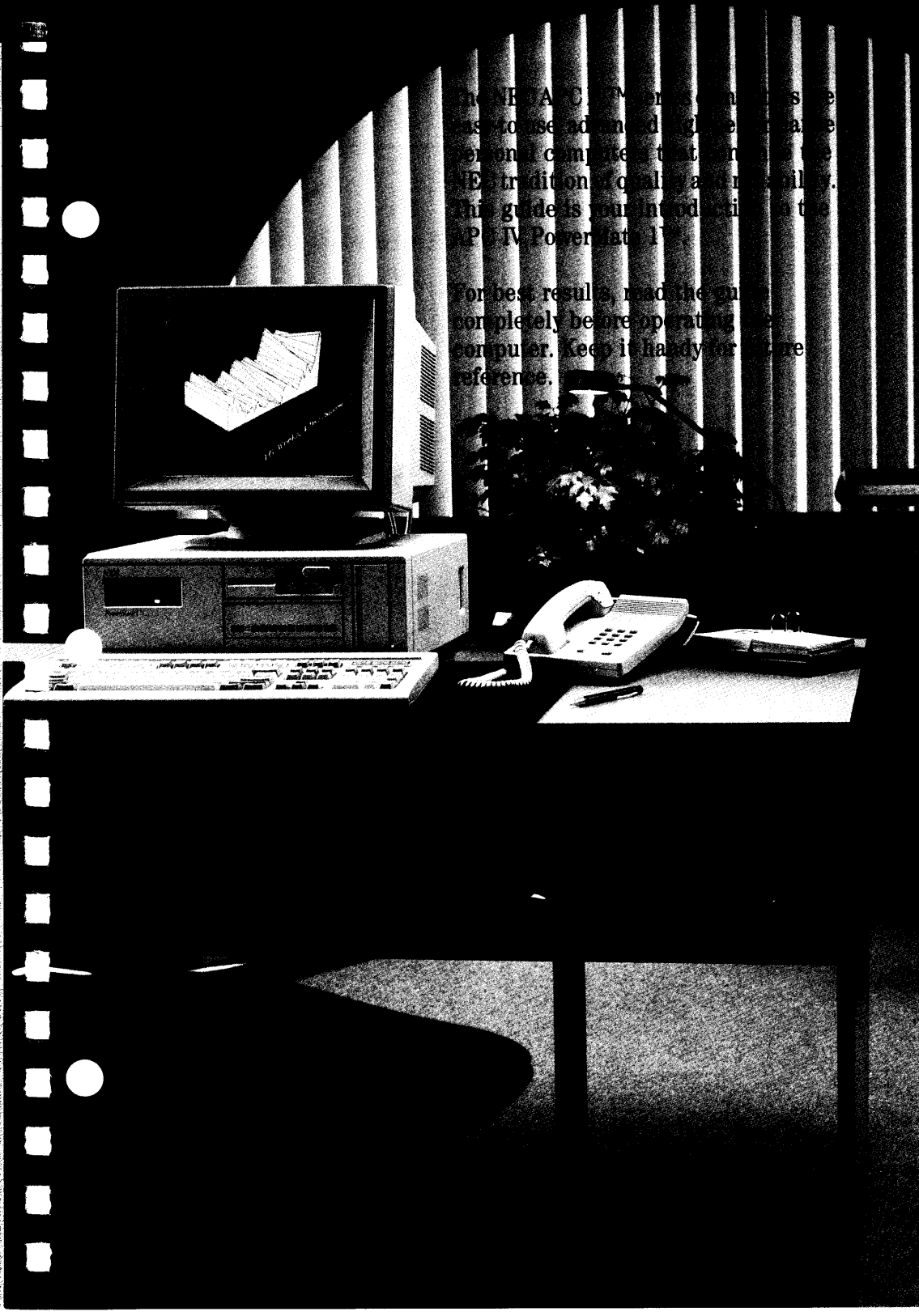
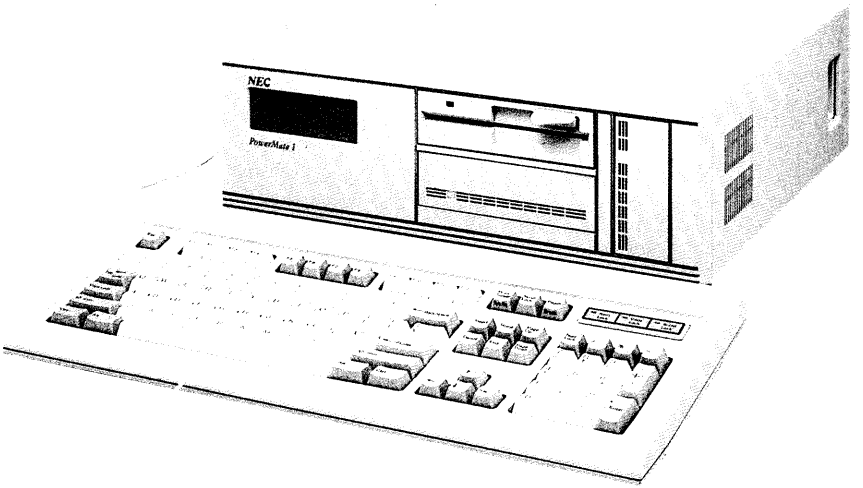


System Components

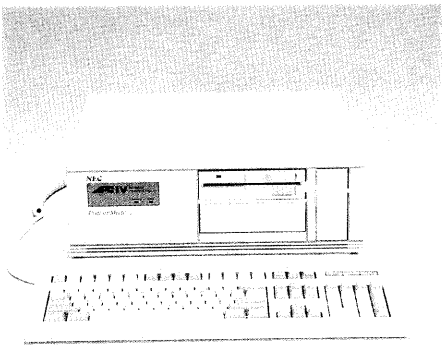
The APC IV PowerMate 1 has four models, all of which have the same two basic components.

SYSTEM UNIT



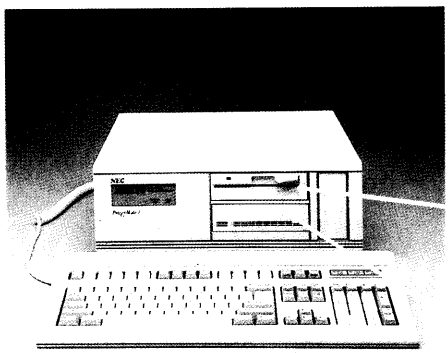
KEYBOARD

The four models differ in the type and the number of magnetic storage devices in the system unit.



The APC-H2000 has a single 5¼-inch 1.2 megabyte (MB) high capacity diskette drive.

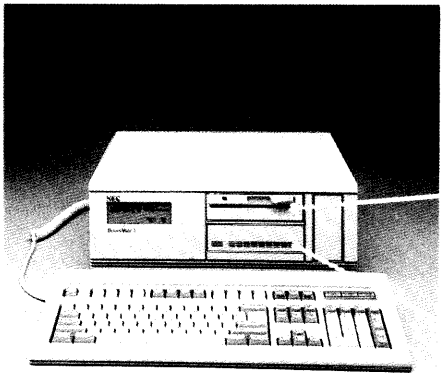
1.2 MB HIGH CAPACITY
DISKETTE DRIVE



The APC-H2010 has a single 5¼-inch 1.2 MB high capacity diskette drive and a 5¼-inch 40 MB hard disk.

1.2 MB HIGH CAPACITY
DISKETTE DRIVE

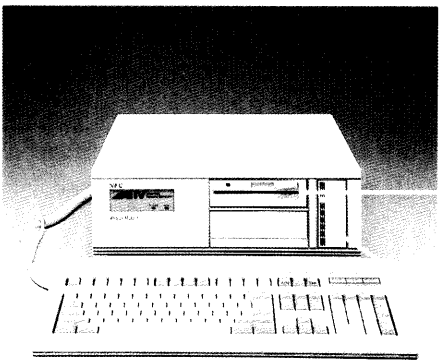
40 MB HARD DISK



The APC-H2020 has a single 5¼-inch 1.2 MB high capacity diskette drive and a 5¼-inch 20 MB hard disk.

1.2 MB HIGH CAPACITY DISKETTE DRIVE

20 MB HARD DISK

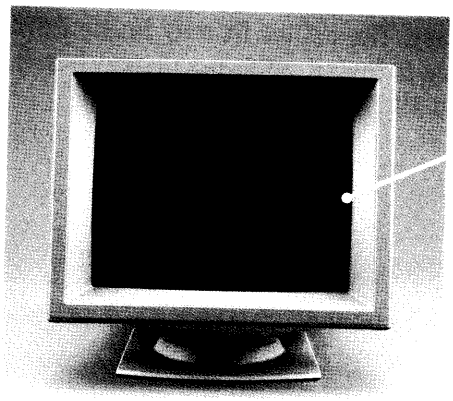


The APC-H2030 has a single 5¼-inch 1.2 MB high capacity diskette drive and a 3½-inch 20 MB hard disk.

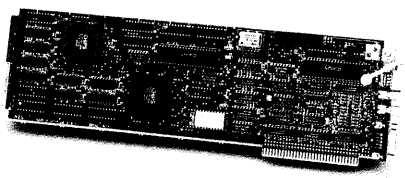
1.2 MB HIGH CAPACITY DISKETTE DRIVE

20 MB HARD DISK (3½-INCH)

Your PowerMate 1 requires only the following hardware options.



DISPLAY



DISPLAY BOARD

The display board allows for the attachment of a display. This board is installed inside the system unit.

You can add other options, such as a printer, or an additional disk drive, to expand your PowerMate 1. The APC IV series supports a wide variety of NEC and industry-standard options to suit your particular requirements. Refer to "Expansion Options."

Setting Up

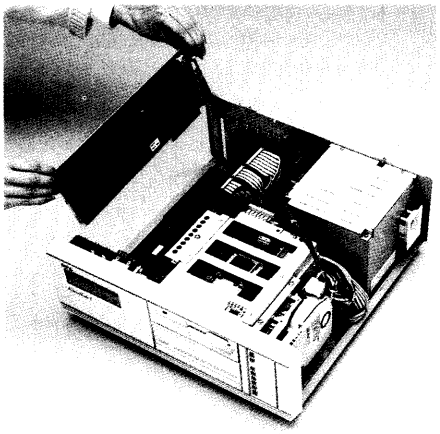
Setting up your PowerMate 1 consists of attaching the keyboard and the display to the system unit. This is easy. The cables fit only in the right places. You may also have other options to install, such as a display board. Easy-to-follow instructions come with all NEC options.

First some considerations...

- The system unit weighs about 30 pounds. You may need another person to help you unpack and move it.
- Save the shipping cartons and packing materials for shipping or moving the PowerMate 1.
- Set up where there is plenty of air circulation. Avoid blocking the ventilation holes in the system unit and display.
- Keep the PowerMate 1 away from excessively warm surroundings, direct sunlight, excessive dust, vibration, shock, or moisture.
- Place the PowerMate 1 away from any devices, such as electric motors or transformers, that generate magnetic fields.

Then...

Place the system unit on a flat, sturdy surface, such as a desk or table, so you can get at the front and rear of the unit.

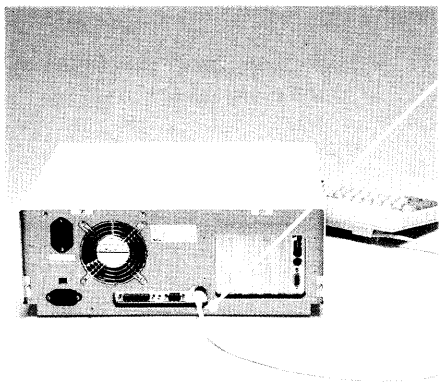


If you have an option that needs to be installed inside the system unit, such as a display board, install it now.

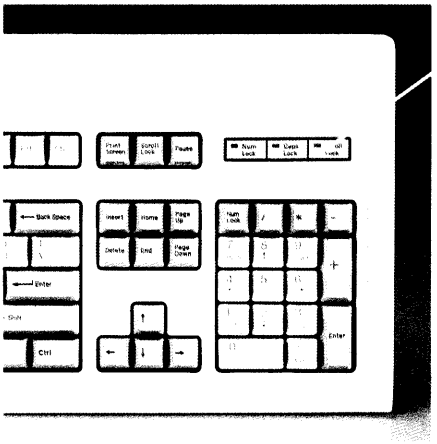
Be sure to follow the instructions that come with the option.

If your instructions do not include procedures for the removal and replacement of the system unit cover, see "Cover Removal and Replacement."

If you install a monochrome display board, the system unit's Display Type switch must be set to OFF (see "Checking Switch Settings").

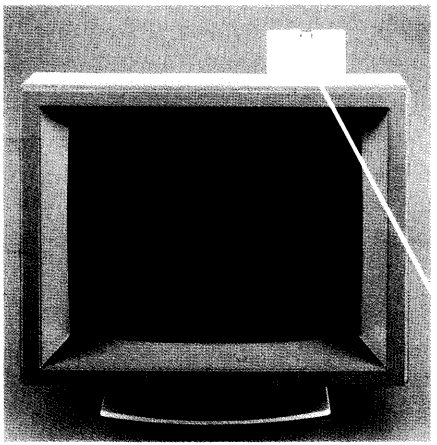


Plug the keyboard into the system unit at the keyboard connector.



If your keyboard has a protective adhesive strip covering the status lamps, remove it.

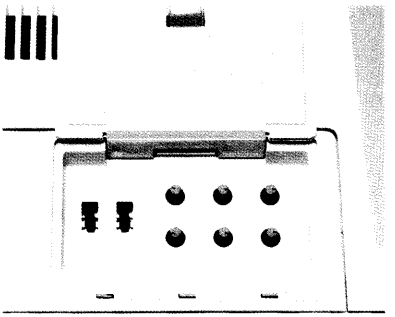
Attach your display to the system unit.

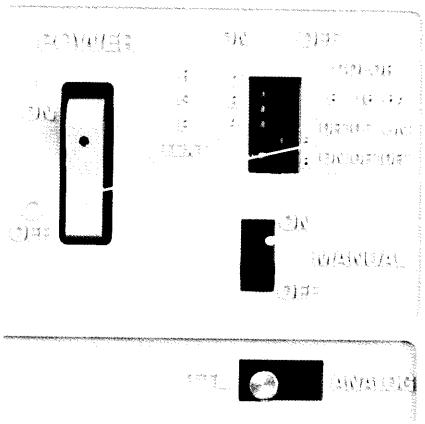


If you have an NEC Advanced Color Display(APC-H431x), connect it as follows. Otherwise follow the instructions that come with your display and then go to step 5.

- Make sure that the following switches are set as shown.

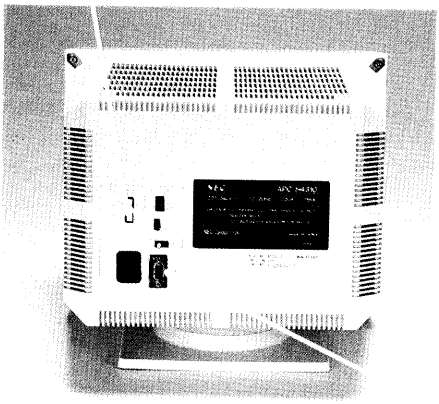
  H.WIDTH switch to **OFF**.





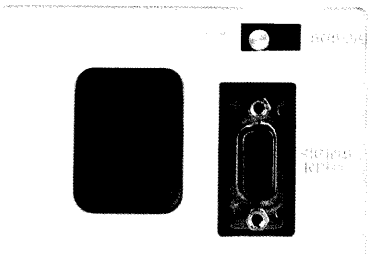
POWER switch to **OFF**.

MANUAL switch to **OFF**.

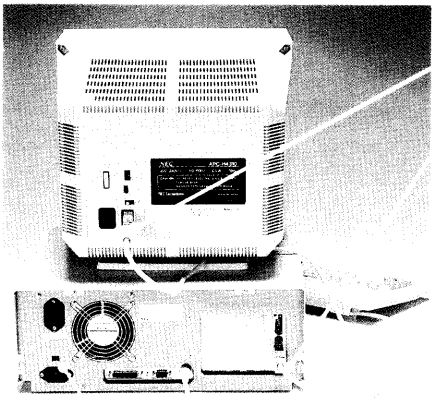


- Make sure that the **TTL/ANALOG** switch on the rear of the display is set correctly for your display board.

  For NEC's Color Graphics Board (APC-H4400) and Advanced Graphics Board (APC-H4410), set the **TTL/ANALOG** switch to **TTL**.

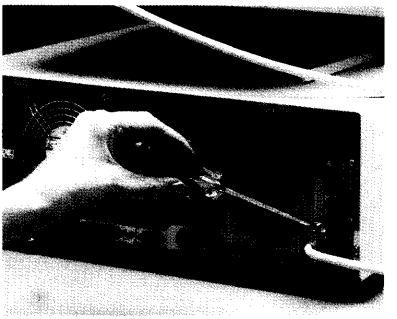


For other boards, see the instructions that come with the board or ask your dealer.



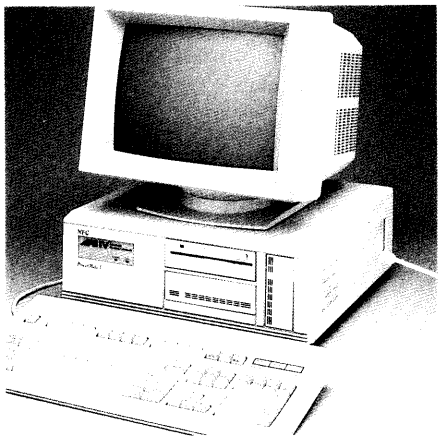
- Plug the display signal cable into the display and into the display board connector.

  Secure the display and board connections with the screws provided.

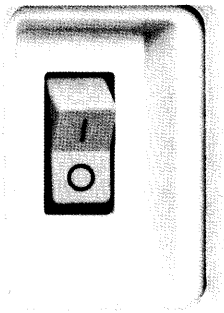


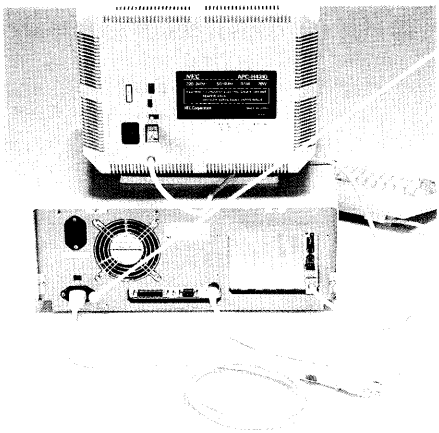
Check that the 115/230 V power supply switch is set correctly.

The correct setting is **230 V.**

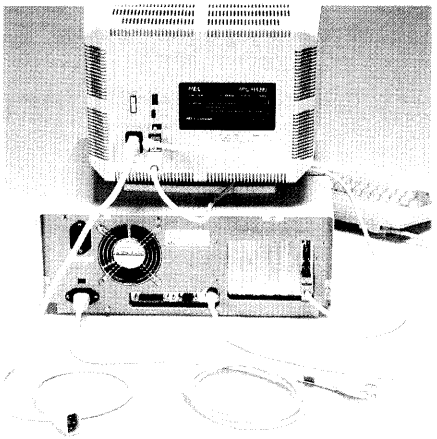


Be sure that the system unit's power switch is in the **0** (off) position.



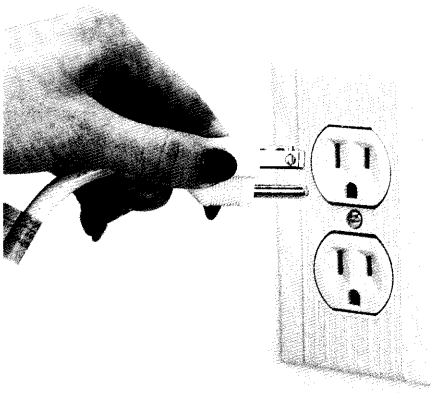


Plug the system unit power cord into the system unit.



If your display has a detachable power cord, connect the power cord to the display.

ADVANCED COLOR DISPLAY
POWER CORD



Plug the display power cord in the outlet of the system unit.
Plug the system unit power cord into a properly grounded wall outlet.

The PowerMate 1 system unit and Advanced Color Display come with approved, three-pronged safety cords. To ensure your safety, do not alter these cords.

Be sure to plug the power cords into a properly grounded wall outlet.

If you have expansion options, a printer, or other peripheral, now is a good time to set them up. Be sure to follow the instructions that came with your expansion options and the instructions in the next sections for setting up peripherals.

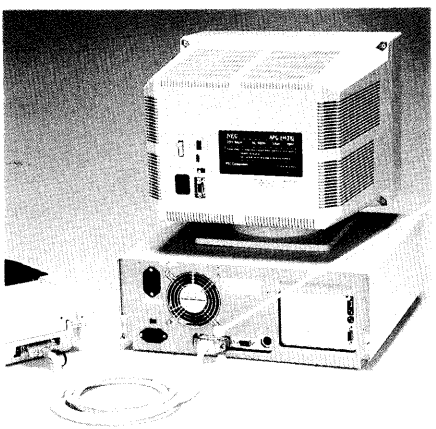
After you have set up all of your options, or if you don't have any options to install, go to "Your First Program."

Connecting a Printer

Use the following steps to connect a parallel printer to your system unit. If you have a serial printer, see the next section "Connecting an RS-232C Device."

Before connecting a printer to the system unit, be sure that you have set up the printer correctly. Follow the setup instructions that come with the printer.

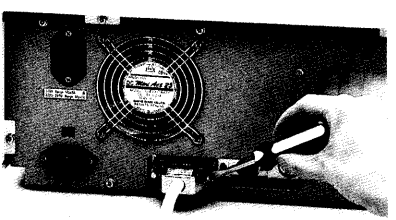
Turn off and unplug the system unit and any external option connected to the system unit.

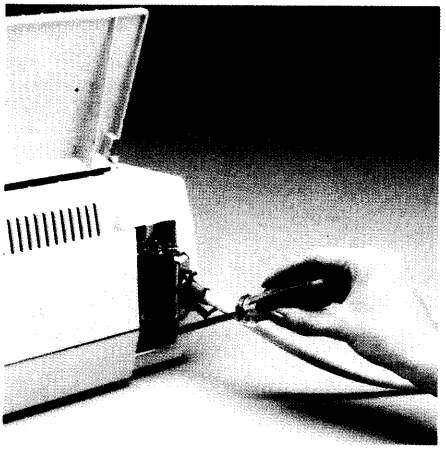


Make sure that your printer power is off and the power cord is unplugged.

Connect the printer cable to the system unit printer port and to your printer. Secure the cable as follows.

- Secure the system unit connection with the screws provided.





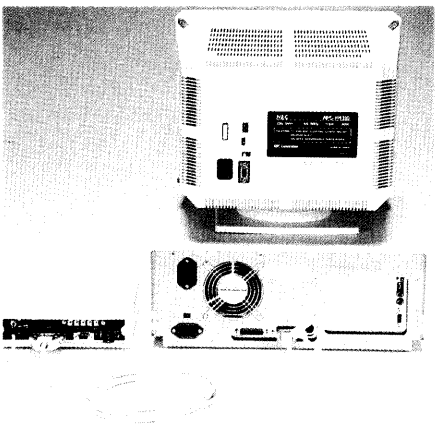
- Lock the connector to the printer with the connector clips.
- Attach the ground wire to your printer's ground screw.

Connecting an RS-232C Device

Use the following steps to connect a modem, a serial printer, or any other RS-232C device to your system unit.

Before connecting your RS-232C device to the system unit, be sure that you have set up the device correctly. Follow the instructions that come with the option.

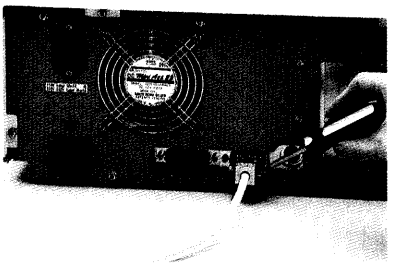
Turn off and unplug the system unit and any external option connected to the system unit.

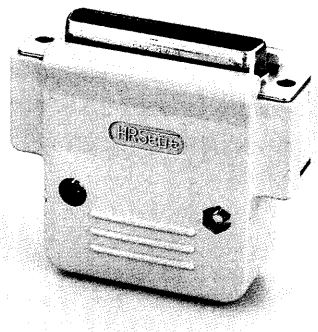


Check that any power to the RS-232C device is turned off and the power cable is unplugged.

Connect your RS-232C cable to the system unit RS-232C port and to the device.

Use the screws provided to secure the connections.

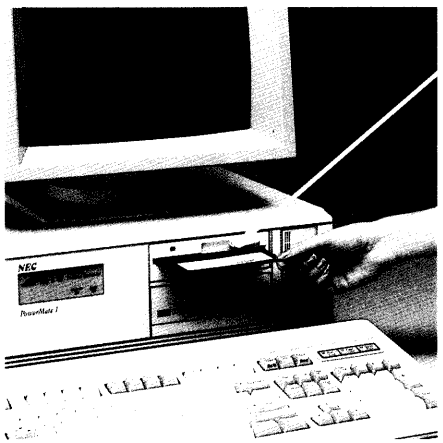




A loopback connector comes with your RS-232C cable. This connector is used only when testing the operation of your RS-232C port.

Your First Program

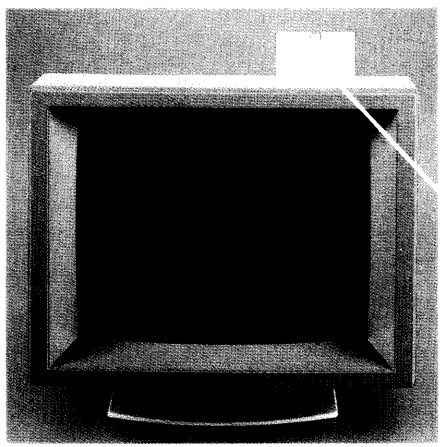
After setting up all of your system's hardware, you must prepare the PowerMate 1 for use. The MS-DOS® System Diskette that is supplied with your PowerMate 1 contains the necessary software to boot-up or start the PowerMate 1 and to prepare the system. Use the following procedure to get started.



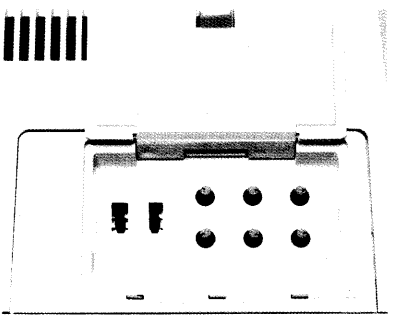
Raise the load lever and remove the shipping blank from the diskette drive.

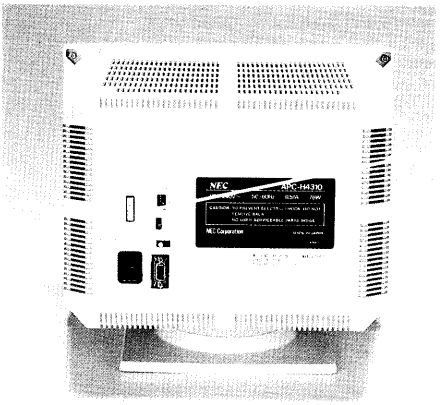
Store the shipping blank.

Replace the shipping blank whenever you pack or move the system unit.



If you have an NEC Advanced Color Display, set the **TEXT** switch to **OFF**.

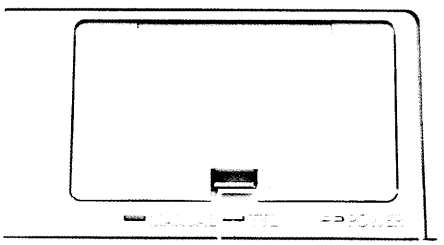




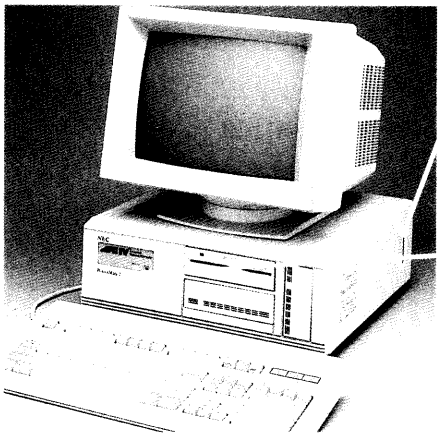
Turn on the display.

POWER SWITCH

Advanced Color Display

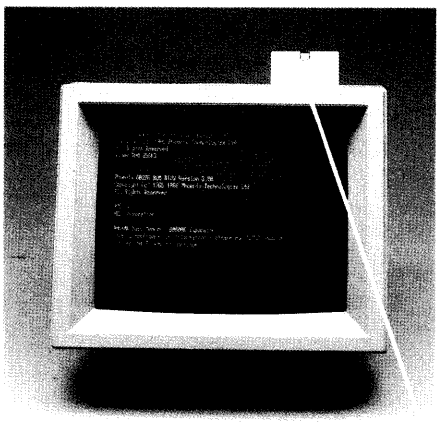


If you have an Advanced Color Display, the display's **POWER** lamp lights. The **TTL** lamp lights when the **TTL/ ANALOG** switch is set to **TTL**.



Turn on the system unit.

The system unit's **POWER** lamp lights.



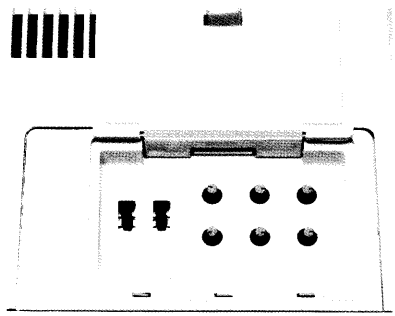
The system's power-on screen appears.

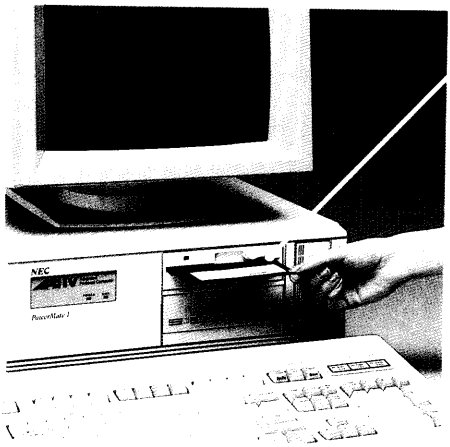
One or two beeps indicate that the system has completed its power-on self-test.

If intermittent beeping occurs, turn off the system unit and try again. If the beeping persists, call your NEC dealer.

Adjust the contrast and brightness controls on your display.

Advanced Color Display

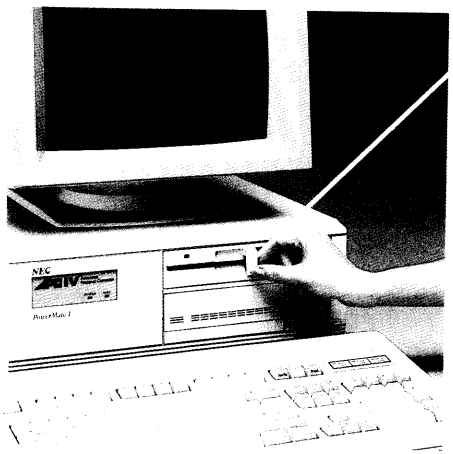




Locate your MS-DOS System Diskette. Remove the diskette from its envelope.

Holding the diskette at its top edge, insert it, label side up, into drive A.

You will feel resistance when the diskette is almost fully inserted. Gently push the diskette past the resistance until you hear a click.



Lower the drive load lever.

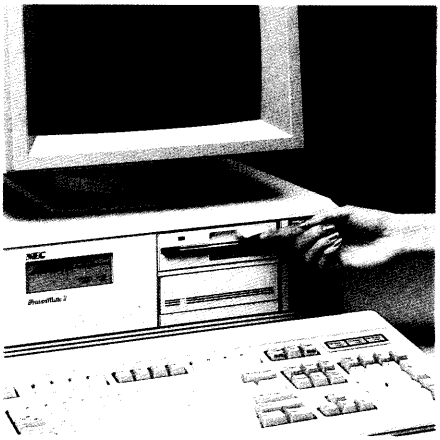
Press **F1** to load the program into system memory. The busy lamp on the front of the drive will light.

It is normal for the drive to make a clicking sound while the program loads. Program loading takes about ten seconds. One or two beeps indicate that the program is loaded.

The program's Entry menu appears, indicating the completion of your system's booting routine.

If anything does not work as described, see "If You Have a Problem" in this guide. After boot-up, go to your *MS-DOS for the APC IV Series* guide for instructions on how to run the program.

When you are through running the program, perform the following steps to shut down the system.



Remove the diskette from the drive by moving the load lever up. A spring mechanism ejects the diskette.

Turn off the system unit and the display.

CAUTION To avoid damage to diskettes, never remove a diskette from a drive when the busy lamp is on. Always remove all diskettes before turning off the system unit.

Any time you install or remove an expansion option from the system unit, you must run the Setup program on the MS-DOS System Diskette.

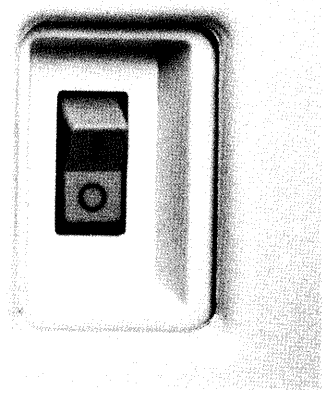
Features and Controls

SYSTEM UNIT

DISKETTE DRIVE BUSY LAMP
Indicates when a drive is reading or writing to a diskette.

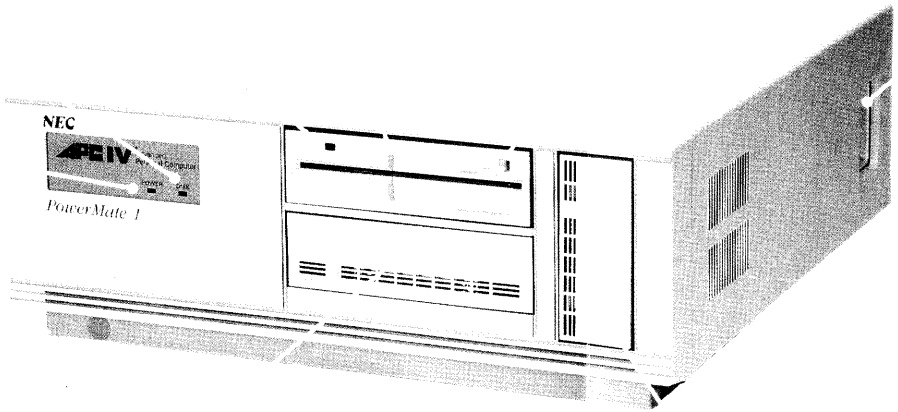
DISKETTE DRIVE A
1.2 MB high capacity diskette drive.

DISKETTE DRIVE LEVER
Locks diskette into drive.



DISK BUSY LAMP (Red)
Indicates when a hard disk is performing a read or write operation.

POWER LAMP (Green)
Indicates power on.



POWER SWITCH
Press **1** to turn on the power.
Press **0** to turn off the power.

5¼-INCH HARD DISK 1/
OPTIONAL 5¼-INCH DISKETTE DRIVE B
40 MB hard disk (in APC-H2010), or 20 MB hard disk (in APC-H2020), or blank panel on APC-H2000 and APC-H2030 with a slot for any of the following optional kits:

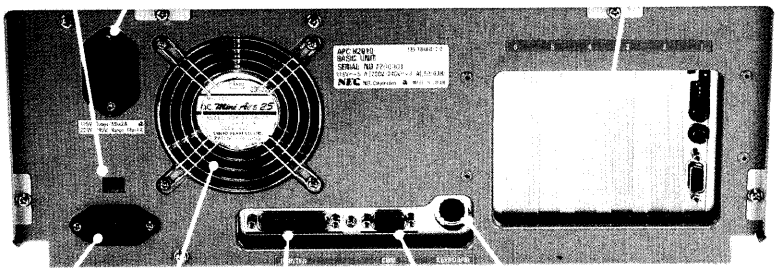
- 40 MB hard disk kit (APC-H4220)
- 20 MB hard disk kit (APC-H4230)
- 1.2 MB high capacity diskette drive kit (APC-H4200)
- 360 KB diskette drive kit (APC-H4210).

3½-INCH HARD DISK 2/
OPTIONAL 3½-INCH DISKETTE DRIVE B
20 MB hard disk (in APC-H2030) or blank panel on APC-H2000, APC-H2010, and APC-H2020 with a slot for an optional 20 MB hard disk kit (APC-H2210) or 720 kilobyte (KB) diskette drive kit (APC-H2200).

115/230 V POWER SUPPLY SWITCH
Selectable 115 V or 230 V power supply.

EXPANSION SLOT COVERS
By removing these covers you can add up to six expansion boards.

AC OUTLET FOR A MONOCHROME DISPLAY
The power at this outlet is switched by the system unit power switch. This feature allows you to control the system unit and monochrome display power with one switch.



AC INPUT

PRINTER PORT
See "Connecting a Printer."

KEYBOARD CONNECTOR

FAN

RS-232C PORT
Communications port for connecting a modem, a serial printer, or any RS-232C device. See "Connecting an RS-232C Device."

KEYBOARD

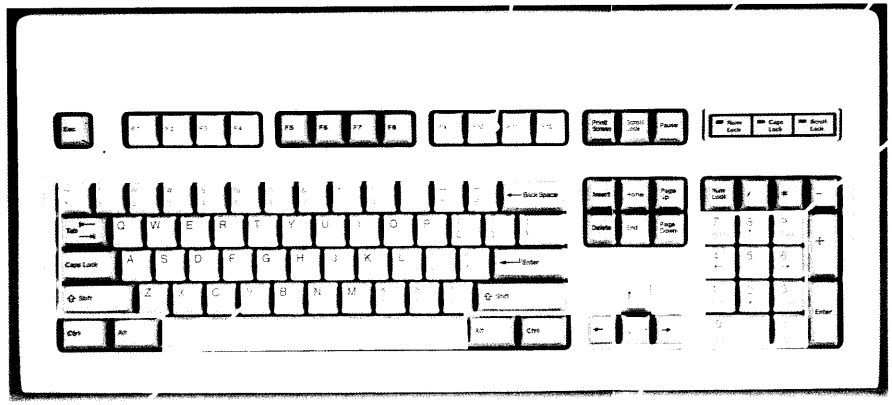
How you use the keyboard depends upon your software applications program. See the guide that comes with your software. In general, it is used as follows.

Most of the keys have a repeat function. When you hold down a key, the character or function repeats itself until you release the key.

FUNCTION KEYS
Use these keys for functions specific to your particular software.

TEMPLATE HOLDER
Use this area to hold key function templates.

STATUS LAMPS
Indicate the status of the Caps (Capital) Lock, Num (Numeric) Lock, and the Scroll Lock keys.



NUMERIC KEYPAD/CURSOR CONTROL KEYS
Use these keys like a numeric keypad. In the numeric keypad mode (Num Lock lamp is on), the Shift keys work in reverse.

To use these keys to control the direction of the cursor, press the Num (Numeric) Lock key (Num Lock lamp goes off).

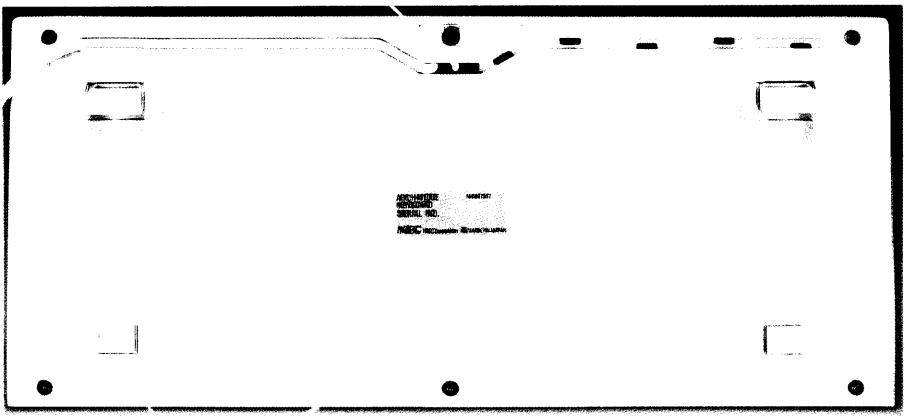
To return to the numeric keypad mode, press the Num Lock key.

TYPEWRITER KEYS
Use these keys like typewriter keys.

STANDARD CURSOR CONTROL KEYS
Use these keys for controlling the direction of the cursor. These keys also function when the keypad is operative (Num Lock lamp is lit).

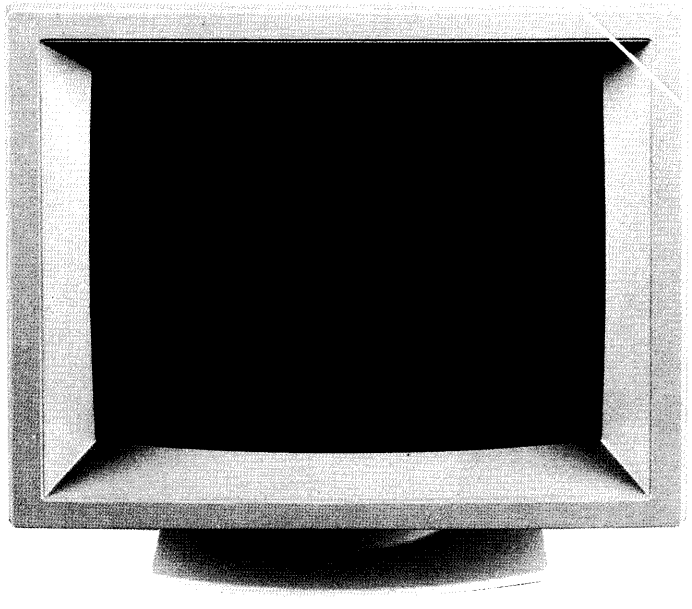
CABLE CHANNEL
Allows a choice of routing the cable to the left or right side of the keyboard.

To change the direction of the cable, carefully pull the cable out from the one side of the cable channel and press it into the other side.



COMFORT SUPPORTS
You can change the angle of your keyboard by moving these supports. Use the position most comfortable to you.

ADVANCED COLOR DISPLAY



TEXT SWITCH
Set this switch to control the text color mode of your display.

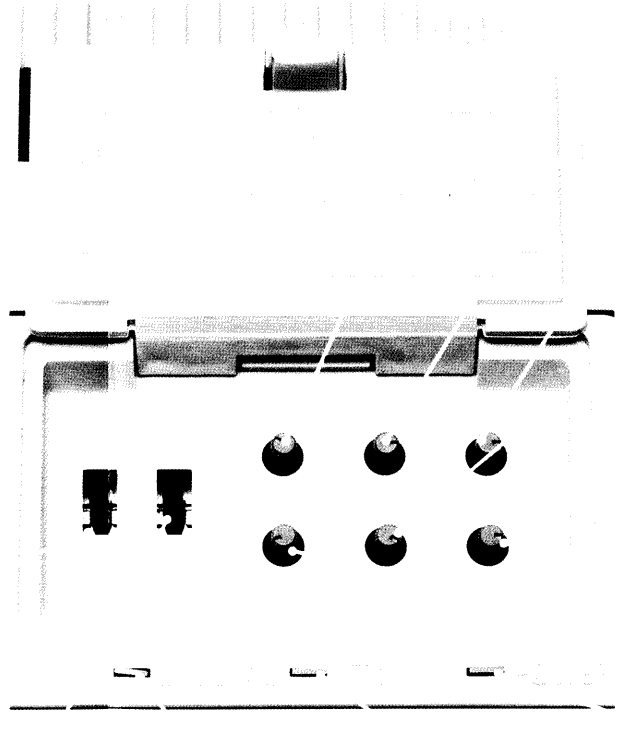
When set to OFF, the text color of your software program is displayed.

When set to ON, text appears in the color selected by the TEXT color switches on the back of the display (see "Rear Controls").

Top Controls and Status Lamps

COVER TAB
Lift tab to open top cover.

BRIGHT CONTROL



V.SIZE CONTROL
Turn this knob to adjust the vertical on-screen size.

V.HOLD CONTROL
Turn this knob to adjust the stability of the display's screen.

V.POSITION CONTROL
Turn this knob to lower or raise the on-screen position.

H.POSITION CONTROL
Turn this knob to adjust the horizontal on-screen position.

CONT. (CONTRAST) CONTROL

POWER LAMP
Indicates power on.

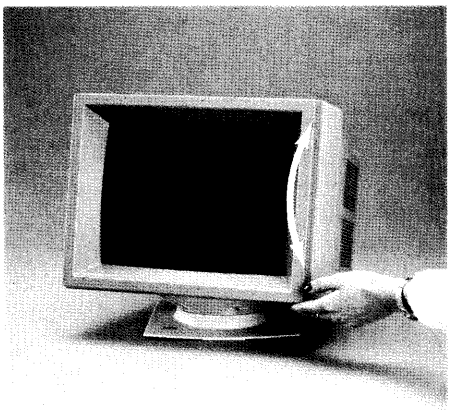
H.WIDTH SWITCH
Set this switch to ON to change the horizontal on-screen size.

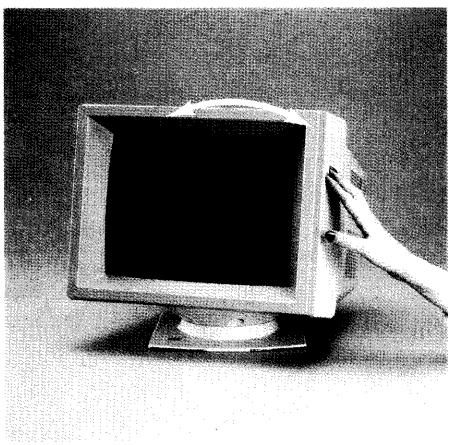
TTL LAMP
Indicates TTL switch setting (see "Rear Controls").

MANUAL LAMP
Indicates MANUAL mode switch setting (see "Rear Controls").

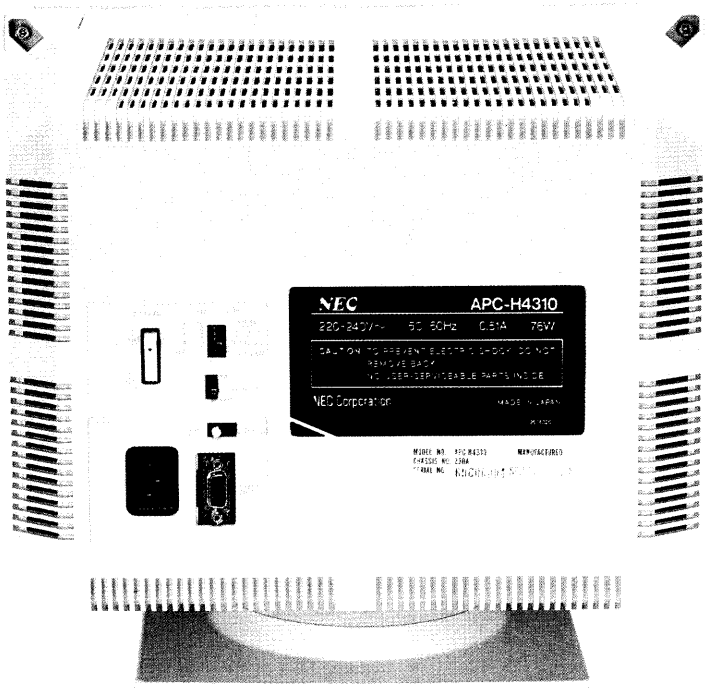
Tilt Swivel Feature

The Advanced Color Display has a tilt/swivel feature so you can tilt the screen up and down and swivel it from side to side. This feature allows you to set the screen angle to the viewing position most comfortable to you.

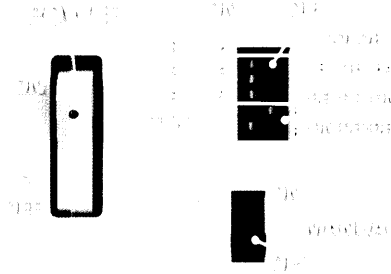


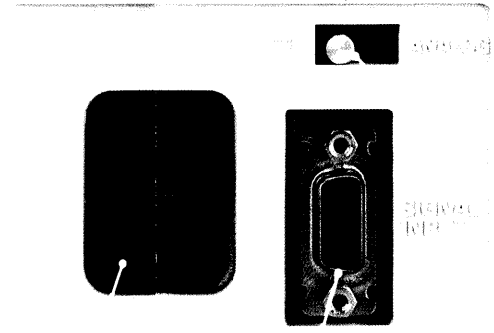


Rear Controls



POWER SWITCH
Controls power to the display. When this switch is in the ON position, the POWER lamp on the top of the display is lit.





AC INPUT DISPLAY INPUT

TEXT COLOR SWITCHES — 2, 3, AND 4
Set these switches to select the text color of your display, regardless of the colors used by your software program. (The TEXT switch on the top of the display must be set to ON.) For switch settings see the "Text Color Switch Settings" table on the following page.

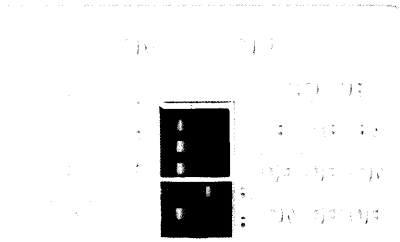
COLOR SWITCHES — 5 AND 6
When you set the MANUAL switch to ON, set these switches for the number of colors that your software program requires. For settings, see the "Color Mode Switch Settings" table on the following page.

MANUAL SWITCH
Set to OFF for IBM-compatible mode; set to ON for manual (non-IBM compatible) mode (MANUAL lamp lights). If you select manual mode, you must set the COLOR switches.

TTL/ANALOG SWITCH
This switch selects either a TTL or an analog input display signal. Set this switch according to the type of display board installed in the system unit.

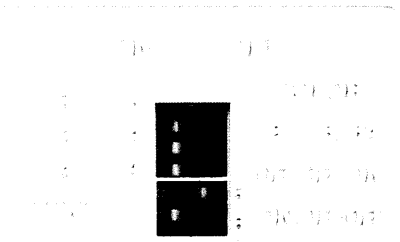
For NEC's Color Graphics Board (APC-H4400) and Advanced Graphics Board (APC-H4410), set the TTL/ANALOG switch to TTL.

For other boards, see the instructions that come with the board or see your dealer.



Text Color Switch Settings

TEXT COLOR	DIP SWITCH		
	2 R	3 G	4 B
Red	ON	OFF	OFF
Green	OFF	ON	OFF
Blue	OFF	OFF	ON
Yellow	ON	ON	OFF
Cyan	OFF	ON	ON
Magenta	ON	OFF	ON
White	ON	ON	ON



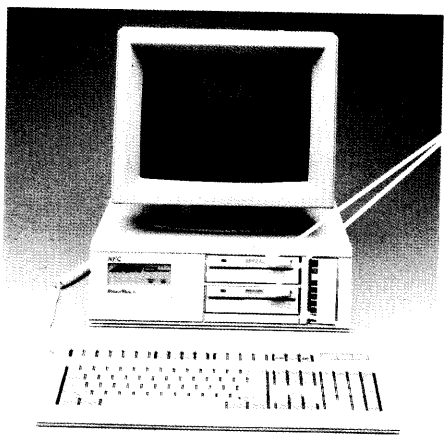
Color Mode Switch Settings

NUMBER OF COLORS	DIP SWITCH	
	5	6
8 colors	OFF	ON
16 colors	OFF	OFF
64 colors	ON	OFF
Unused	ON	ON

Diskettes and Diskette Care

Diskette drives retrieve (read) data from and record (write) data to diskettes.

For the successful operation of your PowerMate 1, it is important to select the correct diskette for the type of drive you are using. When purchasing diskettes, check that the diskette type is clearly marked on them. See your dealer for help in choosing the correct diskettes.



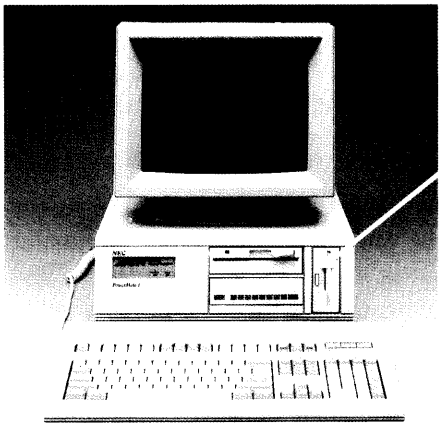
1.2 MB HIGH CAPACITY DISKETTE DRIVE
Standard drive A or optional 5¼-inch drive B. Reads and writes to 5¼-inch

- high capacity diskettes and
- double-sided, double-density diskettes.

360 KB DISKETTE DRIVE
Optional 5¼-inch drive B. Reads and writes *only* to 5¼-inch double-sided, double-density diskettes.

CAUTION Do not use a high capacity diskette in your 360 KB Diskette Drive.

Once a double-sided, double-density diskette is *written to or formatted* by a high capacity diskette drive, the diskette must be used only in a high capacity drive.



720 KB DISKETTE DRIVE
Optional 3½-inch drive B. Reads and writes *only* to 3½-inch micro-diskettes.

All diskettes must be formatted before you can use them (see your *MS-DOS User's Guide* for formatting instructions).

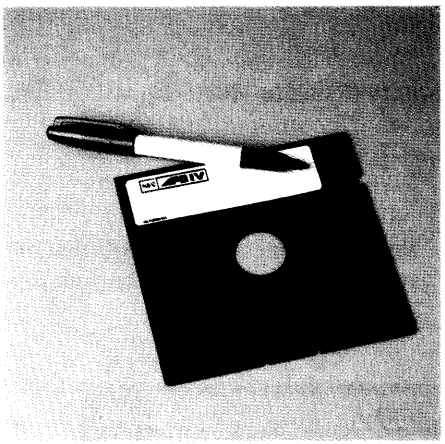
5¼-INCH DISKETTES

Each 5¼-inch high capacity diskette stores up to 1.2 MB, equivalent to about 600 pages of text.

Each 5¼-inch double-sided, double-density diskette stores up to 360 KB, equivalent to about 180 pages of text.

Most diskettes come with labels that you can write on and attach to the diskette.

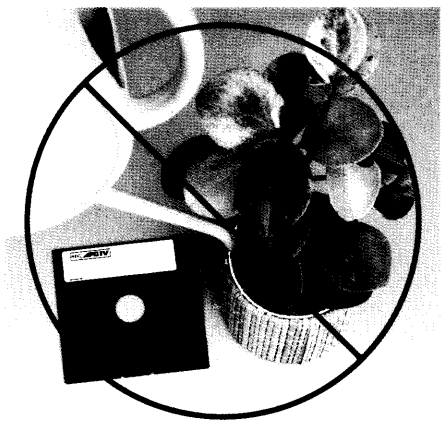
For reliability and protection from data loss, always use high-quality, name-brand diskettes. Take the following precautions with your diskettes.



- Always return diskettes to their protective envelopes after removing them from a diskette drive. This protects them from contamination.

- Do not write on an attached diskette label with a ballpoint pen. Mark the label before attaching it or use a felt-tip pen if the label is attached.

- Avoid touching or trying to clean an exposed diskette surface. Fingerprints or cleaning materials can damage diskette surfaces.

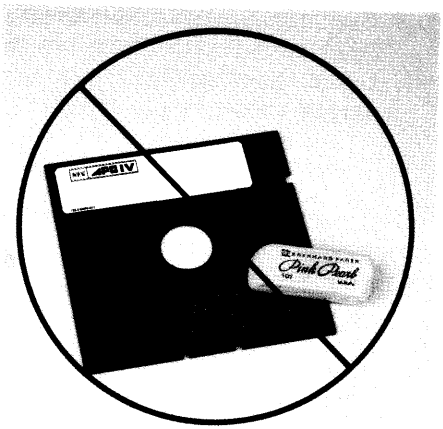


- Avoid getting diskettes wet.

- Avoid bending or folding diskettes. Store diskettes upright in a protected place.

- Do not attach paper clips, elastic bands, or tape to diskettes.

- Keep diskettes out of direct sunlight and high temperatures.



- Avoid using an eraser on or near diskettes. Eraser particles can contaminate diskettes.

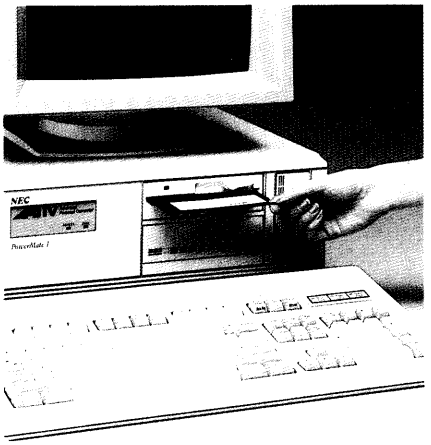
- Don't place diskettes near magnets or equipment that generate magnetic fields.

- Do not use contaminated diskettes. They can damage the diskette drive.

- To avoid contaminating diskettes, do not eat, drink, or smoke when handling them. Food or smoke particles could contaminate the diskette surface.

- Do not lay heavy objects on top of diskettes.

- Avoid dusty work environments.



- Insert diskettes into drives carefully. Never insert diskettes before turning on the computer, even if your software instructions say to do so.

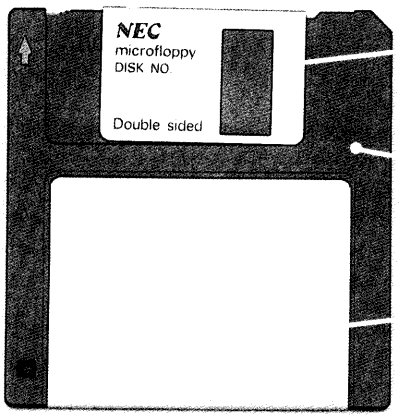
- Always remove all diskettes before turning off the system unit.

- Never lift the drive load lever when the busy lamp on the drive is on.

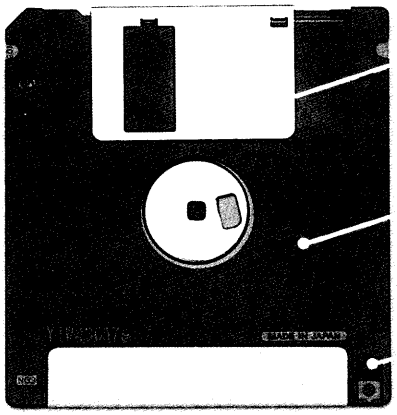
3½-INCH MICRO-DISKETTES

The 3½-inch double-sided micro-diskette used with the APC-H220 diskette drive is contained inside a hard plastic jacket. The diskette surface is protected from fingerprints and dust by an automatic shutter. When the diskette is ejected from the drive, the shutter slides over the exposed read/write area of the diskette.

Each double-sided micro-diskette stores up to 720 KB, equivalent to about 360 pages of text.



Front of Micro-diskette

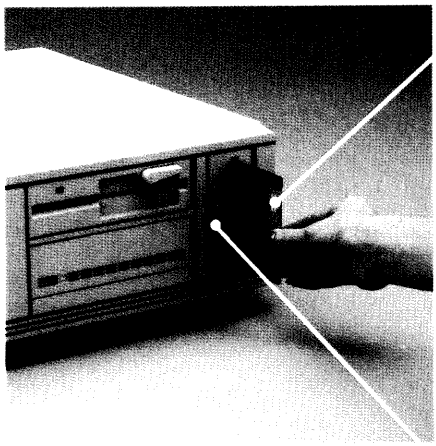


AUTOMATIC
SHUTTER

JACKET

WRITE PROTECT
SLIDER TAB

Back of Micro-diskette



Insert the micro-diskette into the drive correctly.

- Holding the micro-diskette at its bottom edge, insert it, label side facing right, into the drive.
- Be sure to insert the micro-diskette into the drive fully, until you hear a click.
- Never insert a micro-diskette before turning on the PowerMate 1, even if your software instructions say to do so.

Remove the micro-diskette by pressing the drive release button.

- Always remove the micro-diskette before turning off the PowerMate 1.
- Never press the drive release button when the busy lamp on the drive is on.

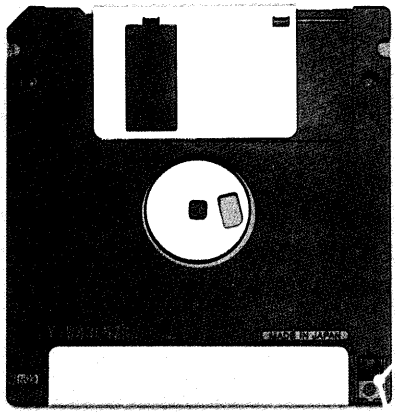
WRITE PROTECTION

You can write protect your diskettes. This ensures that you will not accidently overwrite information.

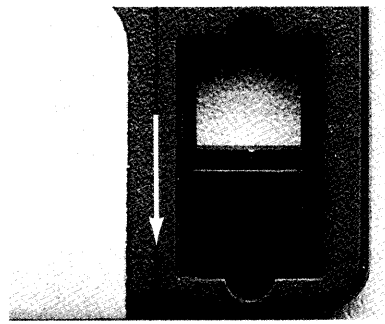
Note that when a diskette is write protected, you cannot store (write) information on it until you remove the write protection. You will know how to plan for this after you use the system for a while.

To write protect a 5¼-inch diskette, cover the write enable notch with an adhesive write protector tab. These tabs usually come with 5¼-inch diskettes.

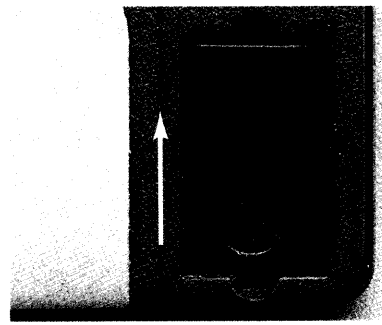
To protect a 5¼-inch double-sided, double-density diskette from being accidently written to by a high capacity drive, place a write protect tab on the diskette before using it.



To write protect a 3½-inch micro-diskette, slide the write protect tab so that the hole is visible.

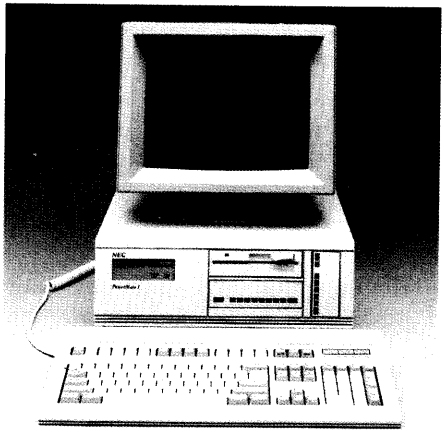


Write Protected



Write Enabled

PowerMate 1 Care and Maintenance



Periodically clean the outside of the computer with a soft cloth. You can remove stubborn stains with a cloth slightly dampened with a mild detergent. Never use a strong cleaner or solvent on any part of the PowerMate 1. For safety, unplug the PowerMate 1 before cleaning it.

Before you pack your system unit for shipping or moving, insert a shipping blank into each diskette drive. If you do not have a shipping blank, insert a blank diskette.

Be sure to lower the drive lever to lock the blank in the drive.

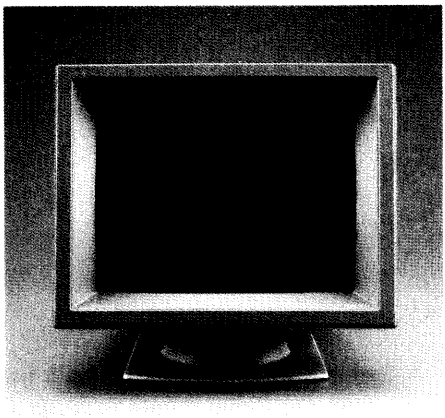
When you pack the PowerMate 1, pack the components in the original shipping materials and cartons that they came in.

Hard disks are sealed. The only maintenance they require is the use of the MS-DOS RETRACT utility. Use this utility whenever the system unit is moved or packed. See your *MS-DOS User's Guide*.

Expansion Options

The following paragraphs describe NEC expansion options for the APC IV PowerMate 1. Setup instructions come with each option.

DISPLAY



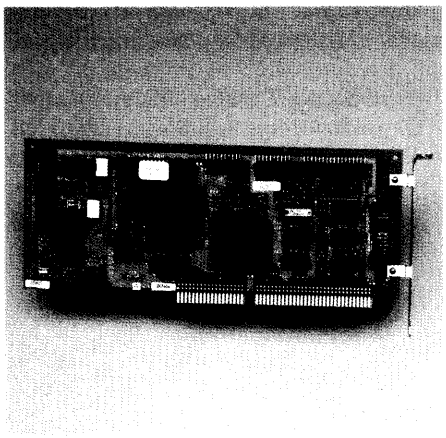
Advanced Color Display

Advanced Color Display
APC-H431x

The Advanced Color Display automatically adjusts to display board scanning frequencies from 15.75 KHz to 35 KHz for compatibility with most color graphics boards.

This high resolution display can be used with the APC-H4400 Color Graphics Board and the APC-H4410 Advanced Graphics Board, and is compatible with most other graphics boards.

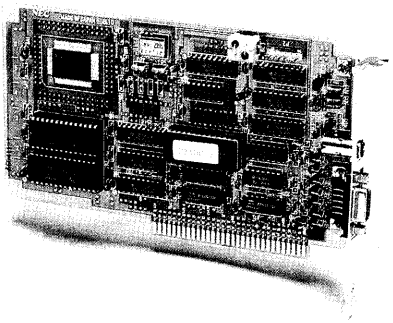
BOARDS AND CHIPS



Hard Disk Controller Board

Hard Disk Controller Board
APC-H2540

Allows the addition of up to two hard disk drives to the PowerMate 1 system unit. The Hard Disk Controller Board provides connectors for the connection of one 5¼-inch 40 MB or 20 MB drive and a 3½-inch 20 MB drive.

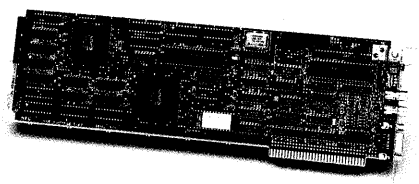


Color Graphics Board

Color Graphics Board
APC-H4400

Allows for the attachment of a color display or any display with a composite video interface. The Color Graphics Board (CGB) operates in alphanumeric (A/N) and all-points-addressable (APA) graphics modes.

The board provides 40-column by 25-row or 80-column by 25-row text display and 320 x 200 pixel and 640 x 200 pixel resolutions. The CGB supports 16 colors.

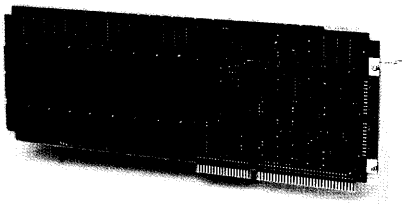


Advanced Graphics Board

Advanced Graphics Board
APC-H4410

Allows for the attachment of a color or monochrome display. The Advanced Graphics Board (AGB) operates in alphanumeric (A/N) and all-points-addressable (APA) graphics modes.

The board provides a 40-column by 25-row or 80-column by 25-row text display and 320 x 200, 640 x 200, and 640 x 350 pixel resolutions. The AGB supports 16 colors.



Memory Expansion Board

512 KB Memory Expansion Board
APC-H4500

Increases the system memory by 512 KB and has sockets on the board for installing up to three APC-H4510 Memory Expansion Kits. The board has a total memory capacity of 2 MB. Up to four memory boards can be installed in the system unit for a total system memory of 8 MB.

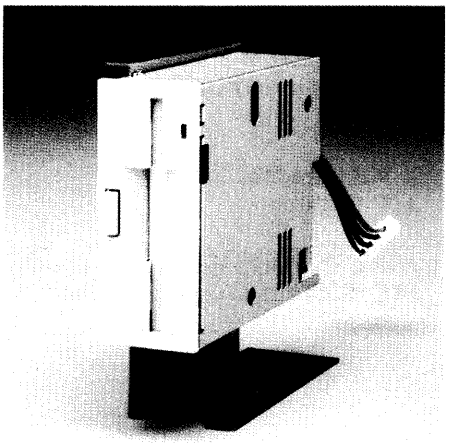
512 KB Memory Expansion Kit
APC-H4510

This 18-chip memory kit adds an additional 512 KB to an APC-H4500 Memory Expansion Board.

80287 Math Coprocessor
APC-H5520

Adds an additional microprocessor, thus increasing the PowerMate 1 processing speed for "number crunching" applications such as complex scientific and mathematical tasks.

DRIVES[1]



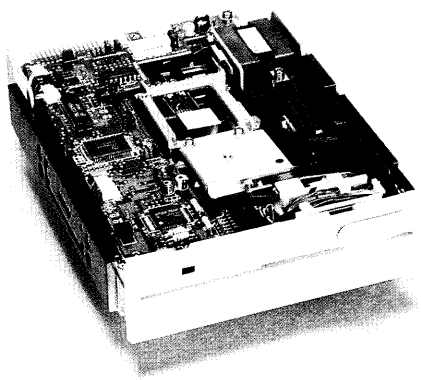
3½-inch 720 KB Diskette Drive Kit

720 KB Diskette Drive Kit
APC-H2200

Adds a 3½-inch 720 KB diskette drive to APC-H2000, APC-H2010, and APC-H2020 system units.

20 MB Hard Disk Kit
APC-H2210

Adds a 3½-inch 20 MB hard disk drive to APC-H2000, APC-H2010, and APC-H 2020 system units.



5¼-inch 1.2 MB Diskette Drive Kit

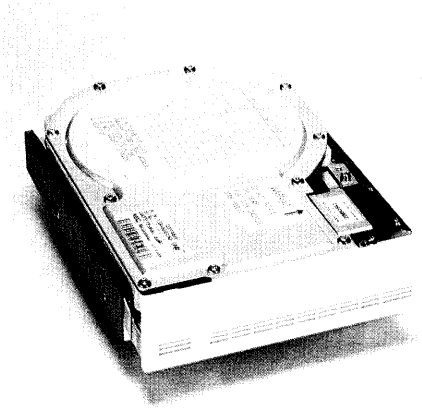
1.2 MB Diskette Drive Kit
APC-H4200

Adds a second 5¼-inch 1.2 MB high capacity diskette drive to APC-H2000 and APC-H2030 system units.

360 KB Diskette Drive Kit
APC-4210

Adds a 5¼-inch 360 KB diskette drive to APC-H2000 and APC-H2030 system units.

[1] In addition to the standard diskette drive, one diskette drive and one hard disk or two hard disks can be installed in the PowerMate 1.



5¼-inch 40 MB Hard Disk Kit

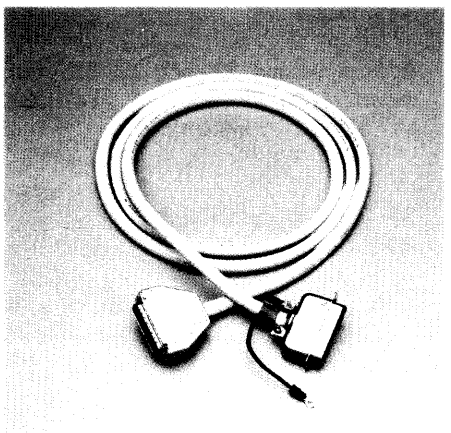
40 MB Hard Disk Kit
APC-H4220

Adds a 5¼-inch 40 MB hard disk drive to APC-H2000 and APC-H2030 system units.

20 MB Hard Disk Kit
APC-H4230

Adds a 5¼-inch 20 MB hard disk drive to APC-H2000 and APC-H2030 system units.

ACCESSORIES



Printer Cable

Printer Cable
APC-H4900

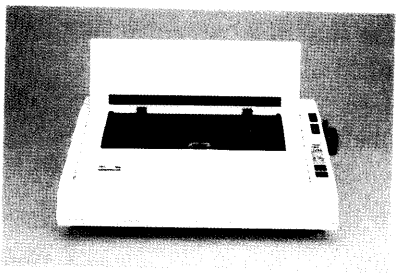
RS-232C Cable
APC-H4910

Null Modem Cable (10 ft)
APC-H4920

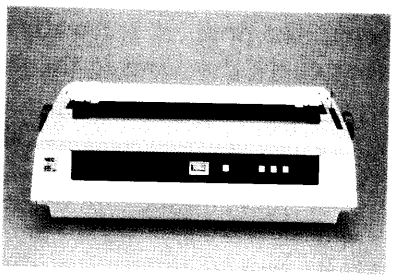
Null Modem Cable(33 ft)
APC-H4930

NEC PRINTERS FOR YOUR POWERMATE 1

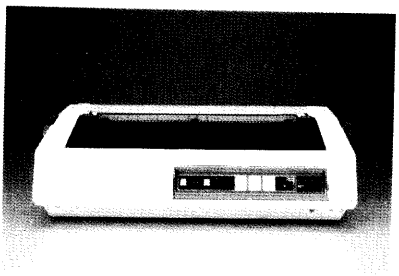
NEC makes several printers that are compatible with your APC IV PowerMate 1. These include the following Spinwriter® letter-quality printers and Pinwriter™ multimode dot matrix printers.



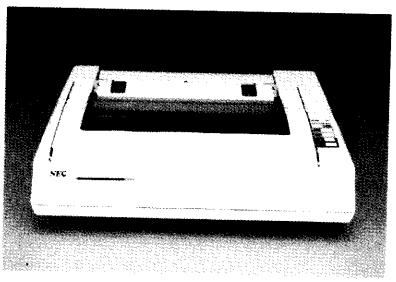
Elf 350 Spinwriter



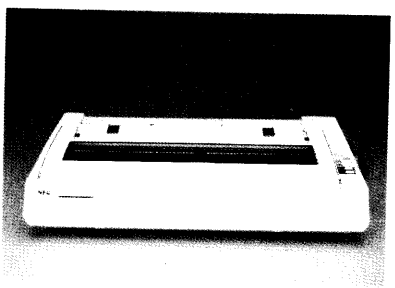
3550 Spinwriter



8850 Spinwriter



Pinwriter P6



Pinwriter P7

If You Have a Problem

The PowerMate 1 has a built-in checking program that automatically tests its components when you turn the power on. If there is a problem in the system, intermittent beeping occurs. If this happens repeatedly when you turn on the system unit, turn it off and call your NEC dealer.

If you encounter a problem with the PowerMate 1 and beeping does not occur, the problem is usually a simple one that you can solve yourself. First check the items in the following checklist.

- ☐ The power switch for each component is on.
- ☐ All cables and power cords are tightly connected.
- ☐ The electrical outlet that your components are connected to is working. Test the outlet by plugging in a lamp or other electrical device.
- ☐ The 115 V/230 V power supply switch is selected correctly.
- ☐ The system unit's Display Switch is set correctly for your display.
- ☐ The display's brightness and contrast controls are adjusted properly.
- ☐ Any option you have just installed is designed for your system and has been set up correctly.

If these items do not help, see the following "Solving Problems" table. If you still can't determine the problem, call your APC IV PowerMate 1 dealer.

Solving Problems

PROBLEMS AND SYMPTOMS	CORRECTIVE ACTIONS
A diskette won't load. • System unit and display POWER lamps are on. • Diskette drive busy lamp doesn't come on when you insert the diskette. • Power-on screen appears on the display.	Check that the diskette is inserted correctly and that the load lever is down. If so, try a different diskette. If this loads, the problem is in your software. Call your software dealer. If this won't load, call your APC IV PowerMate 1 dealer.
The display screen stays dark. • System unit and display POWER lamps are on. • All display cable connections are tight. • Brightness and contrast controls are adjusted.	Call your hardware dealer.
The display's power-on self-test remains on the screen.	Press F1. If the power-on screen is still displayed, load a different diskette. Press F1. If the diskette loads, you have a software problem. Call your software dealer. If the power-on screen is still displayed, call your APC IV PowerMate 1 dealer.
A distorted image appears on your display screen.	Adjust the video controls on your display. If this doesn't help, turn the display off for a few seconds, then turn it back on. If the problem persists, call your hardware dealer.
An image appears on the screen but keyboard seems "dead."	Check and tighten the keyboard cable connection.

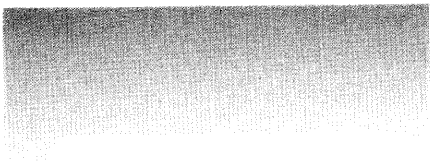
Solving Problems (cont'd)

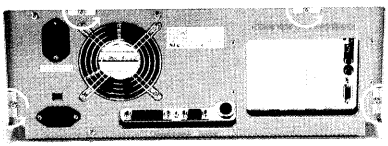
PROBLEMS AND SYMPTOMS	CORRECTIVE ACTIONS
Constant screen movement.	Magnetic field is affecting your display. If you have another display close by, or other device with a motor generating a magnetic field (for example, a fan), move the display or device away from the affected display.
Fuzzy screen on the Advanced Color Display.	Check the TTL/ANALOG switch setting. Make sure that the switch is set correctly for your display board.

Cover Removal and Replacement

Use the following procedures to remove and replace the system unit cover.

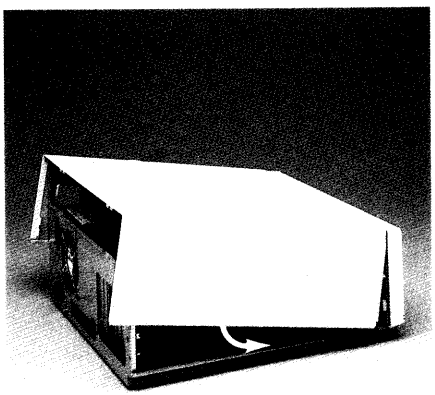
REMOVING THE COVER





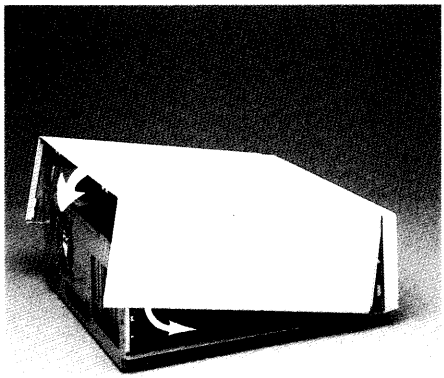
Turn off and unplug the system unit and any external options connected to it.

Remove the four screws on the rear of the system unit.



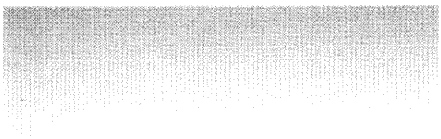
Pull the sides of the cover outward, and carefully lift and remove the cover.

REPLACING THE COVER

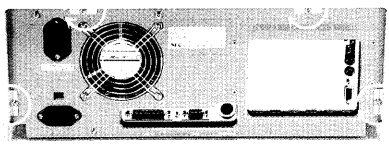


Insert the front edge of the cover under the lip of the front panel.

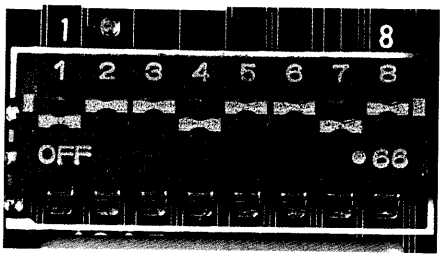
Pull the sides of the cover outward and carefully replace the cover.



Replace the four screws.



System Board Switch Settings



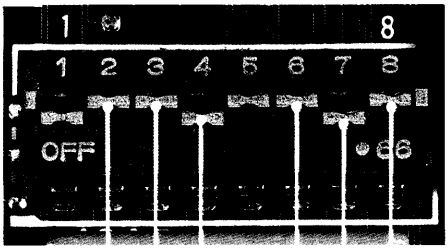
This block of 8 switches is located on the system board inside the system unit. The switch settings shown are the factory settings. These settings are appropriate for most software and hardware configurations.

Factory Settings

CHECKING SWITCH SETTINGS

The following shows switch settings for display type, parallel and serial ports, and diskette drive functions. Check these settings for your particular application. If you need to change any of the factory settings, see "Changing Switch Settings."

Switches 1 and 5 must be set as shown.



PARALLEL PORT (PR, LPT1)
ON: Enables parallel port
OFF: Disables parallel port

DISPLAY TYPE
ON: Color display
OFF: Monochrome display

SERIAL PORT CHANNEL 1
ON: Enables serial port channel 1
OFF: Disables serial port channel 1

DISKETTE DRIVE SELECT
ON: Selects second drive (drive B)
OFF: Selects first drive (drive A)

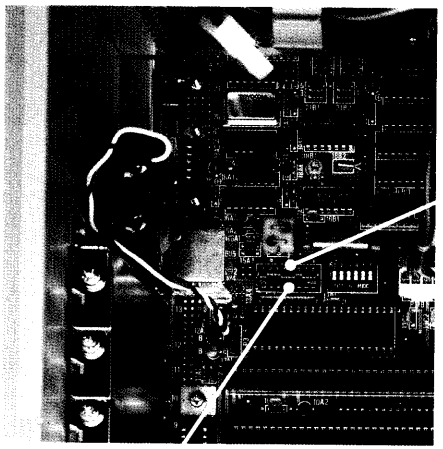
SERIAL PORT CHANNEL 2
ON: Enables serial port channel 2
OFF: Disables serial port channel 2

DISKETTE DRIVE ENABLE
ON: Enables diskette drive
OFF: Disables diskette drive

If you are installing an option board that has either an LPT1 parallel port or a COM1 or COM2 serial port, disable the corresponding system board port by changing the appropriate switch setting to off.

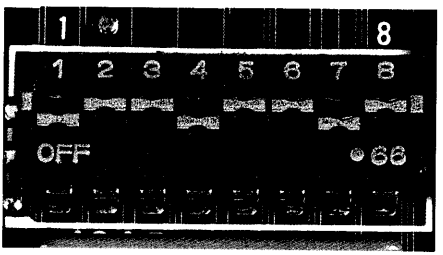
CHANGING SWITCH SETTINGS

If you need to change any switch setting inside the system unit, follow these steps.



Remove the system unit cover (see "Removing the Cover").

Locate the block of 8 switches on the system board.



Change the appropriate switch setting by using a pointed instrument, such as the tip of a ballpoint pen.

Replace the system unit cover (see "Replacing the Cover").

Specifications

The following specifications are standard except where noted.

System Processor

Intel μPD80286-8
Word length — 16 bits
Clock rate — 8 MHz, one wait state

Random Access Memory (RAM)

Standard size — 640 KB
Optional — expandable in 512 KB increments, 2 MB per board; total memory capacity expandable to 8 MB.

Read Only Memory (ROM)

64 KB

Calendar Clock

Year/month/day/hour/minute/second/1/100 second, battery-backed
Battery type — lithium, non-rechargeable

I/O Facilities

Parallel — one integrated port
RS-232C — one serial port, asynchronous communication, up to 9600 bps

Option Slots

Six slots — five 8/16 bit slots and one 8 bit slot

Keyboard

Industry-standard, enhanced
Total number of keys — 101
Special function keys — 12 keys, capable of up to 48 function selections
Status lamps for capital lock, numeric lock, and scroll lock keys
Numeric keypad — standard
Separate cursor control keys — standard

Diskette Drives

Packaging

- One internal 5¼-inch 1.2 MB drive standard
- Optional second integrated 5¼-inch 1.2 MB drive (APC-H4200) or 360 KB drive (APC-H4210) or 3½-inch 720 KB drive (APC-H2200)

Formatted Diskette Capacity (each)

- APC-H4200 — 720 KB / 1.2 MB
- APC-H4210 — 360 KB
- APC-H2200 — 720 KB

Drive Performance Characteristics

- Rotation rate
  APC-H4200 — 360 rpm
  APC-H4210 — 300 rpm
  APC-H2200 — 300 rpm
- Transfer rate
  APC-H4200 — 500 K bit/sec
  APC-H4210 — 250 K bit/sec
  APC-H2200 — 250 K bit/sec

Controller — industry standard

Hard Disk Drives

Packaging

- One internal 5¼-inch 40 MB drive standard for APC-H2010
- One internal 5¼-inch 20 MB drive standard for APC-H2020
- One internal 3½-inch 20 MB drive standard for APC-H2030
- Optional second integrated 5¼-inch 40 MB drive kit (APC-H4220) or 20 MB drive kit (APC-H4230) or 3½-inch 20 MB drive kit (APC-H2210)

Formaatted Disk Capacity

- APC-H4220 — 40 MB
- APC-H4230 — 20 MB
- APC-H2210 — 20 MB

Internal Configuration

- APC-H4220 — four disks, eight heads
- APC-H4230 — two disks, four heads
- APC-H2210 — two disks, four heads

Number of cylinders — 615
Data transfer rate — 625 KB/sec
Rotation rate — 3,564 rpm ±0.5%
Access Time (average)

- APC-H4220 — 40 ms
- APC-H4230 — 40 ms
- APC-H2210 — 85 ms

Start Time

- APC-H4220 — 25 sec maximum
- APC-H4230 — 15 sec maximum
- APC-H2210 — 15 sec maximum

Stop Time

- APC-H4220 — 30 sec maximum
- APC-H4230 — 15 sec maximum
- APC-H2210 — 15 sec maximum

Recording method — Modified Frequency Modulation (MFM)
Recording Density

- APC-H4220/APC-H4230
  9,000 bits per inch
  700 tracks per inch
- APC-H2210
  15,000 bits per inch
  750 tracks per inch

Dimensions

System Unit

- Height — 6 in. (15.2 cm)
- Width — 16.5 in. (42 cm)
- Depth — 16.5 in. (42 cm)

Keyboard

- Height — 1.6 in. (4.1 cm)
- Width — 19 in. (48.3 cm)
- Depth — 8.4 in. (21.3 cm)

Weight

System Unit

- APC-H2000 — 26.8 lb (12.2 kg)
- APC-H2010 — 30.3 lb (13.8 kg)
- APC-H2020 — 29.9 lb (13.6 kg)
- APC-H2030 — 29 lb (13.2 kg)

Keyboard — 3.5 to 4 lb (1.6 to 1.8 kg)

Power

Universal power supply, 115/230 V, switch selectable

Recommended Operating Environment

Temperature — 50° to 95° F (10° to 35° C)
Relative humidity — 20% to 80%

Operating System

MS-DOS

Supplied Software

MS-DOS Operating System

Advanced Color Display - Optional

Size — 13 inches (diagonal viewing)
Colors

- TTL input — 8/16/64 colors
- Analog input — unlimited colors

Resolution — 800 x 560 pixels
CRT type — dot black matrix
Video Input Signal

- TTL level positive
- ANALOG 0.6 Vp-p/75 positive

Video bandwidth — 30 MHz
Synchronization

- Horizontal — 15.5 KHz to 35 KHz (automatically)
- Vertical — 50 Hz to 60 Hz (manual), non-interlace

Board compatibility — uses most color graphics boards, including the NEC Color Graphics Board (APC-H4400) and Advanced Graphics Board (APC-H4410).

Dimensions

- Height — 12.8 in. (32.5 cm)
- Width — 14.4 in. (36.6 cm)
- Depth — 14.9 in. (37.9 cm)

Weight — 31 lb (14 kg)

Color Graphics Board — Optional

Interface — direct drive, and composite video

Text Display

- 40-column x 25-row
- 80-column x 25-row

Resolution

- 320 x 200 pixel
- 640 x 200 pixel

Colors — supports 16 colors

Advanced Graphics Board - Optional

VRAM — 256 KB

Interface — direct drive

Text Display

- 40-column x 25-row
- 80-column x 25-row

Resolution

- 320 x 200 pixel
- 640 x 200 pixel
- 640 x 350 pixel

Colors — supports 16 colors from a palette of 64

Glossary

applications programs Programs designed for a specific purpose, such as for solving a particular business or mathematical problem.

asynchronous communications Method of data transmission where characters are preceded by a start bit and followed by a stop bit, permitting the time between characters to vary.

bit Binary digit. The smallest unit of computer data.

board Printed circuit board. Board onto which computer components are soldered and thin wires are printed to connect the components.

boot To start up a computer program.

bps Bits per second, a unit of transmission. Also called baud rate.

busy lamp Indicator on the front of diskette drive that lights when the drive is writing to or reading a diskette.

byte Group of eight bits.

chip Integrated circuit. A miniature circuit made by etching electronic components on a silicon wafer.

clock Electronic timer used to synchronize computer operations.

cold boot Restarting the computer by turning it off and then on.

cursor An image on the display screen that indicates where the next entered data will appear.

diskette A thin flexible platter coated with a magnetic material for storing information.

diskette drive A magnetic device that writes on and retrieves data from a diskette.

double-density Refers to how information is "packed" onto a diskette. Information on double-density diskettes is packed at twice the density of that on a single-density diskette.

expansion slot Location inside the system unit for the connection of an optional printed circuit board. There are six expansion slots for option boards available in the PowerMate 1 to expand the computer's capabilities.

expansion option Add-on hardware that expands the PowerMate 1 power and versatility.

formatting Preparing of a diskette to accept data.

hard disk A rigid magnetic storage device that provides fast access to stored data.

hardware The electronics and mechanical parts that a computer is made of.

high capacity Refers to the storage capacity of a diskette or diskette drive that uses high capacity diskettes. In the PowerMate 1, a high capacity diskette drive uses a high capacity diskette with a storage capacity of 1.2 MB.

Hz Hertz. A unit of frequency equal to one cycle per second.

interface A connection that enables two devices to communicate.

KB Kilobyte. 1024 bytes.

load To enter a program into the computer's memory from a storage device.

load lever Lever on the front of a diskette drive that locks the diskette in place.

memory An electronic part of a computer that stores information.

menu A video display of programs or tasks.

modem MOdulator-DEModulator. A device that links computers over a telephone.

monochrome A video display that features different shades of a single color.

overwrite Storing information at a location where information is already stored, thus destroying the original information.

parallel interface Interface that communicates eight bits at a time.

parallel printer A printer with a parallel interface.

peripheral Input or output device not under direct computer control.

pixels Picture elements. Tiny dots that make up a screen image.

port Place on a computer where a peripheral can be plugged in.

processor A computer on a chip.

RAM Random access memory. Temporary read/write memory that stores information only when the computer is on.

read To extract data from a storage device such as a diskette or memory.

ROM Read-only memory. Permanent computer memory that cannot be written to.

RS-232C Standard interface for serial devices.

serial interface An interface that communicates information one bit at a time.

serial printer A printer with a serial interface.

software Computer programs.

synchronous communication Method of data transmission where transmission is regulated by a clock.

system board The main printed circuit board inside the system unit into which other boards are connected.

system unit The PowerMate 1 component that contains the computer parts, disk drives, and option boards.

VRAM Video random access memory.

write To record or store information in a storage device.

write enable notch Slot on the side of a 5¼-inch diskette that, when uncovered, permits the diskette to be written on.

write protecting Allows reading from a diskette but prevents writing to the diskette.

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NOTES