NEC

# Enhanced APC IV™ PowerMate™1

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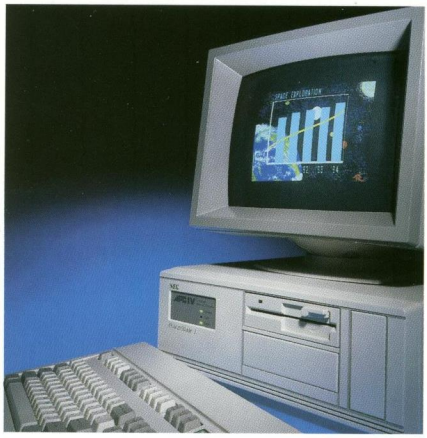

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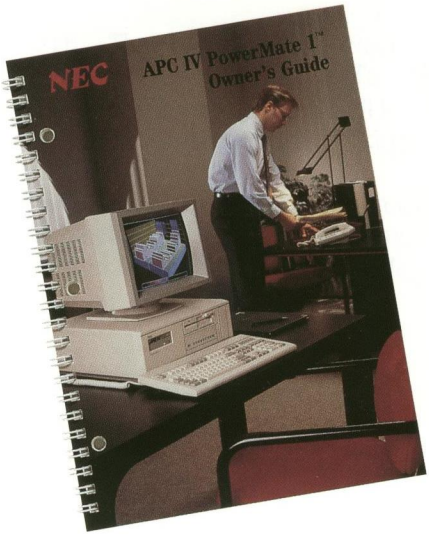
# The Enhanced APC IV PowerMate 1

Your APC IV™ PowerMate™ 1 is an enhanced version of the standard PowerMate 1 described in the *APC IV PowerMate 1 Owner's Guide*. The enhanced system is more powerful than the standard. Enhanced features include a faster clock speed selection, greater storage capacity, and new options.

Read this supplement to the owner's guide completely before you begin setting up your PowerMate 1. Refer to this supplement for a description of

- enhanced APC IV PowerMate 1 features
- new options
- installation of options
- system board switch location
- specifications for enhanced features.




Use the *APC IV PowerMate 1 Owner's Guide* for setup procedures and reference material. Except for the items listed above, the information in the owner's guide is the same for both standard and enhanced APC IV PowerMate 1 models.

NOTE APC IV PowerMate 1 model numbers end with the letter E to designate enhanced versions.

# Enhancements

Enhanced features for your PowerMate 1 are listed below and described in the following sections.

- 8/10-MHz clock speed, software selectable.
- New APC-H203E model configuration with a half-height 80-MB hard disk and enhanced small device interface (ESDI) hard disk controller board (APC-H654).
- Increase, from 6 to 7, in the number of available expansion slots.
- New options for the enhanced PowerMate 1:
  - — 80-MB Hard Disk Kit
  - — ESDI Hard Disk Controller Board
  - — 3½-inch 20-MB Hard Disk Kit
  - — 3½-inch 40-MB Hard Disk Kit
  - — 3½-inch Tape Drive
  - — 5¼-inch Tape Drive
  - — Advanced Graphics Board Plus.

# Features and Controls

## SYSTEM UNIT — FRONT

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

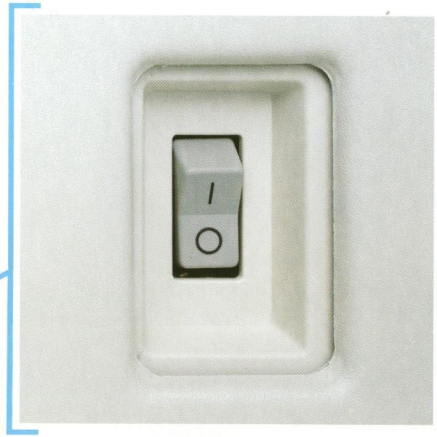
DISKETTE DRIVE A
1.2 MB high capacity diskette drive.

DISKETTE DRIVE LEVER
Locks diskette into drive.

POWER LAMP (Green)
Indicates power on.

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

10-MHz LAMP (Green)
Indicates when the system is operating at 10 MHz.



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

NOTE The 10- or 8-MHz clock speed can be changed by keyboard input. To switch the clock speed, hold down the **Ctrl** and **Alt** keys and press the - (minus) key on the numeric keypad.

The default clock speed at which the system boots can be changed by the TURBO command (see Section 4 in *MS-DOS 3.2 User's Guide*).

5¼-INCH HARD DISK 1/
OPTIONAL DISKETTE DRIVE B OR TAPE DRIVE
APC-H201E — 40-MB hard disk.

APC-H202E — 20-MB hard disk.

APC-H203E — 80-MB hard disk.

APC-H200E — Blank panel covers empty slot available for any of these optional kits:

- 40-MB Hard Disk Kit (APC-H422)
- 20-MB Hard Disk Kit (APC-H423)
- 80-MB Hard Disk Kit (APC-H223E). Requires installation of the APC-H654 ESDI Hard Disk Controller Board.
- 5¼-inch 1.2-MB Diskette Drive Kit (APC-H420)
- 5¼-inch 360-KB Diskette Drive Kit (APC-H421)
- 3½-inch 720-KB Diskette Drive Kit (APC-H424E) with a 5¼-inch frame.
- 3½-inch Tape Drive (APC-H528) with a 5¼-inch frame.

OPTIONAL 3½-INCH DRIVE
Slot for the following optional 3½-inch diskette drive B, hard disk 2, or tape drive kits:

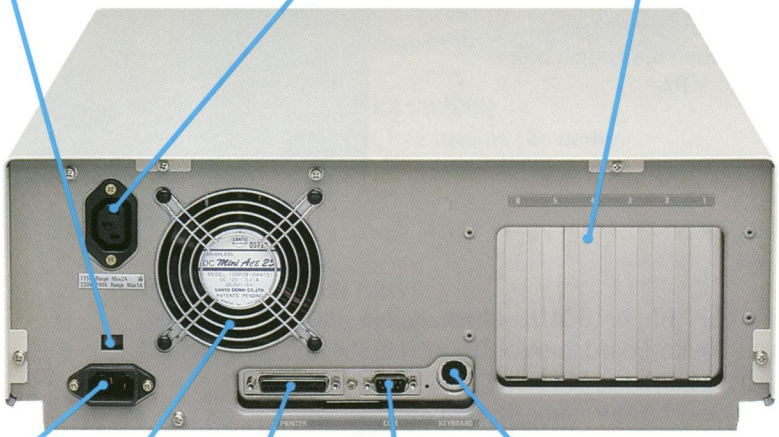
- 720-KB Diskette Drive Kit (APC-H220)
- 20-MB Hard Disk Kit (APC-H224E)
- 40-MB Hard Disk Kit (APC-H225E)
- Tape Drive (APC-H228).

## SYSTEM UNIT — REAR

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 DISPLAY
Some display power cable connectors fit this outlet. The power at this outlet is switched by the system unit power switch. This feature allows you to control the system unit and display power with one switch.



AC INPUT

PRINTER PORT

FAN

KEYBOARD CONNECTOR

RS-232C PORT
Communications port for connecting a modem, a serial printer, or any RS-232C device.

# Expansion Options

In addition to the options listed in the *APC IV PowerMate 1 Owner's Guide*, the following options are available for your enhanced PowerMate 1.

- 80-MB Hard Disk Kit (APC-H223E)
  Adds a half-height, 5¼-inch 80-MB Hard Disk to the PowerMate 1 when a 20-MB or 40-MB drive is not present in the system unit. Requires installation of the APC-H654 ESDI Hard Disk Controller Board. The 80-MB Hard Disk has an access speed of 25 ms.

- ESDI Hard Disk Controller Board (APC-H654)
  Allows the addition of an APC-H223E 80-MB Hard Disk Kit to the system unit.

- 3½-inch 20-MB Hard Disk Kit (APC-H224E)
  Adds a 3½-inch 20-MB Hard Disk to the PowerMate 1 when an 80-MB ESDI Hard Disk is not installed. This 20-MB Hard Disk has an access speed of 40 ms.

- 3½-inch 40-MB Hard Disk Kit (APC-H225E)
  Adds a 3½-inch 40-MB Hard Disk to the PowerMate 1 when an 80-MB ESDI Hard Disk is not installed. This 40-MB Hard Disk has an access speed of 40 ms.

- 40-MB Tape Drive (APC-H428)
  Adds a 3½-inch tape drive that fits in the 5¼-inch drive slot of the PowerMate 1. The Tape Drive stores 40 MB of data copied from your hard disk and can be used for archiving data, storing data off-line, and transferring data between computers.

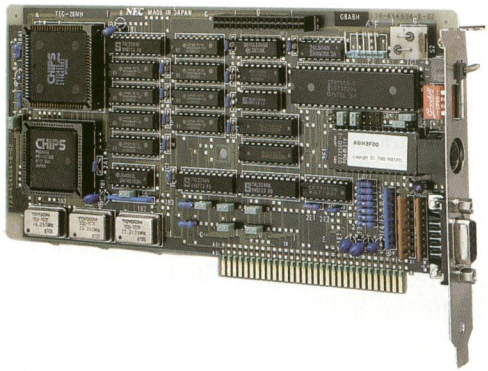
- 40-MB Tape Drive (APC-H228)
  Same as the APC-H428 Tape Drive except this drive fits in the 3½-inch drive slot of the PowerMate 1.

- Advanced Graphics Board Plus (APC-H444)
  Allows for the attachment of a color or monochrome display and an InPort™ or Bus mouse. The Advanced Graphics Board (AGB) Plus 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. The following pixel-resolutions are available with the AGB Plus.

  — 320 x 200
  — 640 x 200
  — 640 x 350
  — 640 x 480
  — 720 x 348

  The board supports 16 colors from a palette of 64.



Advanced Graphics Board Plus

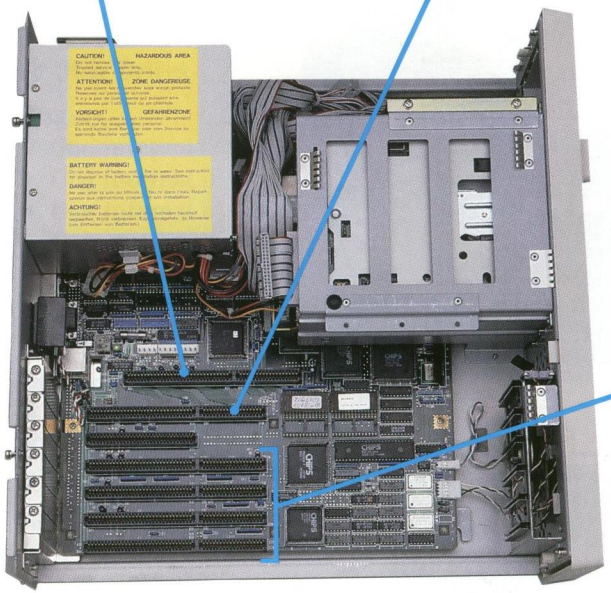
# Installation of Options

Installation instructions for options are basically the same for both standard and enhanced versions of the PowerMate 1. Any difference in installation is specified in the documentation that comes with the option.

Expansion slots in the enhanced version of the PowerMate 1 are shown below.

EXPANSION SLOT 7
Reserved for future use.

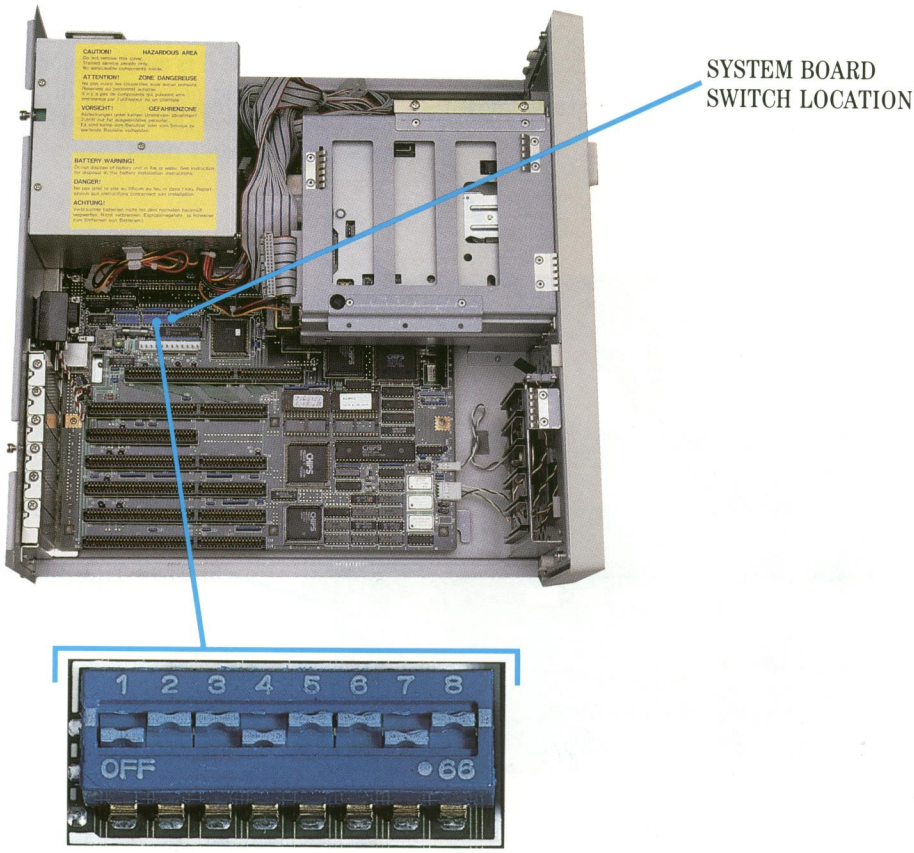
EXPANSION SLOT 6
If not occupied by a hard disk controller board, slot 6 is available for option boards that normally go in slots 1 through 4 of the standard version PowerMate 1 units.




NOTE Cover removal procedures are given in the owner's guide and in the option installation guides.

# Switch Location

The location of the system board switches has changed in the enhanced version of the APC IV PowerMate 1. The location is shown below. For cover removal procedures or switch setting information, see the *APC IV PowerMate 1 Owner's Guide*.



# Specifications

The specifications below apply to the enhanced version of the APC IV PowerMate 1. For other specifications, which are the same for both enhanced and standard versions of the PowerMate 1, see the *APC IV PowerMate 1 Owner's Guide*.

### System Processor

Intel iAPX80286-10
Clock rate — 8/10 MHz, selectable by software

### Option Slots

Seven slots

- Five 8/16-bit full-size slots
- One 8-bit full-size slot
- One 8/16-bit half-size slot (reserved for future use).

### Hard Disk Drives

Packaging

- One internal 5¼-inch 40-MB drive standard for APC-H201E
- One internal 5¼-inch 20-MB drive standard for APC-H202E
- One internal 5¼-inch 80-MB drive standard for APC-H203E
- Optional integrated drive
  - — 5¼-inch 80-MB Hard Disk Kit (APC-H223E)
  - — 3½-inch 20-MB Hard Disk Kit (APC-H224E)
  - — 3½-inch 40-MB Hard Disk Kit (APC-H225E)

Formatted Disk Capacity

- APC-H223E — 80 MB
- APC-H224E — 20 MB
- APC-H225E — 40 MB

Internal Configuration

- APC-H223E — four disks, six data heads
- APC-H224E — two disks, four heads
- APC-H225E — four disks, eight heads

Number of Cylinders

- APC-H223E — 823
- APC-H224E — 615
- APC-H225E — 615

Data Transfer Rate

- APC-H223E — 1250 KB/sec
- APC-H224E — 625 KB/sec
- APC-H225E — 625 KB/sec

Rotation Rate

- APC-H223E — 3600 rpm ± 1.0%
- APC-H224E — 3600 rpm ± 0.5%
- APC-H225E — 3600 rpm ± 0.5%

Access Time (average)

- APC-H223E — 25 ms
- APC-H224E — 40 ms
- APC-H225E — 40 ms

Start Time

- APC-H223E — 20 sec
- APC-H224E — 15 sec
- APC-H225E — 15 sec

Stop Time

- APC-H223E — 20 sec
- APC-H224E — 15 sec
- APC-H225E — 15 sec

Recording Method

- APC-H223E — 2-7 Run Length Limited (RLL)
- APC-H224E — MFM
- APC-H225E — MFM

Recording Density

- APC-H223E — 18,500 bpi, 960 tpi
- APC-H224E — 14,000 bpi, 850 tpi
- APC-H225E — 14,000 bpi, 850 tpi

Interface

- APC-H223E — ESDI
- APC-H224E — ST506
- APC-H225E — ST506

**Tape Drives**

Formatted Capacity

- Per tape
  - Error Correction Coding (ECC) — 40.6 MB
  - No ECC — 45.7 MB
- Per track
  - ECC — 2 MB
  - No ECC — 2.3 MB
- Per block
  - ECC — 16,384 bytes
  - No ECC — 18,432 bytes
- Per sector
  - ECC — 1,024 bytes
  - No ECC — 1,024 bytes

Tape Format

- Number of data tracks — 20
- Number of blocks per track — 124
- Number of sectors per block — 18
- Recording density — 10,000 bpi
- Track density — 87 tpi
- Data encoding method — MFM

Performance Characteristics

- Data transfer rate — 500K bit/sec
- Write precompensation — 125 ns
- Tape speed
  - Read/write — 50 ips
  - Rewind/fast forward — 70 ips
- End-to-end positioning time
  - Read/write speed — 49 sec
  - Rewind/fast forward speed — 35 sec
- Time to dump/restore a full tape — 16.4 min[1]
- Read/write modes supported
  - Streaming (mirror image)
  - Start/stop (file-by-file)
  - Block addressable (file update)

[1]The dump/restore time specified assumes the drive is operated in streaming mode without data verification.

- Controller — standard APC IV PowerMate 1 diskette drive interface
- Maximum R/W speed variation
  Instantaneous (ISV) — 3.5%
  Long term — 1.5%
- Start/stop time — 400 ms
- Head positioning time
  Adjacent tracks — 250 ms
  Maximum — 1 sec

Media[2]
- Type — 3M DC-2000
- Width — 0.25-in.
- Length — 205 ft

Reliability
- Error rate
  Recoverable errors — 1 in $10^9$ bits read
  Unrecoverable errors — 1 in $10^{11}$ bits read
- Preventive maintenance — clean read/write head

**Weight**

APC-H203E — 31 lb (14.1 kg)

**Advanced Graphics Board Plus** — Optional

VRAM — 256 KB
Interface — direct drive and Input or Bus mouse
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
640 x 480 pixel
720 x 348 pixel

Colors — supports 16 colors from a palette of 64

[2]Capacity and tape formatting specifications apply to the 3M DC-2000 data cartridge.

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