The COMPAQ SYSTEMPRO
Personal Computer System
Features/Specifications

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The COMPAQ SYSTEMPRO Personal Computer System

COMPAQ *SYSTEMPRO*
Personal Computer System
FEATURES/SPECIFICATIONS
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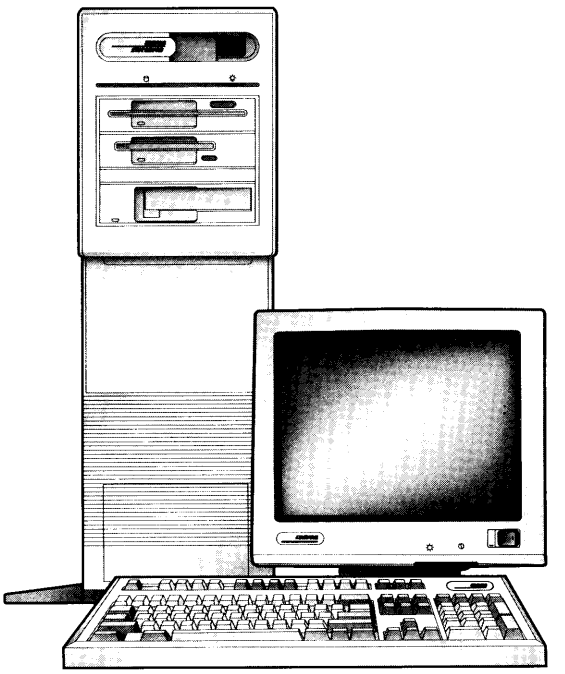
Features Overview

The COMPAQ SYSTEMPRO Personal Computer System delivers an unprecedented combination of performance and expandability to address the requirements of network servers and multiuser hosts in connected-user environments. Representing a new class of personal computer, this PC system extends the boundaries of personal computing to best meet the demands of advanced connectivity applications, including local area networking, communications bridges and gateways, and multiuser transaction processing. In addition, the sophisticated system architecture of the COMPAQ SYSTEMPRO is fine-tuned for new client-server applications such as shared databases and departmental productivity applications.

The flexible system processor design of the COMPAQ SYSTEMPRO takes full advantage of the latest generation 386 and 486 processor technology. Initial models offer a powerful 386/33 System Processor that combines a 33-MHz 386 microprocessor, cache memory, and optional numeric coprocessors. Using advanced 33-MHz 486 processor technology, as it becomes available, doubles the computing power of the COMPAQ SYSTEMPRO.

In addition, support for multiple system processors raises the computing potential of the COMPAQ SYSTEMPRO to a new level. Adding a second 386/33 System Processor, for example, nearly doubles the computing power of standard model configurations. The multiple processor design can also accommodate 33-MHz 486 processor technology, providing up to four times the computing power of initial models. Support for this full range of new and emerging processor technologies guarantees protection of the users' investment as applications grow larger and more complex.

The COMPAQ SYSTEMPRO integrates advances in system processor and I/O technology using the Flexible Advanced Systems Architecture with Multiprocessing Support (Flex/MP). COMPAQ Flex/MP allows concurrent processing and I/O activity, delivering the highest possible 32-bit system performance while maintaining compatibility with industry-standard hardware and software.



The COMPAQ SYSTEMPRO Personal Computer System

The COMPAQ SYSTEMPRO supports multiple 32-bit Extended Industry Standard Architecture (Extended ISA or EISA) expansion boards to deliver exceptional I/O performance. For example, users can add up to six 32-bit network interface controllers to deliver the highest possible network server throughput. Powerful 32-bit controllers are available for Token Ring, Ethernet and ArcNet networks. In addition, the EISA expansion bus supports 8- and 16-bit Industry Standard Architecture (ISA) boards. The industry-standard compatibility inherent in EISA ensures that users can choose from the largest selection of software applications and expansion options available in the personal computer industry.

To respond faster to the data requests of multiple users, the COMPAQ SYSTEMPRO features new fixed disk drive array technology. COMPAQ drive array technology distributes data across a series of synchronized fixed disk drives, yielding data transfer rates up to four times greater than nonarrayed drive systems. Managed by the 32-Bit Intelligent Drive Array (IDA) Controller, COMPAQ drive arrays provide the unique ability to simultaneously respond to multiple requests for user data. The 32-Bit IDA Controller also supports a comprehensive range of reliability features.

With the COMPAQ SYSTEMPRO, users can actually increase performance as they expand system capabilities. This concept is referred to as *performance scalability.* In addition to a range of system processors, the COMPAQ SYSTEMPRO supports scalable fixed disk drive options. For example, doubling drive array storage capacity from 420 to 840 megabytes correspondingly doubles the array transfer rate from 3 to 6 megabytes per second. This performance scalability protects the users' investment by allowing the COMPAQ SYSTEMPRO to respond to the needs of growing connected environments.

That investment is also protected by the unsurpassed expansion capabilities of the COMPAQ SYSTEMPRO. The PC system provides up to 4.28 gigabytes of drive storage capacity and memory expansion up to 256 megabytes. Its tower chassis includes 11 expansion slots and easily accommodates up to 11 mass storage devices. Optional tape drives provide up to one gigabyte of backup capacity.

The innovations provided by the COMPAQ SYSTEMPRO deliver an unprecedented combination of performance, expandability, reliability, and compatibility to meet the broad range of demanding networking and multiuser environment needs.

Standard Models and Options

MODEL 386-840[1]

- 386/33 System Processor Board
- Four megabytes of 32-bit system memory
- 840-Megabyte 4-Drive Array
- 32-Bit Intelligent Drive Array Controller
- Eight full-sized expansion slots available
  - –Six 8-/16-/32-bit EISA slots
  - –Two 32-bit processor/memory slots

MODEL 386-420

- 386/33 System Processor Board
- Four megabytes of 32-bit system memory
- 420-Megabyte 2-Drive Array
- 32-Bit Intelligent Drive Array Controller
- Eight full-sized expansion slots available
  - –Six 8-/16-/32-bit EISA slots
  - –Two 32-bit processor/memory slots

MODEL 386-240

- 386/33 System Processor Board
- Four megabytes of 32-bit system memory
- 240-Megabyte 2-Drive Array
- 32-Bit Intelligent Drive Array Controller
- Eight full-sized expansion slots available
  - –Six 8-/16-/32-bit EISA slots
  - –Two 32-bit processor/memory slots

STANDARD PROCESSOR ON INITIAL 386-BASED MODELS

- 386/33 System Processor Board
  - –33-MHz Intel 386 microprocessor
  - –33-MHz cache memory controller
  - –64 Kbytes of 25-ns cache memory
  - –Separate sockets for 33-MHz Intel 387 Numeric Coprocessor and 33-MHz Weitek 3167 Numeric Coprocessor

[1] Model designation is comprised of two parts—the processor type and the storage capacity.

STANDARD FEATURES ON ALL MODELS

- Flexible support for 33-MHz 386 and 33-MHz 486 processor technology
- Support for up to two System Processor Boards
- Enhanced-Page Memory Architecture
- Four megabytes of 32-bit system memory (RAM); expandable to 256 megabytes
- Eleven full-sized expansion slots
  - –Seven full-sized 8-/16-/32-bit EISA slots
  - –Four 32-bit processor/memory slots
- Eleven mass storage device positions
- One 5¼-Inch 1.2-Megabyte Diskette Drive
- Integrated Video Graphics System
- VGA Pass-Through Connector on the 32-Bit 4-Socket System Memory Board
- Enhanced Keyboard
- Two Buffered Asynchronous (Serial) Communications Interfaces, one Parallel Interface, and one Pointing Device Interface
- COMPAQ EISA Configuration Utility
- Disk Cache Utility
- COMPAQ Expanded Memory Manager (CEMM) Utility
- Security Features
  - –Security Lock
  - –Power-on Password
  - –Keyboard Password
  - –Network Server Mode
- 300-Watt Power Supply with Automatic Line Switching
- One-Year Limited Warranty

OPTIONS

Processor/Memory

- 386/33 System Processor Board
- 33-MHz Intel 387 Coprocessor
- 33-MHz Weitek 3167 Coprocessor
- 32-Megabyte Dual-Socket Memory Module
- 8-Megabyte Single-Socket Memory Module
- 8-Megabyte Dual-Socket Memory Module
- 2-Megabyte Single-Socket Memory Module
- 32-Bit 6-Socket Memory Expansion Board

Mass Storage Devices

- 5¼-Inch 1.2-Megabyte Diskette Drive
- 5¼-Inch 360-Kbyte Diskette Drive (Drive B only)
- 3½-Inch 1.44-Megabyte Diskette Drive
- 32-Bit Intelligent Drive Array Controller
- 420-Megabyte Drive Array Pair (Internal Use)
- 15-MHz ESDI Controller
- 650-Megabyte Fixed Disk Drive (Expansion Unit and Internal Use)
- 320-Megabyte Fixed Disk Drive (Internal Use)
- 300-Megabyte Fixed Disk Drive (Expansion Unit Only)
- 210-Megabyte Fixed Disk Drive (Internal Use)
- 120-Megabyte Fixed Disk Drive (Internal Use)
- Fixed Disk Expansion Unit
  - –Model 650 (650-Megabyte Fixed Disk Drive)
  - –Model 300 (300-Megabyte Fixed Disk Drive)
- 320-/525-Megabyte Tape Drive
- 150-/250-Megabyte Tape Drive
- 525-Megabyte Tape Cartridges
- 320-Megabyte Tape Cartridges
- 250-Megabyte Tape Cartridges
- 150-Megabyte Tape Cartridges

Communications

- 2400-Baud Internal Modem (U.S. and Canada only)
- Asynchronous Communications/Parallel Printer Board

Graphics Controllers and Monitors

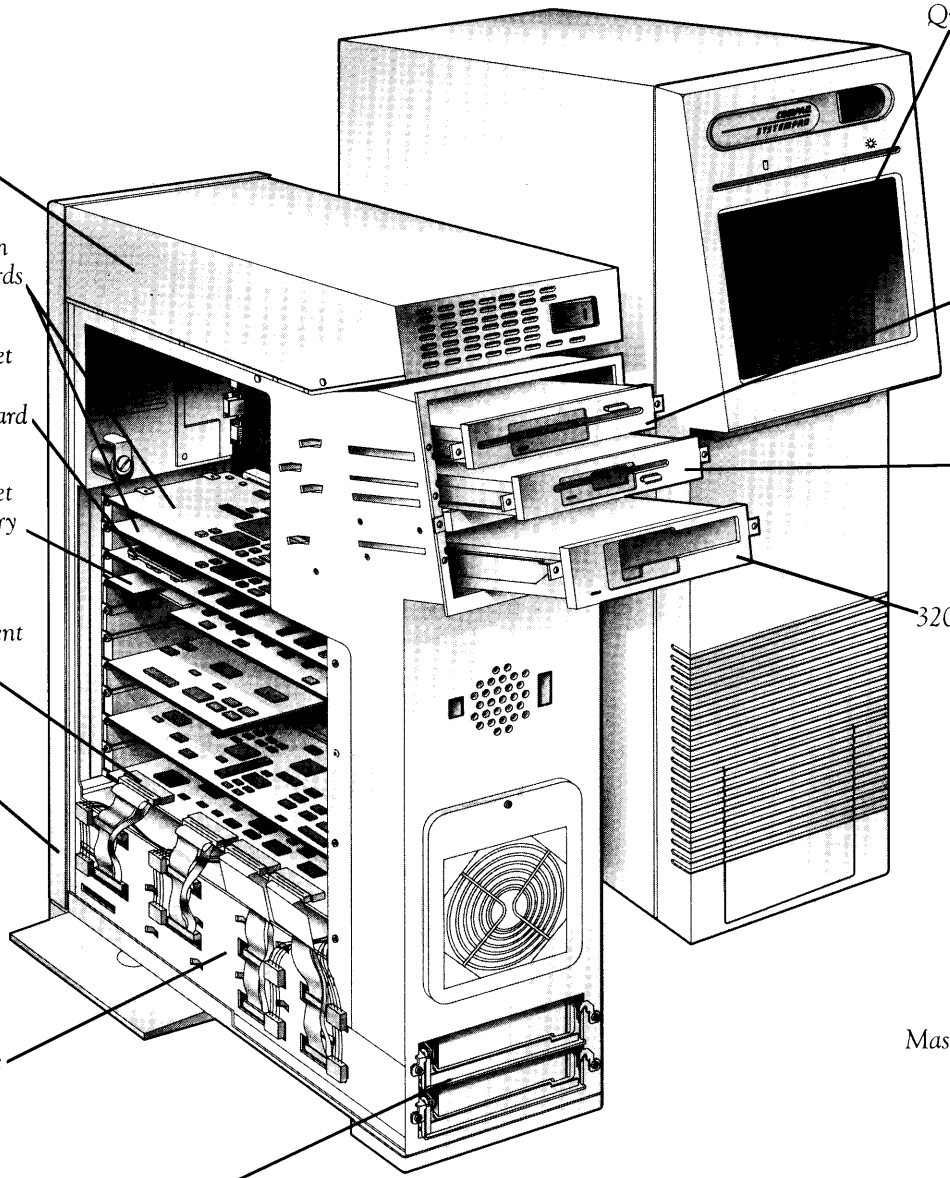
- Advanced Graphics 1024 Board
- Advanced Graphics Memory Board
- Advanced Graphics Color Monitor
- COMPAQ Video Graphics Color Monitor
- COMPAQ Video Graphics Monochrome Monitor
- DGIS Software Interface

Software and Reference Material

- COMPAQ LAN Manager 386/486
- Microsoft Operating System/2 Standard Version 1 as published by Compaq
- MS-DOS Version 4 as published by Compaq
- MS-DOS Version 3 as published by Compaq
- *COMPAQ SYSTEMPRO Personal Computer System Technical Reference Guide*

Flexible support for 33-MHz 386 & 33-MHz 486 Processor Technology

Support for up to 2 System Processor Boards



Up to Eleven Mass Storage Devices

11 Full-Sized Expansion Slots (7 8-/16-/32-bit EISA, 4 32-Bit Processor/Memory)

System Processor

FEATURE	FUNCTION	BENEFIT
System Processor Design	Provides the most powerful and flexible processor design, supporting 33-MHz 386 and 33-MHz 486 processor technology as well as multiple system processors	Meets the processing requirements of demanding departmental applications while protecting the users' investment as applications grow larger and more complex
386/33 System Processor Board (standard and optional): 33-MHz 386 Microprocessor (standard)	Provides advanced processing power as well as a platform for 32-bit software	Increases productivity by processing information faster and provides for future growth potential
33-MHz 82385 Cache Memory Controller (standard)	Allows fastest possible microprocessor-to-memory interaction; 98% of all processor requests are processed at zero wait states	Maximizes performance across all application environments
64 Kbytes of 25-ns Cache Memory (standard)	Stores data in cache memory, increasing probability of a cache hit to 98%	Improves performance relative to current 32-Kbyte cache implementations
33-MHz Intel 387 Numeric Coprocessor (optional)	Increases numeric calculation speed for math-intensive applications	Reduces processing time of numeric-intensive business applications
33-MHz 3167 Weitek Numeric Coprocessor (optional)	Performs math-intensive calculations significantly faster than the 387	Provides optimal coprocessing speed for numeric-intensive business applications
Support for 33-MHz 486 processor technology	Includes support for 33-MHz 486 processor technology as it becomes available; in multiprocessing configurations provides up to four times the computing power of a single 33-MHz 386 processor	Allows the user to take full advantage of the power and capabilities of the 486 processor, including support in multiprocessing configurations

	FEATURE	FUNCTION	BENEFIT
System Processor *(continued)*	Support for multiple system processors	Adds a second system processor for significantly increased performance; two 386/33 system processors perform up to twice as fast as a single 386/33 processor	Delivers unsurpassed system processing power to networking and multiuser environments
		Supported by extensions to leading network and multiuser operating systems	Allows thousands of departmental applications to benefit without modification
System Architecture	COMPAQ Flexible Advanced Systems Architecture with Multiprocessing Support or Flex/MP (standard)	Integrates COMPAQ multiple system processor technology, a 32-bit processor/memory bus, and the EISA 8-/16-/32-bit expansion bus	Delivers the highest possible 32-bit system performance while ensuring compatibility, protecting the users' current hardware and software investment
Expansion Bus Architecture	Extended Industry Standard Architecture (EISA) (standard)	Provides an open extension to the Industry Standard Architecture (ISA) expansion bus, allowing 32-bit data transfer and bus master support for high-speed expansion boards while maintaining compatibility with 8- and 16-bit boards	Supports the I/O performance demands of emerging networking and multiuser applications while allowing the user to choose from the largest selection of 8-, 16-, and 32-bit expansion options
	COMPAQ EISA Configuration Utility	Provides software-assisted configuration for EISA-based systems	Makes system setup quick and easy
System Memory	Four megabytes of 32-bit 80-ns Enhanced-Page Memory (standard)	Provides the basic memory required for network and multiuser applications, processed at 32 bits per cycle	Improves system performance by storing more data in high-speed 32-bit memory
	Shared system memory design (standard)	Permits the standard system processor and an optional system processor to share system memory	Reduces the need to add extra memory when a second processor is added
	Expandable to 256 megabytes • 2-, 8-, and 32-Megabyte Memory Modules (optional) • 32-Bit 6-Socket Memory Expansion Board (optional)	Allows growth of 32-bit system memory to unprecedented levels	Delivers exceptional memory growth path for current and future applications without requiring the use of an EISA expansion slot

	FEATURE	FUNCTION	BENEFIT
System Memory *(continued)*	Flexible memory configuration	Allows the user to add combinations of 2-, 8-, and 32-Megabyte Memory Modules in any order	Provides ultimate flexibility in memory configuration to achieve a variety of memory capacities
	COMPAQ Expanded Memory Manager (CEMM)	Supports the Lotus/Intel/Microsoft Expanded Memory Specification (LIM/EMS) standard Version 4.0, enabling applications to access memory beyond the MS-DOS limit of 640 Kbytes	Allows efficient manipulation of large amounts of data without purchase of additional hardware or software
Diskette Drives	Supports up to two	Choice of sizes, capacities	Provides compatibility with industry standard and flexibility in capacity
	5¼-Inch 1.2-Megabyte (one third-height) (standard and optional)	Reads from/writes to 1.2-megabyte diskettes and 360-Kbyte diskettes	
	5¼-Inch 360-Kbyte (one third-height) (optional)	Reads from/writes to 360-Kbyte diskettes	
	3½-Inch 1.44-Megabyte (one third-height) (optional)	Reads from/writes to 1.44-megabyte and 720-Kbyte diskettes	
Fixed Disk Drive Arrays	Supports up to four drive array pairs 840-Megabyte 4-Drive Array (standard) • Two half-height • Six megabyte-per-second array transfer rate • 32-Bit IDA Controller	A series of synchronized fixed disk drives that can be addressed as a single, higher-performance logical drive	Improves storage performance in connected-user environments by transfering data in parallel and servicing multiple data requests simultaneously
	420-Megabyte 2-Drive Array (standard and optional) • Half-height • Three megabyte-per-second array transfer rate • 32-Bit IDA Controller		
	240-Megabyte 2-Drive Array (standard) • Half-height • Three megabyte-per-second array transfer rate • 32-Bit IDA Controller		

	FEATURE	FUNCTION	BENEFIT
Fixed Disk Drive Arrays *(continued)*	Drive Array Expansion to 1.68 gigabytes	Supports internal storage of more than 840,000 pages of information—greater than any other PC platform	Provides unsurpassed internal storage expansion to meet a variety of user needs with increased performance
32-Bit Intelligent Drive Array (IDA) Controller		Provides superior 32-bit performance and data reliability in support of COMPAQ drive arrays	Delivers breakthrough drive storage performance within connected-user environments and protects users from critical data loss
	Parallel data transfers	Distributes data across a series of synchronized drives to provide array transfer rates up to four times faster than non-arrayed drive systems	Provides high data throughput, optimizing performance
	Simultaneous request servicing	Services multiple requests for user data simultaneously	Improves overall data throughput rate for connected-user environments
	Optimized request management	Provides intelligent management of, and access to, drive arrays, efficiently queuing multiple requests for data	Improves the response rate to multiple requests for data stored on the network server or multiuser host
	32-Bit bus master operation	Transfers data to system memory in burst rates up to 33 megabytes per second while minimizing system processor overhead	Permits faster transfer of disk data to system memory while maximizing system processing power for application tasks
	Data reliability options: Data guarding	Allocates 25% of the drive array storage to guard user data; requires four or eight drives in the array	Uses a minimum amount of disk space to protect critical data; works with any operating system
	Drive mirroring	Allocates 50% of drive array capacity to act as physical mirror image of user data	Protects critical data while improving system performance; works with any operating system
	Duplexing	Uses two controllers and arrays to protect against drive or controller failure	Provides maximum reliability; in the event of a drive or controller failure, remaining controller and arrays can service the requests

	FEATURE	FUNCTION	BENEFIT
Controller *(continued)*	Drive replacement alert system	Provides audible and visual warning for immediate notification of a drive failure	Allows the user to quickly restore the system to full operating speed
Fixed Disk Drives	Supports up to four 650-Megabyte (optional) • Full-height • <18 ms average access time • 1:1 interleave • 15-MHz ESDI Controller 320-Megabyte (optional) • Half-height • <18 ms average access time • 1:1 interleave • 15-MHz ESDI Controller 210-Megabyte (optional) • Half-height • <19 ms average access time • 1:1 interleave • Integrated controller 120-Megabyte (optional) • Half-height • <19 ms average access time • 1:1 interleave • Integrated controller	Provides choice of high-performance mass-storage devices that combine with drive arrays to provide total expansion up to 4.28 gigabytes	Permits customizing of system for a wide range of individual or multiple user applications, including database management, local area networking, and multiuser systems
	Fixed Disk Expansion Unit Models 650 and 300 (optional)	Supports up to two full-height fixed disk drives in each unit; 650-megabyte or 300-megabyte	Allows up to 2.6 gigabytes of mass-storage capacity for demanding applications
	300-Megabyte Fixed Disk Drive (optional) • Full-height • <18 ms average access time • 1:1 interleave • 15-MHz ESDI Controller	Increases capacity of Fixed Disk Expansion Unit by 300 megabytes	Allows gradual build-up in expansion units

Tape Drives

FEATURE	FUNCTION	BENEFIT
	Copies and verifies data stored on a fixed disk drive onto a removable tape cartridge	Permits backup of important or sensitive data
320-/525-Megabyte (optional)	Copies and verifies up to 525 million characters of data onto a removable tape cartridge at a transfer-and-verify rate of 11 megabytes per minute	Allows backup of larger capacity fixed disk drives in less time
150-/250-Megabyte (optional)	Copies and verifies up to 250 million characters of data onto a removable tape cartridge at a transfer-and-verify rate of 5 megabytes per minute	Allows backup of larger capacity fixed disk drives in less time
Second tape drive (optional)	Allows two high-capacity tape drives to be addressed as one logical drive, providing more than one gigabyte of backup capacity	Provides greater unattended backup capacity and offers redundant tape drives to ensure backup capacity is available

Expansion

Eleven Slots total: • Seven 8-/16-/32-bit EISA expansion slots	Allows for installation of industry-standard 8-/16-/32-bit expansion options (supports up to six EISA bus master boards)	Increases system flexibility by providing the ability to customize the computer for today's and tomorrow's needs
• Four 32-bit processor/ memory expansion slots	Allows for internal 32-bit system processor and memory expansion	Provides optimum expansion of high-performance system processor and memory capabilities
QuickAccess storage area	Allows installation of up to three removable media devices of any size, at a convenient orientation and height	Allows user maximum flexibility in choice of diskette or tape devices and provides comfortable access to the media

	FEATURE	FUNCTION	BENEFIT
Expansion *(continued)*	Lower storage area	Supports up to eight, half-height 3½-inch storage devices (four drive array pairs) or two full-height 5¼-inch storage devices, permiting mirroring of high-capacity drive arrays and fixed disk drives	Allows system storage capabilities to evolve as user needs increase
Standard Interfaces	Two buffered asynchronous (serial) communications Parallel printer Pointing device (mouse)	Allows the connection of high-speed serial (up to 19.2 Kbaud) and parallel devices and permits use of a mouse or other pointing device	Offers flexibility in choosing ouput devices at no incremental cost and without using an expansion slot
Keyboard	Enhanced Keyboard	Includes ten-key pad and dedicated keys for screen and cursor control	Increases productivity by enabling faster cursor and screen movement and easier numeric input
Modem	2400-Baud Internal Modem	Provides communications capabilities to transfer data to and from other personal computers, mainframes, or outside services over telephone lines	Enables users to choose from a wide array of Hayes-compatible communications programs
Power Supply	Steady State: 300 Watts with Automatic Line Switching (120/220-240V); peak at 360 Watts	Determines voltage of incoming power and switches to provide power for all available configurations	Provides ample power to run existing and anticipated system configurations in either 120V or 220-240V environments

Physical Characteristics

FEATURE	FUNCTION	BENEFIT
System Dimensions: • Height: 23.8 inches (60.5 cm) • Depth: 20.3 inches (51.6 cm) • Width: 7.6 inches (19.2 cm)	Delivers expansion and configuration flexibility in an exciting new form factor	Provides processing power in a design appropriate for departments or individuals
Aluminum chassis design	Uses strong aluminum alloy chassis design to minimize weight	Lightweight chassis is easy to manuever
Cable manager	Provides efficient cable routing support on the rear panel	Improves access to peripherals and simplifies cable arrangement

Operating Systems

COMPAQ LAN Manager 386/486 (optional)	Provides 32-bit specific implementation of OS/2 LAN Manager, optimized for COMPAQ SYSTEMPRO features	Delivers the highest performing implementation of OS/2 LAN Manager for a broad range of existing and future applications
MS OS/2 Standard Version 1.2 Diskettes, Command Reference and User's Guide (optional)	Provides a multitasking feature, 16 megabytes of RAM addressability, Presentation Manager graphic user interface, and MS-DOS emulation	Provides advanced capabilities and ease-of-use features for the personal computer environment
	Includes new High Performance File System, which uses advanced memory caching	Improves overall system performance and functionality
MS-DOS Version 4 Diskettes and Reference Guides (optional)	Includes MS-DOS Shell graphical user interface and COMPAQ FASTART installation and upgrade utility; supports LIM 4.0 for expanded memory enhancements; and allows logical fixed disk drive partitions up to two gigabytes	Increases productivity through ease-of-use improvements, expanded memory use, and greater fixed disk drive partition size
MS-DOS Version 3 Diskettes and Reference Guide (optional)	Enables partitioning of high-capacity fixed disk drives into logical drives of up to 512 megabytes each	Ensures compatibility with the installed base of software and allows efficient use of high-capacity fixed disk drives

FEATURE	FUNCTION	BENEFIT
Integrated Video Graphics System with Graphics Accelerator (standard)	Supports VGA, CGA, and EGA graphics resolutions up to 50% faster than other integrated VGA products; displays up to 256 colors simultaneously	Allows greater graphics creativity while protecting software investment
	Graphics Accelerator combines hardware and software to perform typical graphic operations such as scrolling, popups, and pull-down menus up to 25% percent faster than other 16-bit VGA products	Increases productivity in graphics-based environments such as Windows/386 and Presentation Manager
VGA Pass-Through Connector on the System Memory Board (standard)	Provides VGA, EGA, and CGA compatibility when used with video display boards that support resolutions beyond VGA	Protects investment by ensuring VGA software compatiblity when using high-resolution display boards
Advanced Graphics 1024 Board with 50-MHz TI 34010 Graphics System Processor (optional)	Provides high-performance, high-resolution display capabilities • 1024 x 768 resolution with 16 colors or 640 x 480 resolution with 256 colors • 1024 x 768 resolution with 256 colors with optional memory board	Provides higher performance in graphics-intensive applications such as CAD/CAE or business graphics
Advanced Graphics Color Monitor (optional)	High-resolution graphics on a 16-inch (diagonal) screen with up to 256 colors in 1024 x 768 or 640 x 480 resolutions	Provides high-quality images that make details easier to see
COMPAQ Video Graphics Color Monitor (optional)	VGA-compatible, displaying 256 colors in 320 x 200 graphics resolution, 16 colors in 640 x 480 resolution, and text in 720 x 400 resolution on a 14-inch (diagonal) screen	Provides high-quality images with a wide selection of colors for business applications
COMPAQ Video Graphics Monochrome Monitor (optional)	Displays graphics in 640 x 480 resolution and text in 720 x 400 resolution and allows for black letters on white display with 12-inch (diagonal) screen	For less-demanding video applications and environments requiring high-quality display such as networking or word processing

Expansion

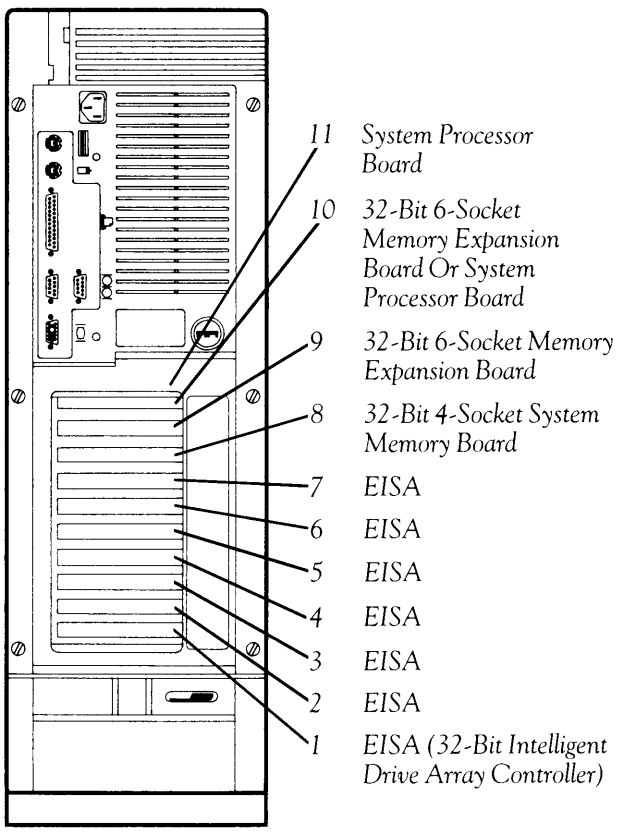
System Expansion

The tower design of the COMPAQ SYSTEMPRO Personal Computer System offers 11 expansion slots and room for up to 11 mass storage devices.

Seven expansion slots are Extended Industry Standard Architecture (Extended ISA or EISA) slots, providing support for new high-performance 32-bit EISA boards as well as 8- and 16-bit ISA boards.

Figure 1 shows the location and order of the eleven expansion slots.

Figure 1. Form Factor Overview



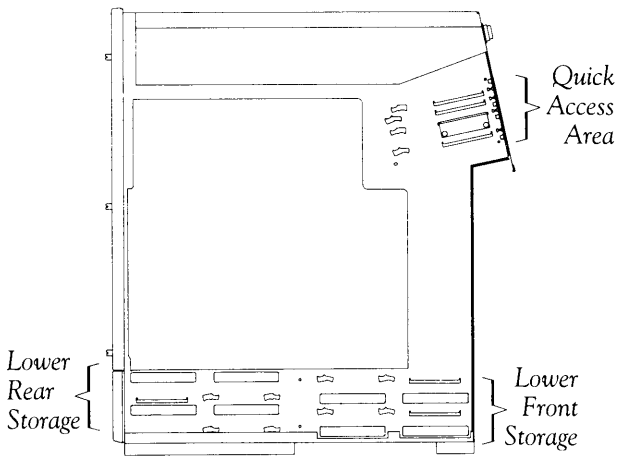


Figure 2. Storage Areas

The remaining four slots are flexible 32-bit processor/memory slots reserved for central system resources, including standard and optional system processors and high-speed 32-bit memory.

By using three processor/memory slots for memory boards, system memory can be expanded to 256 megabytes of RAM. Or the user can choose to add a second system processor while still expanding RAM to 160 megabytes.

Figure 1 shows the location and order of the eleven expansion slots.

As Figure 2 shows, the QuickAccess storage area comes with a 1.2-megabyte 5¼-inch diskette drive installed, and provides room for up to two more accessible, half-height storage devices, such as diskette, tape, or CD-ROM drives. The lower storage area offers room for eight half-height 3½-inch or two full-height 5¼-inch devices. For example, the lower storage area can be used to install eight synchronized fixed disk drives in an 8-drive array. As Figure 2 shows, both the front and rear storage areas allow access to two half-height devices (or one full-height device).

Memory Expansion

The COMPAQ SYSTEMPRO comes standard with a 32-Bit 4-Socket System Memory Board. Initial models are configured with four megabytes of memory.

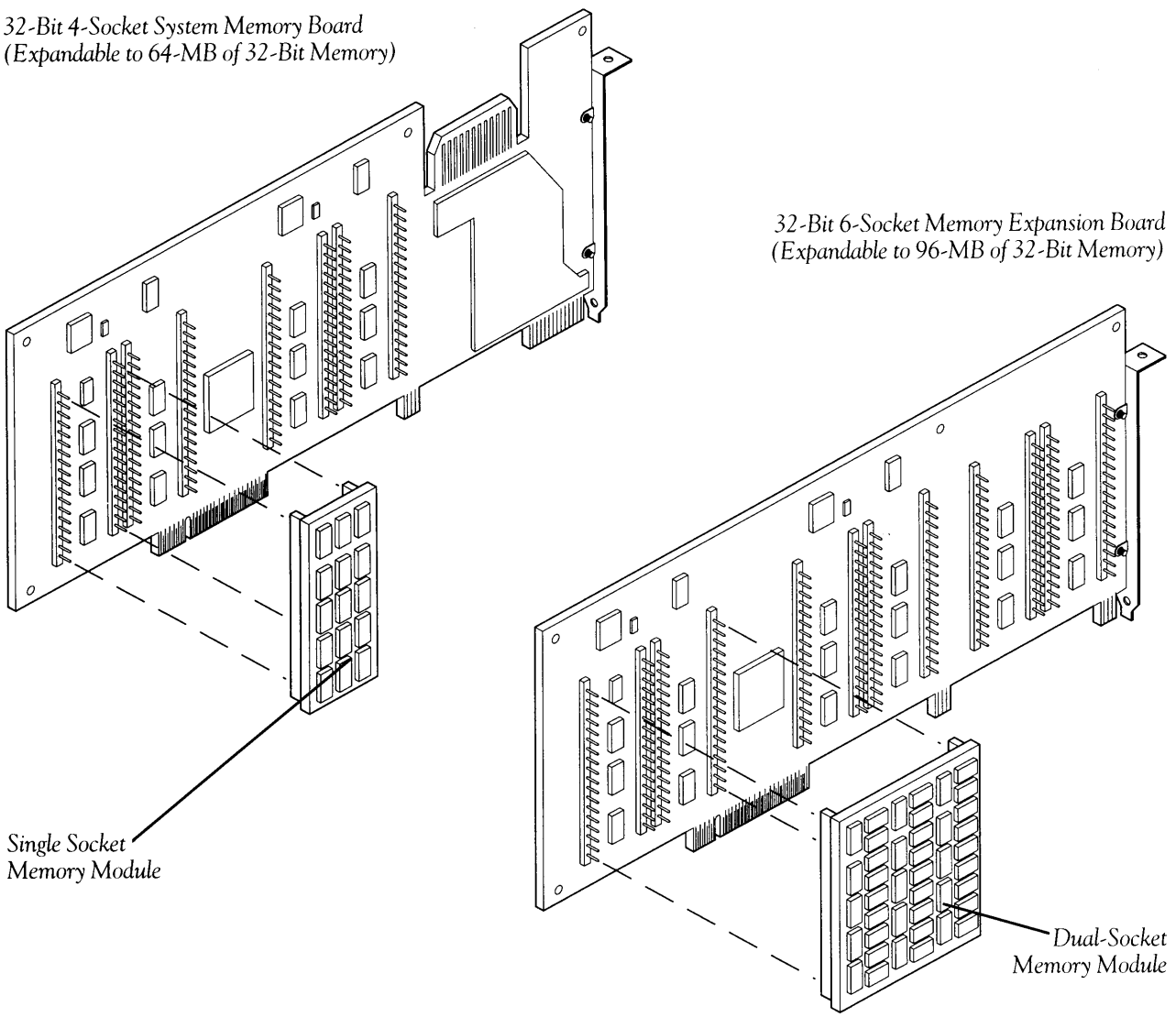
Memory can be expanded up to 256 megabytes on any of these models by adding memory modules and up to two optional 32-Bit 6-Socket Memory Expansion Boards.

Memory modules can be installed in any combination on the system memory boards. Four types of memory modules are available:

- The 2-Megabyte Single-Socket Memory Module occupies one socket.
- The 8-Megabyte Dual-Socket Memory Module occupies two sockets.
- The 8-Megabyte Single-Socket Memory Module uses new 4-Mbit technology to occupy only one socket.
- The 32-Megabyte Dual-Socket Memory Module uses new 4-Mbit memory technology to occupy only two sockets.

Figure 3 illustrates memory expansion options for the COMPAQ SYSTEMPRO.

Figure 3. 32-Bit 4-Socket System Memory Board and 32-Bit 6-Socket Memory Expansion Board



Drive Storage Expansion

The COMPAQ SYSTEMPRO allows expansion of fixed disk drive arrays up to 1.68 gigabytes internally. The addition of up to 2 external Fixed Disk Expansion Units raises the total drive expansion capability to 4.28 gigabytes. (Each expansion unit supports up to two 650- or 300-Megabyte Fixed Disk Drives.)

Drive storage in the COMPAQ SYSTEMPRO is configured as follows:

- Model 386-840, which provides a full 840 megabytes of data storage with a four-drive array.
- Model 386-420, which provides 420 megabytes of fixed disk storage in a two-drive array.
- Model 386-240, which provides 240 megabytes of fixed disk storage in a two-drive array.

The standard two- or four-drive array can be expanded by installing optional 420-Megabyte Drive Array Pairs. The maximum number of arrayed drives in a COMPAQ SYSTEMPRO is eight (or four drive array pairs). Figure 4 illustrates COMPAQ drive array options.

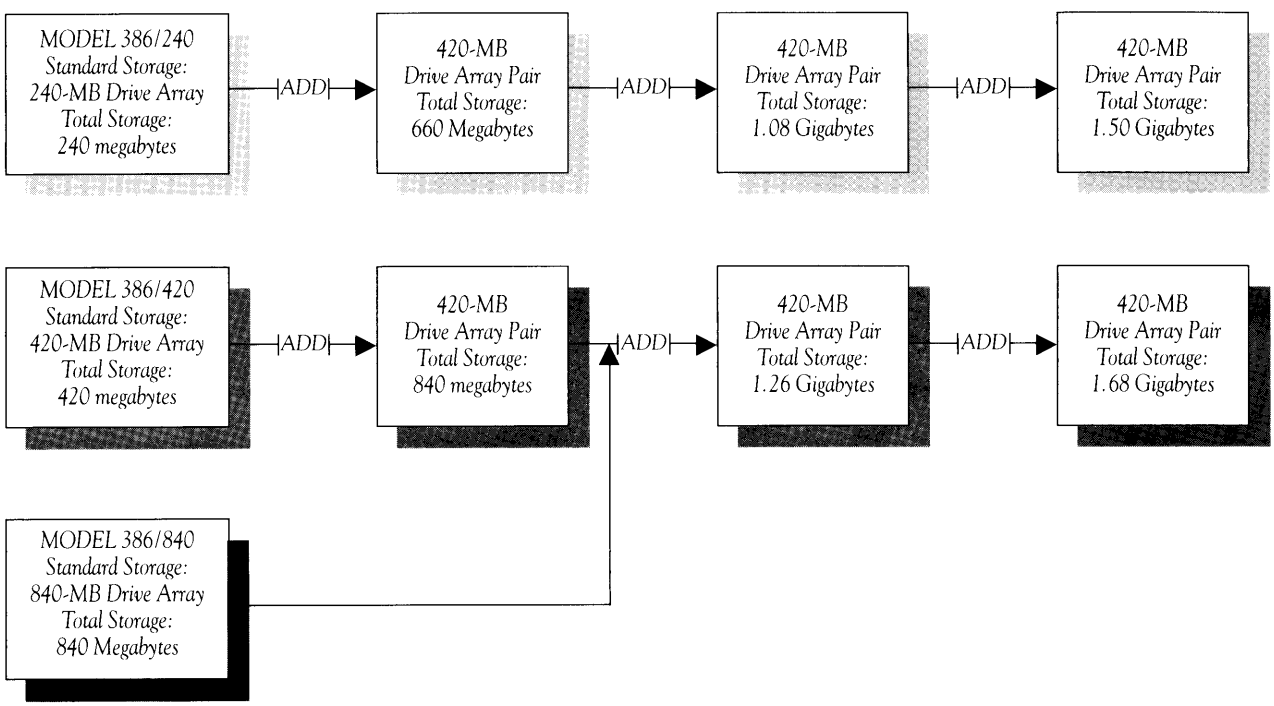
When installing and configuring drive array systems, the following guidelines apply:

- More than one logical drive array can be installed.
- Drive array pairs of different capacity must be configured as separate logical drives. For example, the Model 386-240 comes standard with a 240-Megabyte Drive Array Pair. If a 420-Megabyte Drive Array Pair is added, it must be configured as a separate logical drive.
- When adding a second drive array pair with the same capacity—for example, upgrading a Model 386-420 with a second 420-Megabyte Drive Array Pair—the user has two options. The new drive array pair can be added as a second logical drive. Or the new drive array pair can be added to the existing logical drive to gain additional performance.

NOTE: If the new drive array pair is added to the existing logical drive, the user must first back up all data, reconfigure both drive array pairs as a single logical drive, format the drive, then restore the data.

The COMPAQ SYSTEMPRO also comes standard with an integrated fixed disk drive controller. The PC System supports up to two 120- and 210-Megabyte Fixed Disk Drives in a nonarrayed configuration.

Figure 4



Technical Specifications

Diskette Drives

	1.2-MEGABYTE 5¼-INCH	360-KBYTE 5¼-INCH	1.44-MEGABYTE 3½-INCH
LED Indicators Read/Write (high density)	Green/Orange	N/A/Orange	Green/Orange
Capacity per Diskette (high/low)	1.2 MB/360 KB	N/A/360 KB	1.44 MB/720 KB
Drives Supported	Two	Two	Two
Drive Height	One-third	One-third	One-third
Drive Rotation (rpm)	360	300	300
Transfer Rate (bits/sec) (high/low)	500 K/300 K	N/A/250 K	500 K/250 K
Bytes/Sector	512	512	512
Sectors/Track (high/low)	15/9	N/A/9	18/9
Tracks/Side (high/low)	80/40	N/A/40	80/80
Access Times:			
Track-to-Track (ms)	3	6	3
Average (ms)	79	80	79
Settling Time (ms)	15	15	15
Latency Average (ms)	84	100	100
Cylinders (high/low)	80/40	40	80/80
Read/Write Heads	Two	Two	Two

Fixed Disk Drive Arrays

	840-MEGABYTE	420-MEGABYTE	240-MEGABYTE
Standard Configuration	COMPAQ SYSTEMPRO Model 386-840	COMPAQ SYSTEMPRO Model 386-420	COMPAQ SYSTEMPRO Model 386-240
Drive Array Pairs Supported	Four	Four	Four
Spindle Synchronization	Yes	Yes	Yes
Formatted Capacity/Drive Array:			
Standard	849.4 MB	424.7 MB	242.5 MB
With Data Guarding	636.8 MB	N/A	N/A
With Mirroring	424.7 MB	212.6 MB	121.4 MB
Drive Array Pair Height	Half	Half	Half
Drive Array Pair Size (in inches with drive frame)	5¼	5¼	5¼
Half-Height Drive Positions Used	Two	One	One
Controller	32-Bit IDA	32-Bit IDA	32-Bit IDA

Fixed Disk Drive Arrays *(continued)*

	840-MEGABYTE	420-MEGABYTE	240-MEGABYTE
Array Transfer Rate (bits/sec)	48 M	24 M	24 M

32-Bit Intelligent Drive Array Controller

FEATURE	SPECIFICATION
Processor	16-MHz 80186
Command List Buffer	256-Kbyte, 80-ns pseudo static RAM
Data Transfer Buffer	128-Kbyte, 30-ns static RAM
Drives Supported	Up to eight
Data Transfer Method	32-bit bus master
Simultaneous Drive Transfer Channels	Four
Reliability Features:	
Data Guarding	Yes
Drive Mirroring	Yes
Controller Duplexing	Yes

Fixed Disk Drives

	650-MEGABYTE (OPTIONAL)	320-MEGABYTE (OPTIONAL)	300-MEGABYTE (OPTIONAL)
Standard Configuration	Fixed Disk Expansion Unit (Model 650)	N/A	Fixed Disk Expansion Unit (Model 300)
LED Indicators Read/Write	Green	Green	Green
Formatted Capacity/Drive	651.3 MB	325.0 MB	315.3 MB
Drives Supported	Two[1]	Two	Two
Drive Height	Full	Half	Full
Drive Size (in)	5¼	5¼	5¼
Drive Type(s)	49, 41	28	38
Controller	15-MHz ESDI	15-MHz ESDI	15-MHz ESDI
Transfer Rate (bits/sec)	15 M	15 M	10 M
Sector Interleave	1:1	1:1	1:1
Access Times (including settling):			
Track-to-Track (ms)	5	5	5
Average (ms)	<18	<18	<18
Maximum (ms)	40	40	40

[1]Per system unit or per optional expansion unit, permitting up to a total of four.

Fixed Disk Drives *(continued)*

	650-MEGABYTE (OPTIONAL)	320-MEGABYTE (OPTIONAL)	300-MEGABYTE (OPTIONAL)
Physical Configuration:			
Cylinders	1632	1744	1222
Heads	15	7	15
Sectors Per Track	52	52	34
Bytes Per Sector	512	512	512
Logical Configuration:			
Cylinders	816/1631	872	611
Heads	30/15	14	16
Sectors Per Track	52/52	52	63
Bytes Per Sector	512/512	512	512

	210-MEGABYTE (OPTIONAL)	120-MEGABYTE (OPTIONAL)
LED Indicators Read/Write	Green	Green
Formatted Capacity/Drive	212.6 MB	121.4 MB
Drives Supported	Two	Two
Drive Height	Half	Half
Drive Size (in)	3½	3½
Drive Type(s)	51	50
Controller	Integrated	Integrated
Transfer Rate (bits/sec)	12 M	12 M
Sector Interleave	1:1	1:1
Access Times (including settling):		
Track-to-Track (ms)	5	5
Average (ms)	<19	<19
Maximum (ms)	35	35
Physical Configuration:		
Cylinders	1366	1520
Heads	8	4
Sectors Per Track	38	39
Bytes Per Sector	512	512
Logical Configuration:		
Cylinders	683	760
Heads	16	8
Sectors Per Track	38	39
Bytes Per Sector	512	512

Tape Drives

	320/525-MEGABYTE	150-/250-MEGABYTE
LED Indicators	Green	Green
Drives Supported	Two	One
Drive Height	Half	Half
Approximate Operating Times		
Backup	11 MB/min	5 MB/min
Restore	11 MB/min	5 MB/min
Format Blank Cartridge	Not required	Not required
Maximum Formatted Capacities:		
Per Tape	320.0/525.0 MB	150.0/250.0 MB
Per Track	12.3/20.2 MB	7.5 MB/12.5 MB
Per Data Block	1024 bytes	512 bytes
Mechanical Measurements:		
Tape Width	.25 in	.25 in
Tape Length	620/1020 ft	600/1000 ft
Tape Speed:		
Read/Write (both directions)	120 ips	72 ips
Rewind/Fast Forward	120 ips	90 ips
Per Frame	29 blocks	16 blocks
Track Pattern:	Serpentine	Serpentine
Number of Tracks	26	18
Number of Blocks Per Track	859/1413	16,276/27,126
Number of Data Sectors Per Block	14	N/A
Percentage of ECC	12.5	6.25
Recording Density/Inch	16,000 bpi	10,000 bpi
Flux Reversals/Inch	20,000 ftpi	12,500 ftpi
Track Density/Inch	111	76
Data Encoding Method	4,5 GCR	4,5 GCR
Data Transfer Rate (bps)	1920	720
Error Detection/ Correction	Reed Solomon	Reed Solomon
Tape Cartridge:		
Read/Write	QIC320 DC6320 DC6525	3M 6150/3M 6250 QICI50
Read	QIC320,150, 120,64 DC6525/ 6320/6250/6150/ 600XTD	QIC24,QIC120
Host Adapter	SCSI Option Adapter Board	Tape Host Adapter

Expansion Slots

SLOT	TYPE
1[1]	8-/16-/32-bit full-sized (First 32-Bit IDA Controller Board)
2[1]	8-/16-/32-bit full-sized (Optional second 32-Bit IDA Controller Board)
3[1]	8-/16-/32-bit full-sized
4[1]	8-/16-/32-bit full-sized
5[1]	8-/16-/32-bit full-sized
6	8-/16-/32-bit full-sized
7[1]	8-/16-/32-bit full-sized
8	32-bit (Used for 32-Bit System Memory Board; includes VGA pass-through)
9	32-bit (Used for 32-Bit Memory Expansion Board)
10	32-bit (Used for 32-Bit Memory Expansion Board or second System Processor Board)
11	32-bit (Used for first System Processor Board only)

[1] These expansion slots support 32-bit EISA bus-master expansion boards

System Unit

	ENGLISH	METRIC
Dimensions:		
Height	23.8 in	60.5 cm
Depth	20.3 in	51.6 cm
Width	7.6 in	19.2 cm
Weight:		
Model 840	43.5 lb	19.7 kg
Model 420	39.4 lb	17.9 kg
Model 240	39.4 lb	17.9 kg
Input Requirements:		
Nominal Line Voltage	120 vac	220 to 240 vac
Range Line Voltage	90 to 135 vac	180 to 270 vac
Line Frequency	60 Hz	50 Hz
Current (nominal)	6.5 A	4.0 A
Fuse	10.0 A	10.0 A
Power (watts):		
Steady-State Power	300	300
Peak Power	360	360
Temperature Range:		
Operating	50° to 104° F	10° to 40° C
Nonoperating	50° to 140° F	10° to 60° C
Shipping	−22° to 140° F	−30° to 60° C
Relative Humidity (noncondensing):		
Operating	20% to 80%	20% to 80%
Nonoperating	5% to 90%	5% to 90%

Enhanced Keyboard

	ENGLISH	METRIC
Dimensions:		
Height	1.7 in	4.3 cm
Depth	7.0 in	17.8 cm
Width	18.5 in	47.0 cm
Weight	4.0 lb	1.8 kg

Fixed Disk Expansion Unit (Model 650, Model 300)

	ENGLISH	METRIC
Dimensions:		
Height	6.5 in	16.2 cm
Depth	16.5 in	41.9 cm
Width	14.1 in	35.9 cm
Weight	27.5 lb	12.4 kg
Standard Drive:		
One 650-Megabyte Fixed Disk Drive (Model 650)		
One 300-Megabyte Fixed Disk Drive (Model 300)		

Video

ADVANCED VIDEO GRAPHICS COLOR MONITOR	ENGLISH	METRIC
Type	Color	Color
Mounting	External	External
Dot Pitch	.29mm	.29mm
Maximum Resolution:		
Text Mode	720 x 400	720 x 400
Graphics Mode	1024 x 768	1024 x 768
Color Scale	Supports up to 256 colors simultaneously	Supports up to 256 colors simultaneously
Brightness and Contrast	Adjustable	Adjustable
Diagonal Size	16.0 in	40.6 cm
Scanning	Noninterlaced	Noninterlaced
Bandwidth	41.0 MHz	41.0 MHz
Horizontal Frequency (Dual-synchronous)	53.5 KHz (31.5 KHz VGA mode)	53.5 KHz (31.5 KHz VGA mode)
Vertical Frequency	66 Hz (70 Hz VGA mode)	66 Hz (70 Hz VGA mode)
Integrated Tilt	5° down, 15° up	5° down, 15° up
Swivel	+1° or −90°	+1° or −90°
Temperature Range:		
Operating (sea level to 7,000 ft)	50° to 95° F	10° to 35° C
Operating (above 7,000 ft)	50° to 86° F	10° to 30° C
Nonoperating	30° to 140° F	0° to 60° C
Relative Humidity		
Operating	10% to 90%	10% to 90%
Nonoperating	10% to 95%	10% to 95%

ADVANCED VIDEO GRAPHICS COLOR MONITOR (continued)	ENGLISH	METRIC
Altitude (mean sea level):		
Operating	12,000 ft	3,658 m
Nonoperating	40,000 ft	12,192 m
Dimensions:		
Height	15.0 in	38.1 cm
Depth	15.5 in	39.4 cm
Width	16.0 in	40.6 cm
Weight	40.0 lb	18.2 kg

ADVANCED GRAPHICS 1024 BOARD	ENGLISH	METRIC
Operating Modes	1024 x 768 640 x 480 VGA via VGA pass-through	1024 x 768 640 x 480 VGA via VGA pass-through
Color Scale Standard:		
1024 x 768	16 out of 16.7 million palette	16 out of 16.7 million palette
640 x 480	256 out of 16.7 million palette	256 out of 16.7 million palette
With Optional Memory Expansion:		
1024 x 768	256 out of 16.7 million palette	256 out of 16.7 million palette
640 x 480	256 out of 16.7 million palette	256 out of 16.7 million palette
Standard Memory:	512 Kbytes VRAM 128 Kbytes DRAM	512 Kbytes VRAM 128 Kbytes DRAM
Optional Memory Expansion	512 Kbytes VRAM for 1 MB total	512 Kbytes VRAM for 1 MB total
Bus Width	16-Bit ISA (8-/16-bit operation)	16-Bit ISA (8-/16-bit operation)
Graphics Coprocessor	TI 34010 (50-MHz)	TI 34010 (50-MHz)
Scan Frequency (horizontal/vertical):		
640 x 480	31.5 KHz/60 Hz	31.5 KHz/60 Hz
1024 x 768	53.5 KHz/66 Hz	53.5 KHz/66 Hz
1024 x 768	48.0 KHz/60 Hz	48.0 KHz/60 Hz
VGA	31.5 KHz/60-70Hz	31.5 KHz/60-70Hz
Interface	Analog 15-pin video connector	Analog 15-pin video connector
Environmental Requirements:		
Temperature (with VCC held between 4.74 and 5.25V)	50° to 104° F	10° to 40° C
Humidity	20% to 80%	20% to 80%
Altitude	−100 ft to 8,000 ft	−30 m to 2438 m

Video
(continued)

COMPAQ VIDEO GRAPHICS COLOR MONITOR	ENGLISH	METRIC
Type	Analog/Color	Analog/Color
Mounting	External	External
Dot Pitch	.31 mm	.31 mm
Maximum Resolution:		
Text Mode	720 x 400	720 x 400
Graphics Mode	640 x 480	640 x 480
Character Display	80 x 25	80 x 25
Color Scale	Supports up to 256 colors	Supports up to 256 colors
Brightness	Adjustable	Adjustable
Diagonal Size	14.0	35.56
Bandwidth	30.0 MHz	30.0 MHz
Horizontal Frequency	31.5 KHz	31.5 KHz
Vertical Frequency	60.0/70.0 Hz	60.0/70.90 Hz
Dimensions:		
Height	14.1 in	35.7 cm
Depth	14.6 in	37.0 cm
Width	13.8 in	35.0 cm
Weight	32.0 lb	14.5 kg

COMPAQ VIDEO GRAPHICS MONOCHROME MONITOR	ENGLISH	METRIC
Type	Analog	Analog
Mounting	External	External
Maximum Resolution:		
Text Mode	720 x 400	720 x 400
Graphics Mode	640 x 480	640 x 480
Character Display	80 x 25	80 x 25
Gray Scale	64 Levels	64 levels
Brightness	Adjustable	Adjustable
Diagonal Size	12.0	30.48
Bandwidth	30.0 MHz	30.0 MHz
Horizontal Frequency	31.5 KHz	31.5 KHz
Vertical Frequency	60.0/70.0 Hz	60.0/70.0 Hz
Dimensions:		
Height	10.2 in	26.0 cm
Depth	12.6 in	32.1 cm
Width	11.7 in	29.8 cm
Weight	13.0 lb	5.9 kg

Questions and Answers

Q: *How will the COMPAQ SYSTEMPRO Personal Computer System incorporate emerging processor technologies?*

A: The COMPAQ SYSTEMPRO design incorporates support for advanced 33-MHz 486 processor technology as it becomes available. This flexible design allows the PC system to take full advantage of the power and capabilities of the latest generation of 486 microprocessors, including support in multiprocessing configurations. When available, the 33-MHz 486 can be used as the first, second, or both processors in the system.

Q: *What is multiprocessing?*

A: Multiprocessing refers to the use of more than one system processor to provide powerful management of central computing activity. The COMPAQ SYSTEMPRO incorporates up to two system processors to deliver computing power exceeding that of most minicomputers. COMPAQ multiple processors are supported by extensions to leading operating systems, including Novell NetWare 386, SCO UNIX System V/386, and COMPAQ LAN Manager 386/486.

Q: *How was the multiprocessing implementation optimized in the COMPAQ SYSTEMPRO?*

A: In the multiprocessing design of the COMPAQ SYSTEMPRO, two tightly coupled system processors share the same system memory. This minimizes the need to expand system memory when a second processor is added. In addition, available extensions to leading network and multiuser operating systems can take full advantage of COMPAQ multiple processors, so that thousands of applications benefit from multiprocessing without modification.

Q: *Can the 25-MHz 486 microprocessor be used with the COMPAQ SYSTEMPRO?*

A: To ensure maximum performance, the system processor design of the COMPAQ SYSTEMPRO operates at one clock frequency, 33 MHz. Running at a common clock frequency allows both system processors to interact effectively with system memory and with each other. Since the COMPAQ SYSTEMPRO operates at the fastest possible processing frequency (33 MHz), it does not support the 25-MHz 486 microprocessor.

Q: *What is Extended Industry Standard Architecture (EISA)?*

A: EISA is a 32-bit extension to the Industry Standard Architecture (ISA) expansion bus. A broadly supported standard that is open to all developers, EISA is also compatible with the thousands of 8- and 16-bit boards on the market today for personal computers designed with the Industry Standard Architecture.

Q: *What are the benefits provided by EISA?*

A: A few key high-performance peripherals, such as server-based disk and network interface controllers, require the capacity of the EISA expansion bus to work effectively with a new class of departmental computing applications. Broad industry support means users can continue to choose from a wide selection of peripheral products.

Q: *How is EISA different from MCA?*

A: One important difference between EISA and MCA is that MCA is proprietary—controlled solely by IBM. EISA is an industry standard, open to all vendors.

In addition, EISA is fully compatible with options for the existing industry standard architecture. The capabilities of EISA extend beyond those of MCA. These enhanced capabilites include full 32-bit support (including 32-bit DMA to memory of up to 4 gigabytes), higher transfer rates, larger board space and additional power for increased board functionality.

Q: *What is a bus master?*

A: A bus master is an expansion board that controls bus transactions. In a system with bus-master peripherals, the control of data transfers is shared between the main system processor and the intelligent peripheral devices. A bus master, with its own I/O processor, can operate in parallel with the main processor and transfer data at high speeds. This capability is valuable for high-performance peripherals such as disk and local-area-network (LAN) controllers in high-demand network servers.

Q: *What is Flexible Advanced Systems Architecture with Multiprocessing Support (Flex/MP)?*

A: COMPAQ Flex/MP fully integrates the advances made in processor and I/O activity technology in the COMPAQ SYSTEMPRO to deliver the highest possible 32-bit system performance while maintaining compatibility with industry-standard hardware and software. This design allows the easy integration of new processor technology—such as the 33-MHz 486 microprocessor—as it becomes available.

Q: *What operating systems are compatible with the COMPAQ SYSTEMPRO?*

A: The COMPAQ SYSTEMPRO is compatible with leading operating system environments, including Novell NetWare 386 and NetWare 286, SCO UNIX System V/386, COMPAQ LAN Manager 386/486, MS OS/2, MS-DOS, and others. This means that thousands of industry-standard applications benefit from the high performance of the COMPAQ SYSTEMPRO.

Q: *What are the benefits of COMPAQ drive array technology?*

A: Compaq implemented drive array technology to provide increased performance and reliablity as well as larger storage capacity for today's demanding networking and multiuser environments. Drive array technology provides the unique ability to respond simultaneously to multiple requests for data while providing higher parallel data transfer rates—up to four times faster than nonarrayed drive systems. In addition, COMPAQ drive arrays support the most comprehensive data reliability options to protect critical data.

Q: *What are the reliability options supported by COMPAQ drive arrays?*

A: COMPAQ drive arrays support three reliability options: data guarding, drive mirroring, and controller duplexing. Data guarding and drive mirroring are supported under all operating systems.

Data guarding is an innovative feature that ensures data reliability while using only 25 percent of the drive array capacity. In data guarding, a portion of the drive array is allocated to store additional encoded data. In the event of a drive failure, lost data can be reconstructed by combining encoded data with data from the remaining drives.

With drive mirroring, one drive in the drive array pair "mirrors" the other, providing two copies of every file. If a drive should fail, the "mirror" drive provides a backup copy of the files.

Duplexing uses two 32-Bit Intelligent Drive Array Controllers to ensure data reliability. The two controllers have their own drive arrays, which contain identical data. In the event of drive or controller failure, the remaining array and controller will service all requests. Leading operating systems such as Novell NetWare support duplexing.

Q: *How do COMPAQ drive arrays support disk caching to improve performance?*

A: The 32-Bit Intelligent Drive Array Controller in the COMPAQ SYSTEMPRO works with a *system-managed* disk cache, in which COMPAQ System Processors and the operating system combine to offer several performance advantages. The powerful microprocessors used in COMPAQ System Processor Boards provide the fastest execution of caching algorithms. Because each operating system implements the most efficient disk-caching strategy for the specific application, users achieve maximum performance. In addition, system-managed disk caching uses system memory that can be dynamically reallocated for user data and program space.

Q: *What are the benefits of the new COMPAQ SYSTEMPRO tower chassis design?*

A: With more standard interfaces and additional room for mass storage devices and expansion boards, the new chassis design offers expansion capabilities rivalling that of minicomputers. The updated design reflects the attention to detail typical of COMPAQ products, from the power switch cover that prevents the user from accidently turning off the machine to the cable manager that efficiently routes expansion board cables.