Eagle IIE Series
IIE-1, IIE-2, IIE-3 & IIE-4

■ PROFILE

Operating System • CP/M-80 single-user operating system from Digital Research, Inc

Data Management • no database management system supported by Eagle

Communications/Networks • no remote communications

Languages • CBASIC from Digital Research, Inc

Models • IIE-1, IIE-2, IIE-3, IIE-4

CPU • based on Zilog Z80A CPU

Memory • 64K bytes standard, not expandable

Chassis Slots • no open slots available

Ports • 2 serial and 2 parallel ports standard

Mass Storage • 390K bytes to 1.6M bytes of diskette storage; 10M bytes to 64M bytes of hard disk storage

Terminals/Workstations • single-user systems; display and keyboard integrated in system unit

Printers • none available from Eagle

First Delivery • September 1981 for original product line (Models I, II, III, IV, V); April 1983 for IIE product line replacing entire previous line

Systems Delivered • 7,500 of IIE plus predecessors as of June 1983

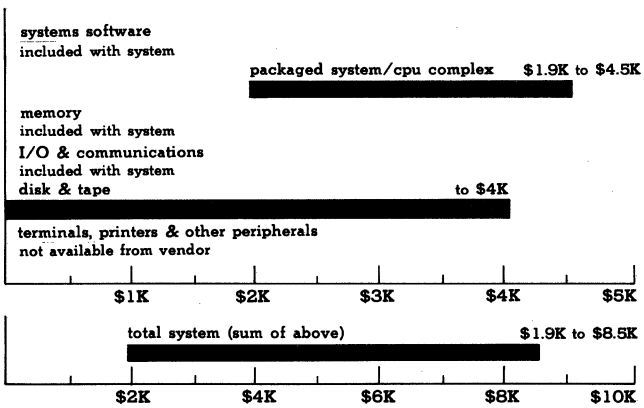
Comparable Systems • over 100 vendors are selling CP/M-compatible desktop microcomputers

Vendor • Eagle Computer, Inc; 983 University Avenue, Los Gatos, CA 95030 • 408-395-5005

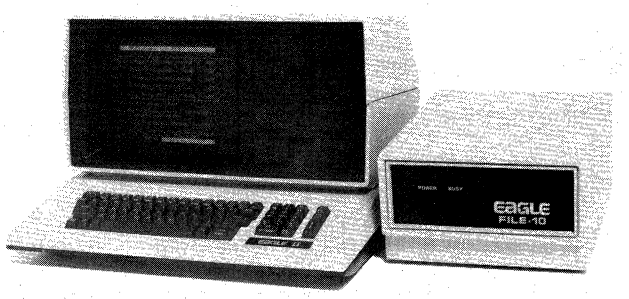
Canada • distributor: DataTek; 5665 Kinsivay, Suite 135, Buonaby, BC V5H 2G4 • 604-437-3751

Distribution • worldwide through company sales/service offices; also 28 distributors to 600 dealers in the U.S. as of June 1983; 10 international distributors

PURCHASE PRICE RANGE — hardware & software



EAGLE IIE SERIES PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing • **SMALL SYSTEM** is based on **IIE-1 packaged system** (includes 8-bit CPU, 64K-byte memory, monitor, keyboard, 390K-byte diskette drive, 2 serial ports, 2 parallel ports, CP/M-80 operating system, CBASIC interpreter, UltraCalc spreadsheet, and Spellbinder word processor • **LARGE SYSTEM** is based on **IIE-4 packaged system** (includes 8-bit CPU, 64K-byte memory, monitor, keyboard, 10M-byte hard disk drive, 780K-byte floppy drive, 2 serial ports, 2 parallel ports, CP/M-80 operating system, CBASIC interpreter, UltraCalc spreadsheet, Spellbinder word processor and the following options: 32M-byte hard disk drive.



■ ANALYSIS

The Eagle IIE systems are 8-bit desktop single user systems based on the Zilog Z80A microprocessor running CP/M-80. The low price includes a bundled diskette subsystem, 12-inch monitor, keyboard, BASIC language, Spellbinder word processing, and UltraCalc spreadsheet analysis software, as well as the CPU, 64K bytes of memory and CP/M-80 (Version 2.2). The series was designed to make maximum use of existing generic software and hardware so that users could complement Eagle offerings with a wide variety of options from third-party vendors.

The IIE series was introduced in April 1983 as a replacement for the previous Eagle CP/M-80 product line models I, II, III, IV, and V. The newer series offers the same features as the older set of models, but at lower, economy (E) prices. It also allows for larger prices, 32M-byte hard disk add-on options, and a local area network (LAN) interface.

The Eagle company was formed in 1981 as a division of Audio Visual Laboratories, Inc, but rapidly developed into a separate company. By June 1983, it had 3 separate product lines and had sold over 8,500 systems.

Over a very short period of time the Eagle company has developed the type of sales/service profile which would appeal to business users. The company has rapidly achieved sufficient stability to become profitable in 1982. Its first stock offering is doing well. This degree of stability is partially due to the IIE series and its predecessors, and

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Eagle IIE Series
IIE-1, IIE-2, IIE-3 & IIE-4

EAGLE IIE STORAGE DIFFERENCES

MODELS	IIE-1	IIE-2	IIE-3	IIE-4
DISKETTE				
Standard No. Drives	1	2	2	1
Standard Capacity	390KB	780KB	1.6MB	780KB
Optional Drives	1	—	—	—
Optional Capacity	780KB	—	—	—
HARD DISK				
10M-byte standard	—	—	—	1
10M-byte option	2	2	2	1
32M-byte option	2	2	2	1
Total No. of Drives	2	2	2	2

partially to the new IBM plug-compatible PC/1600 series lines.

☐ Strengths

The IIE Series was designed with hardware features to support the software. A good example of this and one that has particularly attracted users is keyboard function keys that implement the standard Spellbinder wordprocessing functions with a single keystroke.

The company stability, mentioned previously in the Analysis, is also a notable characteristic since the microcomputer market presently is so volatile.

☐ Limitations

The most obvious limitation of all the Eagle product lines is the lack of remote communications and printer hardware sold and supported by Eagle. Also lacking are high-level program development languages such as COBOL and FORTRAN.

In looking at things from an ergonomic viewpoint, the Eagle IIE keyboard is not detachable, and there are no provisions for tilting the screen to adjust to the operator.

■ SOFTWARE

☐ Terms & Support

Terms • CP/M-80 operating system, CBASIC language, Spellbinder word processing, and UltraCalc spreadsheet analysis are included in the basic packaged system price • optional software products are available on a one-time fee basis.

Support • corrective updates and enhancements from the manufacturer • support through distributors, dealers.

☐ Software Overview

The Eagle IIE Series comes bundled with enough software packages for the entry-level user to utilize the system without worrying about what products to buy. These bundled packages include an operating system, programming language, spreadsheet, and word processor. Eagle also offers a set of accounting packages as an option.

CP/M (2.2) • single-user, single-tasking, general-purpose operating system designed to support the Intel and Zilog families of 8-bit processors; features and facilities of this basic system are all upward compatible and are present in all other versions of CP/M; consists of 4 elemental structures: Basic I/O System (BIOS), Basic Disk Operating System (BDOS), Console Command Processor (CCP), and a Transient Program Area (TPA) • BIOS is the modifiable portion of the operating system enabling users to tailor CPM systems to meet specific configurations; allows users to define all hardware-independent elements of the system by defining low-level interface and the peripheral I/O for the system • BDOS provides all the disk management control; supports up to 16 logical devices, containing up to 65,536 records, with up to an 8M-byte capacity • CCP provides the interface between the user's console and the rest of the CP/M system; it reads, interprets, and executes commands entered from the console; commands are both built-in commands and transient commands; transient commands are loaded into TPA and executed • TPA is the area designated to hold programs that are loaded from disk and then executed • standard utilities provided include: DDT interactive debugger; PIP file transfer utility; DUMP utility; SUBMIT/XSUB batch control utilities; ED command-oriented text editor; ASM assembler; and STAT system status utility • memory requirements depend on number and types of options implemented; basic system requires 20K bytes of memory and an ASCII terminal.

☐ Data Management

No DBMS is supported by Eagle. File handling capabilities are included in CP/M-80.

☐ Communications

No remote communications pacakges are currently sold or supported by Eagle.

☐ Program Development/Languages

CBASIC • from Compiler Systems, Inc • pseudo-code compiler and run-time interpreter • chaining, formatted printing, random and sequential disk access and file control • integer and extended precision variables • bundled in basic system package price.

Flex Menu • allows users to customize their interface menus:
$50 lcns

☐ Application Software

Spellbinder • word processing package from Lexisoft, Inc • implemented with special function keys on IIE keyboard • includes mail merge, alphabetizing, forms design, search and replace, hyphenation, centering, justification; support of 2-column printing, pagination, line numbering, proportional pitch, bidirectional printing, boldfacing, etc • bundled in basic system package.

Accounting Plus • a set of accounting applications packages from Software Dimensions Inc • integrated full set of menu-driven packages with audit trail; online updating of data files; error checking on the interactive data entry up to 10,000 records in most data files; double entry accounting.

Accounting Plus Big 3 • Accounts Payable, Accounts Receivable, and General Ledger:
$495 lcns

LCNS: one-time license fee. RPQ: request price quote. Prices effective as of November 1983.

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Eagle IIE Series
IIE-1, IIE-2, IIE-3 & IIE-4

Accounting Plus Full 8 • Accounts Payable, Accounts Receivable, General Ledger, Inventory Control, Payroll, Sales Order, Purchase Order, Point of Sale:

995

Cyma Software • sets of packages for Dental Practice Management, Medical Practice Management, Client Accounting, others; available from Cyma Corporation or through Eagle:

RPQ

UltraCalc • spreadsheet analysis package from Lattice, Inc • 255 rows and 64 columns of data can be manipulated • user-friendly prompts, error messages • 11 operators and/or algebraic functions can be analyzed; insert, delete, replicate, move, multiple windows • disk save/restore • printer output • included in packaged system.

■ HARDWARE

☐ Terms & Support

Terms • currently offered on a purchase-only basis • distribution channels consist of 28 independent domestic and 10 international distributors supporting a network of over 600 dealers.

Support • service and support are provided by distributors, dealers, and by Bell & Howell third-party service organization.

☐ Physical Specifications (H x W x D); Weight

CPU • 13.5 x 21 x 18 inches; 49 pounds.

Display • integrated with CPU unit.

Keyboard • integrated with CPU unit.

☐ System Overview & Configurability

The Eagle IIE systems are all packaged systems with the CPU, memory, keyboard, monitor, diskette subsystem, I/O ports, operating software and 2 applications packages all included in a single system price. Submodels differ primarily in the amount of main memory and the number and type of diskette/disk drives in the basic system.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

IIE-1 System Maximums • 64K bytes of memory; 780K bytes of diskette storage and 10M bytes or 32M bytes of hard disk storage; 2 serial and 2 parallel ports.

IIE-2 System Maximums • 64K bytes of memory; 780K bytes of diskette storage and 32M bytes of hard disk; 2 serial and 2 parallel ports.

IIE-3 System Maximums • 64K bytes of memory; 1.6M bytes of diskette; and 32M bytes of hard disk; 2 serial and 2 parallel ports.

IIE-4 System Maximums • 64K bytes of memory; 780K bytes of diskette; and 42M bytes of hard disk; 2 serial and 2 parallel ports.

☐ Packaged Systems

Eagle IIE Series

All IIE packaged sytems include a desktop system unit with 8-bit CPU, 64K bytes of memory, 12-inch CRT monitor, keyboard, 2 serial ports, 2 parallel ports, (but no other types of internal expansion slots) CP/M-80 operating system, CBASIC interpreter, UltraCalc spreadsheet analysis and Spellbinder word processing software. Submodels differ as to diskette and/or hard disk capacity as follows.

Eagle IIE-1 • systems unit with monitor and 1 390K-byte diskette drive:

$1,995 prch

Eagle IIE-2 • system unit with monitor and 2 390K-byte diskette drives, totalling 780K bytes:

2,495

Eagle IIE-3 • system unit with monitor and 2 780K-byte diskette drives totalling 1.6M bytes:

2,995

Eagle IIE-4 • system unit with monitor and 1 780K-byte diskette drive and 1 10M-byte hard disk drive, totalling 10.8M bytes:

4,495

☐ CPU

Zilog Z80A Processor • 8-bit internal architecture, 8-bit data bus interface; direct addressing to 64K bytes of memory; fourteen registers include 16-bit program and stack pointers, two index registers, and a duplicate set of an 8-bit accumulator and a 7-bit flag register; upwardly compatible with the Intel 8080, it provides binary coded decimal (BCD) arithmetic, double precision operations, multiple indexing with address registers, multiple interrupt, increment, decrement, and move capabilities • in addition to being able to execute all 78 Intel 8080 instructions, 50 enhancements to the instruction set include advanced block move and search macros, relative jump, and three types of selectable response interrupts, for a total of 128 operations.

☐ Memory

All Eagle IIE systems include 64K bytes of main memory which is not expandable.

☐ I/O & Communications

All I/O devices attach to the 2 RS-232C serial I/O ports or the 2 parallel ports available on every model. Diskette/disk drives have separate standard interfaces.

☐ Mass Storage

All Eagle IIE systems include diskette storage in the basic packaged systems, but the recording format (single or double sided, single or double density) and the number of drives in the basic system vary. The IIE-4 systems include a hard disk drive in the basic system package, but all systems can attach 1 or 2 10M-byte or 32M-byte hard disk as optional features. Hard disk expansion options attach by means of a parallel port. Eagle does not offer any tape drives for the IIE Series.

IIE Diskette Storage

Floppy Disk PC • subsystems record 96 track-per-inch recording density allowing 390K bytes on single-sided, single-density diskettes or 780K bytes for double-sided, single-density diskettes. The number and type of standard and optional drives is model-dependent.

IIE-1 Standard Diskette • single 390K-byte single-sided diskette drive expandable to 2 drives.

Floppy Disk IIE • add-on 390K-byte single-sided drive for IIE-1 only:

$500 prch

IIE-2 Standard Diskettes • 2 390K-byte single-sided drives for a total of 780K bytes.

IIE-3 Standard Diskette • 2 780K-byte double-sided, double-density drives for a total of 1.6M bytes in the basic system.

IIE-4 Standard Diskettes • 1 780K-byte double-sided, non-expandable double-density drive is standard.

IIE Hard Disk Storage

The Eagle IIE-4 basic system includes 10M bytes of hard disk storage in the basic system unit. Winchester hard disk storage is optional in all other sytems. The optional drives, which can be either 10M- or 32M-byte formatted capacity, are added by means of a parallel port; control logic is integral to the standard disk subsystem thus allowing 1 external disk to be added without need of a controller. The model IIE-1 allows a hard disk to be substituted for the second internal floppy diskette drive.

File 10 • 10M-byte formatted capacity, 5.25-inch hard disk drive; 12.75M-byte unformatted capacity • 12.75M-byte unformatted capacity • 3600 rpm, 85-millisecond average access; 2 plotters with 4 read/write heads; totalling 1224 tracks •

PRCH: purchase price. Prices effective as of November 1983.

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Eagle IIE Series
IIE-1, IIE-2, IIE-3 & IIE-4

self loading bootstrap software included • standard on IIE-4; optional on all other models:

$2,495 prch

File 40 • 32M-byte formatted capacity, 5.25-inch hard disk drive; 40M-byte unformatted capacity • 3600 rpm, 85-millisecond average access; 3 plotters with 6 read/write heads; totalling 3840 tracks • self loading bootstrap software included • optional on all models:

3,995

☐ Terminals/Workstations

The Eagle IIE are single-user systems that integrate the display and keyboard in 1 unit.

Display • 12-inch monitor; 80 characters x 24 lines; 25th status line; antiglare green screen standard in every system package but amber or color monitors can be specified.

Keyboard • 75-key fixed typewriter keyboard; is standard in every system pacakge; 32 special function keys preprogrammed to support Spellbinder word processing software; Help key activates built-in help subroutines; separate numeric keypad.

☐ Printers

Eagle does not offer printers for the IIE series. Both a serial and parallel port are available for printer attachment.

• END

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Eagle 16-Bit Systems
PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

■ PROFILE

Operating Systems • MS-DOS and CP/M-86 included with all 16-bit Eagle Systems; Concurrent CP/M and MP/M-86 optionally available on all models.

Data Management • no database management system supported by Eagle.

Communications • EagleNet local area network supported on all models.

Languages • Microsoft's GWBASIC on all models.

Models • PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630, 1640.

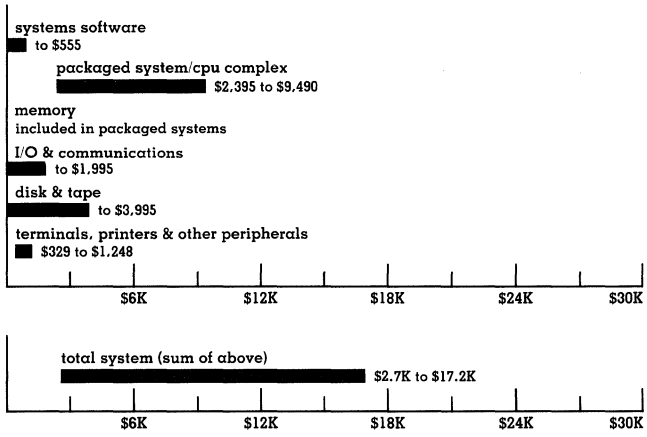
CPU • Intel 8088 based on PC SPIRIT Series and PC Series; Intel 8086 based on 1600 Series.

Memory • PC SPIRIT Series and PC Series support up to 640K bytes of memory; 1600 Series supports up to 512K bytes of memory.

Chassis Slots • PC SPIRIT Series provides 2/1 available expansion slots on PC SPIRIT-2/PC SPIRIT-XL; PC provides 3/1 available expansion slots on PC PLUS-1 and PC PLUS-2/PC-2 and PC PLUS XL; 1600 provides 4/3 available expansion slots on the 1620/1630 and 1640.

Ports • PC SPIRIT and PC Series accommodates 2 RS-232C serial ports and 1 parallel port; the 1600 models provide 2 RS-232C serial ports and 2 parallel ports; an 8 port serial port board is available for all 1600 models using only 1 expansion slot.

PURCHASE PRICE RANGE — hardware & software



EAGLE PC SPIRIT, PC & 1600 SERIES PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing • **SMALL SYSTEM** is based on **PC PLUS-1 packaged system** (includes Intel 8088 microprocessor, 128K-byte memory, 360K-byte floppy disk, 12-inch monitor, 84-key keyboard, 2 serial ports, 1 parallel port, 3 available expansion slots, MS-DOS, GWBASIC, and CP/M-86) • **LARGE SYSTEM** is based on **1640 packaged system** (includes Intel 8086 microprocessor, 512K-byte memory, 780K-byte floppy disk, 32M-byte hard disk, 12-inch monitor, 105-key keyboard, 2 serial ports, 1 parallel port, 3 available expansion slots, MS-DOS and CP/M-86 operating systems, Eagle Writer word processing and EagleCalc spreadsheet software) and the following options: MP/M-86 operating system, GWBASIC compiler, Flex Menu and Flex Key customizing software; EagleNet I local area network communications software & hardware; Intel 8087 Arithmetic Co-Processor; additional 32M-byte hard disk; 2 additional 12-inch monochrome monitors and 105-key keyboards.

Mass Storage • two 32M-byte 5.25-inch hard disks maximum optionally available to all models; two 10M-byte 5.25-inch hard disks alternately available • 360K-byte to 1.6M-byte diskettes are standard, with capacity determined by model.

Terminals/Workstations • PC SPIRIT and PC are single user systems; 1600 can connect up to 8 workstations • all models can be connected to EagleNet local area network.

Printers • none supplied by Eagle.

First Delivery • February 1983 for Eagle 1600; May 1983 for Eagle PC; and October 1983 for Eagle PC SPIRIT.

Systems Delivered • information is not available.

Comparable Systems • over 30 vendors are selling MS-DOS compatible desk top and portable microcomputers including Columbia, Compaq, Corona, and Seequa.

Vendor • Eagle Computer Inc.; 983 University Avenue, Los Gatos, CA 95030 • 408-395-5005.

Canada • Distributor: DataTek; 5665 Kinsway, Suite 135, Burnaby, BC V5H 2G4 • 604-437-3751.

Distribution • worldwide through company sales/service offices; also over 28 distributors to 600 dealers in the U.S.; 10 international distributors.

■ ANALYSIS

Eagle Computer designs, manufactures, markets and supports a full line of 16-bit IBM PC-compatible system and 8-bit small business and personal desktop microcomputer systems. The main emphasis of Eagle's products are ease of use, performance and quality at competitive prices, with a design to utilize a broad base of commercially available applications software. Since Eagle's inception in February of 1981, Eagle has rapidly developed their direct sales/service offices as well as third party distribution and Bell

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Eagle 16-Bit Systems

PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

and Howell maintenance support for their complete product line.

There are currently marketed three 16-bit product lines. The multiuser, desktop, 1600 Series which utilizes the Intel 8086 microprocessor, was first shipped in quantity in February 1983. All 1600 Series are sold bundled with MS-DOS and CP/M-86 operating systems and Eagle's word processing and electronic spreadsheet applications programs. Multiuser MP/M operating system is an optional package for the 1600 Series which provides a growth path with the other Eagle product lines.

Eagle developed the Eagle PC Series to broaden its offering in the personal computer market and to capitalize on the growing market for IBM PC-compatible microcomputers. Shipments of the Eagle PC started in May 1983. The Eagle PC Series uses an Intel 8088 microprocessor and is compatible with most hardware and software designed for the IBM PC. All Eagle PC models are sold bundled with MS-DOS and CP/M-86 operating systems and GWBASIC compiler. The Eagle PC Series provides a growth path of the earlier Eagle 8-bit II E Series.

The latest Eagle offering is a portable IBM PC-compatible series, the Eagle PC SPIRIT. Eagle PC SPIRIT started shipments in October of 1983. Like the Eagle PC the SPIRIT is based on the Intel 8088 microprocessor. It also is sold bundled with MS-DOS and CP/M-86 operating systems and the GWBASIC compiler. Again it offers a viable growth path for the Eagle 8-bit II E Series.

Two models of external storage are provided by Eagle, a 10M-byte or 32M-byte 5.25-inch Winchester disk drive. Two of these devices can be attached to any Eagle computer providing a total of 64M bytes of data storage.

Eagle does not offer either printers or communications line support. But they do provide EagleNet hardware and software supporting a local area network (LAN). This LAN allows up to 64 systems (Eagle and IBM PC's) to be networked.

Communications software, compatible with the Eagle product line is currently available from third-party vendors. Similarly, several database management programs are available.

☐ Strengths

One of the chief strengths of the Eagle 16-bit systems is the IBM compatibility of the system. Current Eagle and IBM system option boards can be swapped and run providing the supporting software is present. It appears that most currently delivered IBM PC software can run on the Eagle PC. Most notable are those containing code from IBM graphics offerings which have caused problems on several systems that claim a high degree of IBM compatibility. The Eagle Systems handle these with no apparent problems. Because of this degree of compatibility Eagle users can avail themselves of the enormous body of third-party hardware and software developed for the IBM PC.

Eagle has incorporated a number of features designed to make their products easy to install and operate. For example, they have customized and enhanced Eagle Writer word processing and EagleCalc spreadsheet software to incorporate instruction "menus" and "help" keys. These features simplify the execution of specific operating commands and provide the user with on-line instruction without having to reference printed manuals. In addition, operating system interaction has been reduced allowing users direct access to application programs, through menus which should simplify operation of the applications.

☐ Limitations

The Eagle systems are aimed at competing with the IBM PC against which they stack up well. The one most obvious limitation of all the Eagle product lines is the lack of communications and printer hardware sold and supported by Eagle. Also lacking are high level program development languages such as COBOL and FORTRAN, although the IBM compatibility of the Eagle systems would mean that software of all types would be plentiful from other vendors.

■ SOFTWARE

☐ Terms & Support

Terms • MS-DOS, GWBASIC and CP/M-86 included in all PC SPIRIT series models; MS-DOS, GWBASIC and CP/M-86 included in all PC series models; the PC-2 also includes Eagle Writer and EagleCalc; Eagle Writer, EagleCalc, MS-DOS and CP/M-86 included in all 1600 series models • optional software products are available on a one-time fee basis.

Support • corrective updates and enhancements from the manufacturer • support through distributors and dealers.

☐ Software Overview

All Eagle systems are bundled with both the MS-DOS and CP/M-86 operating systems. The PC-2 and 1600 Series systems include Eagle Writer and EagleCalc, while GWBASIC is included with both the PC SPIRIT and PC Series. Concurrent CP/M operating system is optionally available on all models, and multiuser MP/M-86 is available for the 1600 Series.

Eagle Writer provides word processing capabilities, while EagleCalc is an electronic spreadsheet facility. Both are optionally available for all Eagle models where they are not bundled into the basic system. GWBASIC is an IBM PC BASICA-compatible BASIC interpreter that is available for all Eagle models.

Two customizing programs are available, one to customize menus (Flex Menu) and one to customize the keyboard table (Flex Key), both are available on all Eagle models.

A completely integrated software accounting system, which was produced by Software Dimensions, that provides 8 separate accounting functions is also available.

To handle networking Eagle provides EagleNet which handles up to 255 stations. Within the networking capability of Eagle is also a software gateway that supports transmission between two or more stations in a network.

☐ Operating Systems

All Eagle systems include both MS-DOS and CP/M-86 operating systems. Concurrent CP/M and MP/M-86 are optionally available on all models.

CP/M-86 • a 16-bit enhanced version of the 8-bit CP/M operating system designed to support the Intel 8086 or 8088 microprocessors; incorporates all the basic elements of the CP/M system but adapts these functions to the larger and faster operating environment • consists of 4 elemental structures: Basic Input/Output System (BIOS), Basic Disk Operating System (BDOS), Command Console Processor (CCP), and a Transient Program Area (TPA) • BIOS is the modifiable portion of the operating system enabling users to tailor CP/M systems to meet specific configurations; allows users to define all hardware-independent elements of the system by defining

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Eagle 16-Bit Systems

PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

low-level interface and the peripheral I/O for the system • BDOS provides all the disk management control; supports up to 16 logical drives containing up to 8M bytes each, for a maximum of 128K bytes of online storage; any one file can reach the full drive size • CCP provides the interface between the user's console and the rest of the CP/M system; it reads, interprets, and executes commands entered from the console; commands are both built-in commands and transient commands; transient commands are loaded into the TPA and executed • TPA is the area designated to hold programs that are loaded from disk and then executed • standard utilities provided include: DDT-86 interactive debugger; PIP file transfer utility; SUBMIT batch control utility; ED command-oriented text editor; ASM-86 assembler; STAT system status utility; and GENCMD that processes Intel "H86" format files • memory requirements depend on number and types of options implemented • supports up to 1M bytes of memory; requires 56K bytes of memory and an ASCII terminal.

MS-DOS 2.00 • single-user, interactive and batch processing operating system with Unix-like hierarchical directories, piping functions, filters and hard disk support; equivalent to IBM-PC DOS 2.0 • supports up to 180K bytes in up to 64 different files in single-sided format and up to 360K bytes in up to 112 files double-sided, and 5M or 10M bytes with thousands of filenames on hard disk; handles records from 1 to 65,535 bytes long in file transfer, executes external (disk based) commands giving the user ability to expand the DOS vocabulary to limits of disk space • batch processing capabilities with automatic execution on power-up, user commands include: DATE, TIME, COPY, ECHO, PATH, MKDIR, RMDIR, CHDIR, TREE, RECOVER, GRAPHICS, BREAK and CTTY • additions over DOS 1.25 in performance include hierarchical directories to facilitate hard disk use, numerous performance enhancements, redirection of input/output I/O, piping of functions (sequentially rather than concurrently as in Unix), higher sector density per track (9 sectors per track vs. 8 in DOS 1.25), and installable device drivers • MS-DOS is divided into four parts: a device-independent I/O handler, an I/O processor, reference and jump vectors in low memory, and a command processor; the device-independent I/O handler on hidden file MSDOS.SYS is the core of MS-DOS through which I/O must be directed; the I/O processor physically moves data and instructions by means of hidden file IO.SYS as commanded by MSDOS.SYS; the command processor using the COMMAND.COM program is responsible for interface between user and MS-DOS, error trapping, batch file processing, interpreting user commands and executing file names • MS-DOS 2.00 will read earlier MS-DOS diskettes; there are several unique system interrupt calls and file descriptors that make programs utilizing these features non-transportable between MS-DOS 2.00 and earlier versions eg: valid MS-DOS 1.25 filenames using certain special characters are not valid in MS-DOS 2.00 • an editor, debugger, and other utilities are provided.

Concurrent CP/M-86 • a single-user, multitasking operating system that is compatible with CP/M-86 and MP/M-86 operating systems; provides a virtual console environment where each virtual console can be performing its own task; one virtual console is always mapped to the physical console and is the foreground console, with all other virtual consoles being background consoles; switching a virtual console to the physical console is accomplished through the use of function keys (typical installations use from 4 to 10 function keys for this process) • supports up to 1M bytes of memory, multiple list devices, and up to 16 logical disk drives, each containing up to 512M bytes of storage for a maximum of 8G bytes of online storage • features include: Real-Time Monitor providing process control and dispatching, as well as queue, flag, and clock management; allows processes to share reentrant code; file management with date and time stamping; and protection of user files and directories through the use of optionally assigned passwords • requires an Intel 8086/8088 microprocessor, 256K bytes of memory (recommended), a console device, disk storage, and a real-time clock • developed by Digital Research, Inc.:

TBA lcns

MP/M-86 • a multiuser, multitasking, multiprogramming operating system designed to support the Intel and Zilog families of 8-bit processors; an enhanced upward-compatible version of CP/M supporting up to 400K bytes of user memory; up to 7 users can be supported using 48K-byte banks of memory • consists of Basic Disk Operating System (BDOS), Extended Disk Operating System (XDOS), Extended Input/Output System (XIOS), Terminal Message Processor (TMP), and Command Line Interpreter (CLI) • BDOS provides the capabilities for managing files and directories, consoles, and printers; supports up to 16 logical drives, each containing up to 512M bytes, for a maximum of 8G bytes of online storage; supports files up to 32M bytes; and supports up to 16 list devices (typically printers and teletypes) • XDOS is the real-time nucleus of MP/M II which monitors the execution of processes and arbitrates conflicts for system resources; it provides facilities for dispatching, queue, flag, and time base management • XIOS is the portion of the operating system that contains all physical hardware-dependent code, such as Input/Output device handlers; maintains disk definition tables which translate logical drive, directory, and file structure to physical characteristics of a disk • TMP provides the interface between users and the system; reads user's commands and repeats them to the CLI • CLI interprets user commands and loads programs based on user command line • includes all commmands (utilities) which are common to CP/M, as well as additional commands unique to MP/M II; some of the additional commands include: MPMSTAT, which displays runtime system status; RDT, a relocatable version of the Dynamic Debugging Tool; SCHED, which allows a specified program to be executed on a specified date and time; ATTACH, which attaches a program to a console; and over 15 others • requires 48K bytes of memory, an ASCII console, and a real-time clock; CP/M 2.2 or MP/M 1.1 must also be implemented • developed by Digital Research, Inc.:

395

☐ Data Management

None directly supported by Eagle. Various third-party data management packages will operate on the Eagle systems.

☐ Communications/Networks

Eagle PC SPIRIT, PC and 1600 Series can be connected to EagleNet I local area network. Eagle does not provide any remote data communications software. EagleNet is a local area network (LAN) capable of expanding to 64 computers and up to 255 stations. EagleNet I converts 2 or more 16-bit personal computers into a business network to share information, databases, and a host of peripherals. It uses the field proven ARCNET standard (baseband, token passing) network system. Additionally, the network utilizes the same high level protocols used to communicate between systems in Xerox's Ethernet network. The RG-62 IBM 3270 coaxial cable, used to connect computers and peripherals within the EagleNet I network is an industry standard. Every station on the network is a fully functioning computer.

EagleNet I Starter Kit • a complete network for 2 personal computers that is ready to connect and use • includes network software, Eagle Mail I, Flex Menu, 2 Eagle Link I adapter boards, one junction and two 20-foot lengths of cable • available for all Eagle 16-bit models:

$1,995 lcns

Eagle Mail I (Internet) • an electronic mail software package • ties the personal computers into an information system; with this feature users can transmit messages, files, documents, spreadsheets, etc. electronically from station to station • included in EagleNet I Starter Kit.

450

☐ Program Development/Languages

Both the PC SPIRIT Series and the PC Series include GWBASIC. Other industry standard languages which will execute on Eagle systems are available from several different vendors.

GWBASIC • pseudo-code compiler and runtime interpreter • supports chaining, formatted printing, random and sequential disk

LCNS: one-time license charge. NA: not available. Prices effective as of November 1983.

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Eagle 16-Bit Systems

PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

access and file control • supports integer and extended precision variables • bundled in basic system price on PC SPIRIT and PC • optionally available on 1600 Series:

$60 lcns

Flex Menu • designed to allow operators to create user friendly menus; for use with software developed and sold by independent vendors • available on all models:

50

Flex Key • designed to allow operators to create a customized keyboard table • available on all models:

50

☐ Application Packages

Eagle Writer Word Processor • menu-driven facility that provides functions for text editing, printing and office management • functions, commands, and disk operations are accomplished with single keystrokes to eliminate command memorization and multiple keystrokes • text editing features include: automatic word wrap; deletion with single keystroke of characters, sentences, paragraphs, lines, or multiple lines; screen line expansion allowing an entire line of 160 characters to be displayed; search, search and replace, search and delete, and search and add • printing capabilities provided are: print to screen rather than printer; true proportional spacing; centering including in proportional spacing mode; proportional justification; sub and super script; and underlining, boldfacing and shadow printing • office management functions are: electronic cut and paste document creation; sorting of records in up to 19 predefined classes as well as standard alphabetic or numerical, ascending or descending sequence; forms creation with fill-ins; and the merging of up to 9 unique pieces of information into a single letter • included in basic system price for PC-2, and 1600 series; available optionally on all other models:

$495 lcns

EagleCalc • electronic worksheet • uses English commands and prompts to perform calculations; displays 255 rows and 64 columns of data; supports all standard worksheet operations including: insert, delete, move, replicate, edit, titles, multiple windows, disk save and restore, and printer output; additional features provided are averages, list counts, maximum and minimum values, sums, percentages, ratios, and logarithms • includes extensive help facilities that display concise description of commands, operations and expressions; data can be readily altered by entry of new data and all affected numbers are automatically recalculated with one command; provides 17 basic commands and 34 operators • included in basic system price for PC-2 and 1600 series; available optionally on all other models:

195

Accounting Plus • a completely integrated software accounting system • menu-driven, prompted system • provides: complete audit trails; on-line updating of data files; error checking on the interactive data entry of records; supports up to 10,000 records in most data files; and supports double entry accounting • available in 2 packages on all Eagle 16-bit models.

Accounting Plus Full 8 • provides 8 accounting functions: Accounts Payable, Accounts Receivable, General Ledger, Inventory, Purchase Order, Point of Sale, Payroll and Sales Order Entry:

995

Accounting Plus Big 3 • provides 3 accounting functions: Accounts Receivable, Accounts Payable, and General Ledger:

495

There is a catalog of over 400 commercially available application packages that can be used with most of the Eagle systems. These packages have been developed by third-party vendors. Most of the applications designed for the IBM PC are compatible with the Eagle PC, PC SPIRIT, and 1600 Series.

■ HARDWARE

☐ Terms & Support

Terms • available on a purchase only basis from the manufacturer • also available through 28 distributors which manage a network of over 600 dealers including Computerland's network of retail outlets worldwide.

Support • provides a limited warranty 90 days for labor, and 1 year for parts from date of purchase • products are serviced nationally by Bell and Howell's service force of more than 600 field representatives operating 175 service locations.

☐ Physical Specifications (H × W × D); Weight

PC

CPU • 5.75 × 20.5 × 13 inches; 26 pounds (total system weight).

Display • 11.75 × 13.5 × 13 inches; included in system weight.

Keyboard • 1.75 × 19 × 8.75 inches; included in system weight.

PC PLUS-XL

CPU • 5.75 × 20.5 × 13 inches; information not available.

Display • information not available.

Keyboard • 1.75 × 18.5 × 7.4 inches; information not available.

PCE, PC-1, PC-2, PC-XL

CPU • 5.75 × 20.5 × 13 inches; 42 pounds (total system weight).

Display • 11.75 × 13.5 × 13 inches; included in system weight.

Keyboard • 1.75 × 19 × 8.75 inches; included in system weight.

1600

CPU • 5.5 × 19 × 19.5 inches; information not available.

Display • 11 × 13.5 × 13 inches; information not available.

Keyboard • 1.75 × 19 × 8.75 inches; information not available.

☐ Systems Overview & Configurability

The Eagle product line provides a broad range of IBM-compatible systems from the IBM PC-compatible Eagle PC and portable PC SPIRIT, to the Intel 8086-based Eagle 1600 Series which is compatible with most IBM PC hardware.

The Eagle PC-2 and PC PLUS-1, 2, and XL are Intel 8088-based microcomputers featuring an 84-key station detachable keyboard (except on PC-2) that can be stored beneath the disk drives in the processor cabinet. All systems are equipped with main memory of 128K bytes, expandable to 640K bytes on the main CPU board. Each of the models is equipped with different amounts of disk storage. The PC PLUS-1, includes a 360K-byte floppy drive, the PC PLUS-2 provides two 360K-byte floppy drives for 720K bytes of storage, the PC-2 provides two 360K-byte floppy drives, and a 105-key keyboard instead of the 84-key keyboard, and the PC PLUS-XL provides 320K bytes of floppy disk storage and 10M bytes of hard disk storage. All systems in this line include GWBASIC, MS-DOS and CP/M-86 operating systems. Two serial ports for telephone communications, printer, or mouse are provided, as well as a parallel port (Centronics-compatible). Four slots are provided for systems peripheral boards that handle items such as: color/graphics board, high resolution 720 × 352 PIXEL graphics monochrome adapter, LAN adapter (Local Area Network Board), and a VCR adapter. The PC PLUS-1 and PC PLUS-2 have 3 of these slots still available, while the PC-2 and PC PLUS-XL have only 1 available.

Eagle's 16-bit portable SPIRIT series is built around the 16-bit Intel 8088 microprocessor and a 9-inch non-glare integral monochrome monitor and an 84-key IBM-type keyboard. The two models, the SPIRIT-2, and SPIRIT-XL include two 360K-byte floppy disk drives, and a single 360K byte floppy disk drive plus a 10M-byte hard disk drive respectively. Standard memory on both SPIRIT models is 128K bytes of RAM expandable to 640K bytes. The systems include GWBASIC, and MS-DOS, and CP/M-86 operating systems software. Two serial ports are provided for printer, telephone com-

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Eagle 16-Bit Systems

PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

munications modem communications or mouse connections, as well as a parallel port for Centronics-type printer connections. Four slots are provided for system peripheral boards supporting a color/graphics board which is included in system, a VCR adapter, and a LAN adapter. Of these slots the PC SPIRIT-2 has 2 available while the PC SPIRIT-XL has 1. The system weighs less than 33 pounds providing easy portability.

The top of the line 1600 series is built around the 16-bit Intel 8086 microprocessor. The 1600 series is PC-compatible and is capable of multiuser and multitasking functions. The 1620 and 1630 are packaged with 128K bytes of memory expandable to 512K bytes, while the 1640 includes 512K bytes of memory. The 1620 is packaged with two 780K-byte floppy disk drives, while the 1630 and 1640 include a single 780K-byte floppy drive and 10M-byte and 32M-byte hard disk drives, respectively. All systems include a 12-inch monitor and the deluxe 105-key keyboard, two serial ports for printer or telephone communications modem connection, and a parallel port for Centronics-type printer connections. Eight expansion slots are provided for connection of such items as a LAN adapter, VCR adapter, video/graphics controller and an 8-port serial board supporting local or remote terminals. Of these provided slots the 1620 has 4 available while the 1630 and 1640 have 3.

An 8087 co-processor is available on the PC SPIRIT, PC, and 1600 series for handling high-speed floating point operations.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

Eagle PC SPIRIT System Maximums • single user; 640K bytes of memory; 64M bytes of disk storage (2 drives); serial or parallel printer; and VCR recorder.

Eagle PC System Maximums • single user; 640K bytes of memory; 64M bytes of disk storage (2 drives); serial or parallel printer; and VCR recorder.

Eagle 1600 Series System Maximums • up to 8 workstations; 512K bytes of memory; 64M bytes of disk storage (2 drives); serial or parallel printer; and VCR recorder.

☐ Packaged Systems

Eagle SPIRIT Series (Portable)

Basic System • all Eagle SPIRIT 16-bit systems are based on Intel 8088 microprocessors and include: 128K bytes of RAM, monitor, IBM-type keyboard, two serial ports, one parallel port, MS-DOS operating system, GWBASIC, and CP/M-86 operating system.

Eagle SPIRIT-2 • includes all components of Basic System plus two 360K-byte slimline 5.25-inch floppy disks:

$3,295 prch

Eagle SPIRIT-XL • includes all components of Basic System plus a 360K-byte slimline 5.25-inch floppy disk and a 10M-byte hard disk:

4,795

Eagle PC Series

Basic System • all Eagle PC 16-bit systems are based on Intel 8088 microprocessors and include: 128K bytes of RAM, IBM-type keyboard, two serial ports, one parallel port, MS-DOS operating system, GWBASIC, and CP/M-86 operating system • monitors and monitor adapters are available separately.

Eagle PC PLUS-1 • includes all components of Basic System plus a 360K-byte slimline 5.25-inch floppy disk:

$2,395 prch

Eagle PC PLUS-2 • includes all components of Basic System plus two 360K-byte slimline 5.25-inch floppy disks:

2,795

Eagle PC-2 • includes all components of Basic System with the exception of the deluxe Eagle 105-key keyboard in place of the IBM-type keyboard, and includes a monitor, monitor adapter, two 360K-byte slimline 5.25-inch floppy disks, and Eagle Writer and EagleCalc software packages:

3,495

Eagle PC PLUS-XL • includes all components of Basic System plus a 360K-byte slimline 5.25-inch floppy disk, and a 10M-byte hard disk:

4,295

Eagle 1600 Series

Basic System • all Eagle 1600 16-bit systems are based on Intel 8086 microprocessors and include: monitor, 105-key keyboard, two serial ports, one parallel port, Eagle Writer, EagleCalc, MS-DOS operating system, and CP/M-86 operating system.

Eagle 1620 • includes all components of Basic System plus 128K bytes of RAM, and two 780K-byte double-sided floppy disks:

$4,495 prch

Eagle 1630 • includes all components of Basic System plus 128K bytes of RAM, a 780K-byte double-sided floppy disk, and a 10M-byte hard disk:

6,995

Eagle 1640 • includes all components of Basic System plus 512K bytes of RAM, a 780K-byte double-sided floppy disk, and a 32M-byte hard disk:

8,995

☐ CPUs

The 3 Eagle product lines are based on 2 different microprocessors: the PC SPIRIT Series and the PC Series are Intel 8088-based, and the 1600 Series is Intel 8086-based. All systems support an Intel 8087 Arithmetic Co-processor.

Intel 8086 Processor • 16-bit data bus interface, 16-bit internal architecture, direct addressing to 1M bytes of memory, 16-bit register set with symmetrical operations, approximately 70 basic instructions with up to 30 addressing modes, 8-bit and 16-bit signed and unsigned arithmetic with binary and decimal operands, extensive string and block move facilities • powerful segmentation facilities allows memory partitioning for multitasking, concurrent or multiuser capabilities • a pseudo-superset of the Intel 8080 instruction set where translation to 8086 is straight foward • instruction set compatible with 8088.

Intel 8088 Processor • 8-bit data bus interface, 16-bit internal architecture, direct addressing to 1M bytes of memory, 16-bit register set with symmetrical operations, approximately 70 basic instructions with up to 30 addressing modes, 8-bit and 16-bit signed and unsigned arithmetic with binary and decimal operands, extensive string and block move facilities • powerful segmentation facilities allows memory partitioning for multitasking, concurrent or multiuser capabilities • a pseudo-superset of the Intel 8080 instruction set where translation to 8088 is straight forward • instruction set compatible with 8086.

Intel 8087 Math Co-Processor • provides extension of Intel 8086/8088 for approximately 100 times faster hardware execution of number-crunching mathematics • 84-bit wide data paths; 80-bit wide working registers perform with 18-decimal digit accuracy; 8 data formats and close interfacing to mother CPU result in a powerful numeric data processor (NDP) • to utilize the Intel 8087 processor capabilities it must be supported by the language processor or have specific 8087 assembly subroutines:

$495 prch

☐ Memory

The PC SPIRIT and PC Series support up to 640K bytes, and the 1600 Series supports up to 512K bytes. Expansion of memory on the PC SPIRIT and PC Series is accomplished using either 64K or

PRCH: purchase price. NA: not available. TBA: to be announced. Prices effective as of November 1983.

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Eagle 16-Bit Systems

PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

256K-byte dynamic RAM on the main CPU board. The 1600 Series uses only the 64K-byte dynamic RAM.

64K-Byte Memory Kit • one 64K-byte add-on memory chip set • available for PC SPIRIT, PC, and 1600:

$135 prch

256K-Byte Memory Kit • one 256K-byte add-on memory chip set • available for PC SPIRIT and PC only:

TBA

384K-Byte Memory Kit • six 64K-byte add-on memory chip sets • available for 1600 only:

795

☐ I/O & Communications

In all Eagle models I/O and communications devices attach to general purpose serial and parallel I/O slots. Diskette drives have standard dedicated interfaces in the system unit and consequently do not impact the total number of available I/O slots. Eagle does not offer remote communications hardware or software, but does offer local LAN connection.

Eagle PC SPIRIT • 2 RS-232C serial I/O ports, a Centronics-compatible parallel printer port, 4 expansion slots with 2 available on the SPIRIT-2 and 1 available on the SPIRIT-XL.

Eagle PC • 2 RS-232C serial I/O ports, a Centronics-compatible parallel printer port, 4 expansion slots with 3 available on the PC PLUS-1 and PC PLUS-2, and 1 available on the PC-2 and PC PLUS-XL.

Eagle 1600 • 2 RS-232C serial I/O ports, 2 parallel ports only one of which is available on the 1620, 8 expansion slots with 4 available on the 1620, and 3 available on the 1630 and 1640; an optional 8-port serial port board is optionally available using only 1 of the available.

8-Port Serial Board • interface board and connector box for supporting more than a 3-terminal multiuser configuration on 1600 Series models:

$295 prch

Monochrome Board • high resolution graphics adapter • available for PC SPIRIT, PC and 1600 series:

495

Monochrome Board • monitor adapter without graphics • available for PC SPIRIT, PC, and 1600 series:

295

Color Monitor Board • color graphics adapter • available for PC and 1600 series:

295

SASI Board • hard disk interface board • available for PC SPIRIT, PC, and 1600 series:

125

EagleNet I Starter Kit • a complete network for 2 personal computers that is ready to connect and use • includes 2 Eagle Link I adapter boards, one junction, two 20-foot lengths of cable, network software, Eagle Mail I and Flex Menu • please see software section under Communications/Networks for software description • available for all 16-bit Eagle models:

1,995

Link I Adapter Board • add-on adapter boards for connection of additional 16-bit systems to the network • 2 included with EagleNet I Starter Kit:

695

EagleNet I Junction • LAN junction for 2 to 4 users • included in EagleNet I Starter Kit:

30

EagleNet Extender • add-on LAN extender for more than 4 users:

295

☐ Mass Storage

All systems in the Eagle line are packaged with a floppy disk drive. The floppy disks available are a single-sided double-density 96 tracks per inch (TPI) drive capable of storing 390K bytes of data, a double-sided 48 TPI drive capable of storing 360K bytes of data, and a double-sided, double-density 96 TPI drive capable of storing 780K bytes of data. In addition, there are 2 hard disk drives available—a 10M-byte drive and a 32M-byte drive. Currently, none of the Eagle systems support any tape drives, but there is a video adpater board available for attachment of a VCR to all systems.

Double-Sided Floppy Disk • standard on 1600 Series • double-sided, double-density drive; 96 TPI; 780K-byte capacity; 150-millisecond average access time; 6-millisecond direct track to track • also available as add-on drive:

$500 prch

Double-Sided Floppy Disk • standard on Eagle SPIRIT series, and PC series • double-sided; 48 TPI; 360K-byte capacity; 150-millisecond average access time; 6-millisecond direct track to track • price is bundled into system fee.

File 10 • standard on SPIRIT-XL, PC PLUS-XL and 1630 • 10M-byte 5.25-inch hard disk drive; 3600 RPM; 85-millisecond average access time; 2 platters with 4 read/write heads • available as add-on drive on all systems:

2,495

File 40 • standard on Eagle 1640 • 32M-byte, 5.25-inch hard disk drive; 3600 RPM; 85-millisecond average access time; 3 platters with 6 read/write heads • available as add-on drive on all systems:

3,995

☐ Terminals/Workstations

The SPIRIT Series is packaged with a 9-inch monochrome monitor and an 84-key keyboard, the PC PLUS-1, -2, and -XL are packaged with 84-key keyboards with optional 12-inch monitor or a 14-inch color monitor. The PC-2 has a 12-inch monitor and 105-key keyboard, and each model in the 1600 Series is packaged with 12-inch monochrome monitor and 105-key keyboard.

Monitors

9-Inch Monochrome • standard on Eagle PC SPIRIT Series • 9-inch green phosphor, gray scale monochrome monitor; provides a subtle rendering of the full color image into eight levels of display intensity; 2000 characters—80 characters by 25 lines displayed on an anti-glare screen; supports 640 × 200 pixels or 320 × 200 pixels in graphics mode • bundled into PC SPIRIT Series fee.

12-Inch Monochrome • standard on Eagle PC-2, and Eagle 1600 Series • 12-inch P39 green phosphor monitor; 2000 characters—80 characters by 25 lines displayed on an anti-glare screen; 9 × 14 dot matrix with 720 × 352 pixel graphics:

$329 prch

Keyboards

84-Key IBM-Style Keyboard • standard on Eagle SPIRIT Series, PC PLUS-1, PLUS-2, and PLUS-XL • a detached sculpted keyboard with familiar Selectric-type key placement; attaches through a recoiling cord • 84 keys including 10 function keys and a 10-key numeric pad:

$195 prch

Deluxe 105-Key Keyboard • standard on Eagle PC-2 and 1600 Series • a detached sculpted keyboard; attaches through a recoiling cord • 105 keys including 24 function keys and a 10-key numeric pad • Eagle Writer word processing and EagleCalc financial planning programs are programmed using this keyboard and make use of all 24 function keys:

295

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Eagle 16-Bit Systems

PC SPIRIT-2, PC SPIRIT-XL, PC PLUS-1, PC PLUS-2, PC-2, PC PLUS-XL, 1620, 1630 & 1640 Microcomputer Systems

☐ Printers

No printers are available from Eagle for any of the systems. Every system provides 2 serial ports for printer installation as well as a parallel printer port compatible with the popular Centronics connection.

• END

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Epson QX-10
Personal Computer System

■ PROFILE

Operating System • Digital Research CP/M 2.2 single-user diskette operating system; TPM included in Rising Star Industries Valdocs (Valuable Documents) integrated software system

Data Management • Valdocs provides an index system with eight keywords available for every item; the CP/M-based system has no specific database package included although it is compatible with a wide variety of commercially available systems

Communications/Networks • general-purpose asynchronous communications available through optional software package

Languages • Microsoft BASIC, Release 5

Models • two models differentiated by conventional or HASCI (Human Applications Standard Computer Interface) keyboard and the associated operating software

CPU • Zilog Z80A-compatible microprocessor (uPD780AC-1 manufactured by NEC), 4 MHz clock rate

Memory • 64K to 128K bytes; 32K to 128K video memory

Chassis Slots • five chassis option slots

Ports • one serial and one Centronics parallel port are standard

Mass Storage • 760K-byte diskette storage; 10M-byte hard disk storage

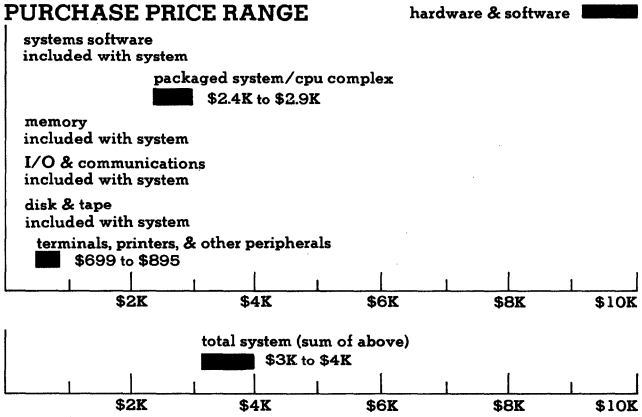
Terminals/Workstations • single-user system; no add-on terminals supported

Printers • Epson dot-matrix printers available

First Delivery • April 1983

Systems Delivered • information not currently available

PURCHASE PRICE RANGE — hardware & software



EPSON QX-10 PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing, • **SMALL SYSTEM** is based on CP/M-based packaged system (includes CPU, 64K-byte main memory, video processor with 32K-byte memory, diskette controller and dual 380K mini-diskettes, 12-inch green monitor, conventional keyboard, RS-232C port, parallel port, light pen interface power supply, five option slots, CP/M, and Microsoft BASIC) and the following options: 160-cps dot-matrix printer. • **LARGE SYSTEM** is based on Valdocs-based packaged system (includes CPU, 256K-byte memory, diskette controller and dual 380K mini-diskettes, 12-inch green monitor, HASCI keyboard, RS-232C port, parallel port, light pen interface, power supply, five option slots, Valdocs software, CP/M, and Microsoft BASIC) and the following options: 160 cps wide-carriage dot matrix printer.

Comparable Systems • the CP/M-based system is similar to any number of systems whose design is based on a Z80 microprocessor with a 64K-byte memory; the Valdocs system limits comparison to microcomputers featuring a simplified user interface, including systems such as the Hewlett-Packard HP 150 and the Apple Lisa • many desktop systems, using flexible menu-driven formats combined with special purpose function keys, could provide a style of operation approaching that of the QX-10

Vendor • Epson America, Inc.; 3415 Kashiwa Street, Torrance, CA 90505 • 213-539-9140

Canada • Epson Canada Ltd; 21 Progress Court, Unit 18, Scarborough, ONT M1G 3V4 • 416-431-5588

Distribution • the QX-10 is handled by twelve independent regional distributors in United States with nearly 1,000 dealers currently providing end-user sales and service

■ ANALYSIS

With its introduction in 1980 of the MX Series, an early, reliable yet low cost dot-matrix printer, Epson America quickly became a recognized market leader. Today, they are said to command a forty percent share of the dot-matrix, correspondence-quality printer market.

In 1982, the HX-20 notebook-size computer was Epson's first entry into the microcomputer market. It was an early entry in the lap-sized computer market and was aggressively priced at under $800. The QX-10, announced later in 1982, was a far more ambitious product for Epson America. It is designed for and marketed to the new computer user, typified as someone who neither cares nor needs to know what an operating system is. The combination of the Valdocs software system and the HASCI keyboard are Epson's answer to the new computer owner's jitters.

The HASCI (Human Applications Standard Interface) keyboard includes a familiar Selectric-style center layout

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Epson QX-10
Personal Computer System

surrounded by clusters of function keys. This keyboard, in conjunction with the Valdocs software, is intended to provide a comfortable first experience with a microcomputer. A standard keyboard layout is also available as part of a CP/M-based system.

The Valdocs (Valuable Documents) software was developed for Epson by Rising Star Industries. Their stated goal is that ninety percent of the potential QX-10 users will never need any software that is not provided directly by the Valdocs environment. The software system provides word processing functions, complemented by a number of user convenience features. These features allow users to schedule activities (with a clock and calendar, "to-do" lists, and alarms), to perform calculations (with a ten-key numeric pad that can be used while within a document), and to prepare graphics (in the form of line and bar graphs and bar charts).

The Valdocs software demonstrates its ease of use by permitting a user to store a document, retrieve it, mail it, or print it, with only a single keystroke. All items stored within Valdocs are indexed by up to eight user-defined keywords to provide easier retrieval. The electronic mail function operates as a background task to avoid interference with the user. This feature, however, requires the addition of a modem to the basic configuration.

The parent company of Epson American is a large Japanese trading company with both manufacturing and research and development organizations within the family. The Seiko Watch Company is probably one of its best known companies. Epson was also a pioneer in the liquid crystal display market with an ultra-thin long-life LCD. They now produce more than twenty million LCDs per year.

☐ Strengths

The Epson QX-10's claim to fame is its initial ease of use for the computer novice. The HASCI keyboard features a well-designed layout of seventeen clearly defined function keys arranged in logical clusters. The System Control keys provide Stop, Help, Copy Disk, and Undo commands. The File Control keys access the Store, Retrieve, Print, Index, and Mail functions. The Application keys provide Menu, Calculator, Schedule, and Draw control. The Typestyle keys provide normal, bold, and italic styles. The style and size keys are reserved for future Valdocs releases.

The system boasts one of the best displays available in a desktop system. For a system so clearly aimed at word processing users, this is a definite plus. The ability to see text and graphics on the display exactly as they are to be printed is appreciated by all users, novices and more experienced folk alike. The Valdocs software provides a type of integrated operating environment specific to word processing and includes some nice time management functions.

The Epson QX-10 also runs CP/M and so provides compatibility with a wide range of commercially available software. Epson America have selected Peachtree as their software vendor of choice. A broad selection of Peachtree accounting and business packages is available from Epson for use on the QX-10. This extends the capability of the system beyond the word processing orientation intrinsic to the Valdocs system.

One amazing fact about the Epson QX-10 is that four of the five available option slots are still available for expansion. The only major QX-10 announcement to date is the availability of a 10-megabyte hard disk add-on unit. Even with that, Epson still has four slots available for growth. Many desktop microcomputers are already limited in terms of their expansion capability. The fact that the Epson has four slots unclaimed leaves future product development opportunity wide open. Will they announce an internal modem for their electronic mail service? Will they add a local area network capability? How about an electronic disk to speed things up a bit? Those four slots, intelligently used, could change the entire character of the QX-10 system.

☐ Limitations

The major problem associated with the Epson QX-10 is its lack of speed. It seems that providing a totally integrated workstation and software system with a bit-mapped display may be a difficult task for an 8-bit Z80-based micro. Something had to suffer. Possibly speed was sacrificed to save ease of use. The only problem with this approach is that once you learn to use the system, you are still stuck with the slow speed. No amount of familiarity with Valdocs will help make the system hum. The bit mapped display is beautiful, with bold face and italics typefaces shown right on the screen. The problem is an average user can get two to three words ahead of its display capability. A system so oriented towards word processing should alleviate the difficulties of putting the right words in right order rather than adding an extra level of confusion by having a display that can't keep up. There is a 32-character buffer included to prevent the user from losing any characters. It is very disconcerting, however, not to have the character appear on the screen as you hit the key.

Early versions of the Valdocs software were reported as having some problems. The product is more mature now and many of these problems have been eliminated in later releases. Since the initial release, there has been a conspicuous lack of additional Valdocs software announcements. If Valdocs is supposed to meet the needs of ninety percent of their perspective users, where is the Valdocs spreadsheet option? The system already provides graphics so it seems a logical connection that a spreadsheet package would be ideal to feed figures into those pie and bar charts. The time management features are a nice touch but a spreadsheet seems like a reasonably basic requirement for a full function system.

■ SOFTWARE

☐ Terms & Support

Terms • available for purchase only.

Support • support provided by local dealers backed by twelve national distributors; Peachtree software supported directly by Peachtree; Valdocs software problems will be upgraded at no cost to the user; Valdocs enhancements will carry an extra charge.

☐ Software Overview

Software for the Epson QX-10 includes the choice of CP/M 2.2

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Epson QX-10
Personal Computer System

from Digital Research or the Valdocs system from Rising Star Industries; the Valdocs system includes a TPM operating system plus word processing, electronic mail, a scheduler, and index, as well as CP/M and Microsoft BASIC. A selection of Peachtree applications packages are available for use with the QX-10. In addition, the CP/M-based system provides compatibility with a wide variety of commercially-available software.

☐ Packaged Software

The following software-package combinations are available at lower cost to the user than the price of the individual products; please refer to the Application Package section of this report for descriptions of the software selections:

Peachtree A Package • includes PeachCalc, Spelling Proofreader, Mailing List Manager, and PeachText with Random House Thesaurus:

$395 lcns

Peachtree B Package • includes PeachCalc, Spelling Proofreader, and Mailing List Manager:

295

Peachtree Accounting 3-Pak • includes general ledger, accounts receivable, and accounts payable modules:

699

Peachtree Accounting 3-Pak • includes general ledger, accounts receivable, accounts payable, and payroll modules:

899

Peachtree Accounting 6-Pak • includes general ledger, accounts receivable, accounts payable, payroll, inventory control, and sales invoicing modules:

1,349

☐ Operating System

Valdocs • not technically an operating system but rather an integrated software environment; single-user, single-tasking, word-processing-oriented system with integral provisions for scheduling, calculations, graphics, filing, and electronics mail; Valdocs automatically brings the system up in the word processing application; all functions are menu-driven and make full use of the HASCI (Human Applications Standard Interface) keyboard; print spooling allows up to three documents to print without interrupting normal operation; the electronic mail function requires the addition of a modem. Valdocs is written in a version of Forth using the TPM operating system as its base; included in packaged system or available under separate license:

$550 lcns

CP/M 2.2 • single-user, single-tasking, general-purpose operating system designed to support the Intel and Zilog families of 8-bit processors; features and facilities of this basic system are all upward compatible and are present in all other versions of CP/M; consists of four elemental structures; Basic I/O System (BIOS), Basic Disk Operating System (BDOS), Console Command Processor (CCP), and a Transient Program Area (TPA) • BIOS is the modifiable portion of the operating system enabling users to tailor CP/M systems to meet specific configurations; allows users to define all hardware-independent elements of the system by defining low-level interface and the peripheral I/O for the system • supports up to 16 logical devices, containing up to 65,536 records, with up to an 8M-byte capacity • CCP provides the interface between the user's console and the rest of the CP/M system; it reads, interprets, and executes commands entered from the console; commands are both built-in commands and transient commands; transient commands are loaded into the TPA and executed • TPA is the area designated to hold programs that are loaded from disk and then executed • standard utilities provided include: DDT interactive debugger; PIP file transfer facility; DUMP utility; SUBMIT/XSUB batch control utilities; ED command-oriented text editor; ASM assembler; and STAT system status utility • memory requirements depend on number and types of options implemented; basic system requires 20K bytes of memory and an ASCII terminal: included in packaged systems.

TPM • operating system written by Computer Design Labs and used in Valdocs operating environment; functionally equivalent to and compatible with CP/M 2.2; supports multibank operation to take full advantage of 256K memory; includes a Chain function critical to Valdocs operation; includes many functions available in CP/M 3.0.

☐ Utilities

Standard CP/M utilities are provided with packaged systems • Valdocs system and HASCI keyboard are intended to eliminate the need for most system utilities.

☐ Data Management

Index • provides eight keywords as a cross-reference index for items stored under Valdocs; Index is an integral part of the Valdocs system:

NC lcns

☐ Communications/Network

Telecommunications • Peachtree general asynchronous communications package; allows file transfer between two CP/M-based systems; support access to public information networks:

$150 lcns

☐ Program Development/Languages

Microsoft BASIC, Release 5 • standard version, included in packaged system configurations:

NC lcns

☐ Applications Packages

PeachText • text-processing system with multi-document access, interdocument communication, search functions, and block manipulation; includes Random House Thesaurus on separate diskette:

$300 lcns

Spelling Proofreader • 21,000-word dictionary; allows user to create specialized dictionaries as needed:

150

PeachCalc • electronic spreadsheet; supports 253 rows of 63 columns:

150

Mailing List Manager • mailing list manager with some database functions; supports up to fourteen item definitions for each list item; index keys may be up to 23 characters long:

250

Calendar • menu-driven appointment scheduler and management tool; handles scheduling of conference rooms and other facilities:

195

Project Manager • management tool to structure projects; assign resources, and track scheduling commitments; uses Critical Path Method (CPM) and Gantt charts as scheduling aids:

250

Peachtree Series 8 • includes general ledger, accounts receivable, accounts payable, payroll, inventory control, sales invoicing, fixed assets accounting, job costing, or client accounting modules; each module priced at:

395

Accounting Partner • Star Software package; includes general ledger, accounts receivable, accounts payable, sales invoicing, purchase orders, and payroll modules:

395

■ HARDWARE

☐ Terms, Support & Documentation

Terms • available for purchase; 90-day warranty; extended twelve-month warranty available after initial 90-day period.

LCNS: one-time license fee. NC: no charge. Prices effective as of September 1983.

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Epson QX-10
Personal Computer System

Support • carry-in service available at local Epson dealer; on-site and pick-up/delivery service plans available through 82 Xerox service centers nationwide; Epson's agreement allows Xerox to perform authorized service on Epson systems, printers, and selected peripherals from Comrex.

Documentation • available manuals include QX-10 Operation Manual, Valdocs Users Guide, Microsoft BASIC Manual, and a CP/M Primer; manuals included with packaged systems; extra copies available at nominal cost.

☐ Physical Specification (H x W x D); Weight

CPU • 5.5 x 12 x 19.15 inches; 20.6 pounds.

Display • 10.6 x 12.4 x 13.6 inches; 12.1 pounds.

Keyboard • 1.9 x 20 x 8.9 inches; 5.5 pounds.

☐ Systems Overview & Configurability

The Epson QX-10 is a completely integrated system designed for the first-time computer user. It is available in two packaged systems, with the hardware configuration depending on the choice of software. One alternative includes CP/M and Microsoft BASIC in conjunction with a 64K-byte main memory and a 32K-byte display memory. The second choice not only adds the Valdocs software system to the QX-10, but also increases both the main memory to the full 256K bytes and the display memory to 128K bytes. Two 5.25-inch diskettes are standard with all systems to provide a total of 760K bytes of storage. An optional 10-megabyte hard disk is available as a separate unit to accommodate increased storage needs.

The QX-10 display is worthy of note as it features a resolution of 640 by 400 pixels. This provides a very clear character set formed within a 16 by 8 cell. The display is a detached 12-inch monochrome monitor with green characters on dark background. One difference between the CP/M and Valdocs systems is that CP/M-based systems include 32K bytes of display memory and use a standard character-generator character set. The Valdocs system includes 128K bytes of display memory and uses bit-mapped graphics to form its character set.

A wide variety of printers can be attached to the QX-10. The Valdocs software, however, is optimized for the Epson FX printer models. Other printers can be used with the QX-10 but it may be more difficult to utilize the full graphics features provided by the Valdocs software.

The system also includes one programmable serial port, one standard Centronics parallel port, and a light pen interface. A clock and calendar are maintained in a 2K-byte CMOS memory with a battery backup. Five option slots are available for expansion.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

System Maximums • 256K-byte main memory • 760K-byte diskette storage and 10M-byte Winchester disk storage • single RS-232C communications port; single parallel printer port; light pen interface.

☐ Packaged Systems

Conventional Keyboard and CP/M Operating System • Z80A-compatible processor, 64K-byte main memory, video processor with 32K-byte memory, diskette controller with dual 5.25-inch 380K byte diskette drives, green 12-inch high resolution monitor, conventional keyboard, single RS-232C port, single parallel port, light pen interface, power supply, and five option slots, CP/M operating system and Microsoft BASIC:

$2,495 prch

HASCI Keyboard and Valdocs Software • Z80A-compatible processor, 256K-byte main memory, video processor with 128K-byte memory, diskette controller with dual 5.25-inch 380K byte diskette drives, green 12" high resolution monitor, HASCI keyboard, single RS-232C port, single parallel port, light pen interface, power supply, and five option slots, Valdocs software (word processing, electronic mail, scheduler, and index), and business software (CP/M operating system and Microsoft BASIC):

2,995

Upgrade to HASCI/Valdocs System • includes HASCI keyboard, with 192K-byte main memory upgrade, 96K-byte video memory addition, and Valdocs:

895

☐ CPU

NEC Micro PD780AC1 • Zilog Z80A-compatible microprocessor; 4MHz clockrate; 8-bit internal architecture, 8-bit data bus interface; direct addressing to 64K bytes of memory; fourteen registers include 16-bit program and stack pointers, two index registers, and a duplicate set of an 8-bit accumulator and a 7-bit flag register; upwardly compatible with Intel 8080 it provides binary coded decimal (BCD) arithmetic, double precision operations, multiple indexing with address registers, multiple interrupt, increment, decrement and move capabilities • in addition to being able to execute all 78 Intel 8080 instructions, 50 enhancements to the instruction set include advanced block move and search macros, relative jump and three types of selectable response interrupts for a total of 128 operations.

☐ Memory

CP/M-Based System • 64K-byte main memory expandable to 256K bytes by inserting 64K RAM chips into 24 sockets located on the main board.

Valdocs System • 256K-byte non-expandable main memory • 2K-byte CMOS RAM supported by battery backup unit to provide calendar/clock feature; resident RAM is generally 8K bytes although it is jumper selectable for sizes ranging from 4K bytes to 32K bytes • includes seven DMA (Direct Memory Access) channels, one assigned to CRT controller, one to diskette controller, remaining five assigned to option cards.

192K-byte Memory Upgrade • includes RAM chips to upgrade memory to full 256K system:

$290 prch

☐ I/O & Communications

In addition to the printer and communications ports on the QX-10, the system also contains five option slots.

Printer Port • general-purpose Centronics parallel printer port • included in packaged systems.

Communications Port • RS-232C programmable port, supports speeds from 50 to 19,200 bps • included in packaged systems.

☐ Mass Storage

All systems include integrated dual 380K-byte, 5.25-inch diskette drives and controller; the QX-10 can also support an optional 10M-byte, 5.25-inch Winchester hard disk drive.

Integrated Diskette Subsystem • double-sided, double-density, dual 5.25-inch diskette drives and controller • 752K-byte total formatted storage; 48 tracks per inch; 16 sectors per track; 80 tracks • 250K-bits-per-second transmission speed; 300-rpm rotation speed • included in packaged systems.

ComFiler • 5.25-inch Winchester disk drive; 10M-byte formatted capacity, 12.8M-byte unformatted capacity; 11,000 hours MTBF (Mean Time Between Failure); • 5.7-inch x 7.9-inch x 14.8-inch includes controller and cables, housed in separate cabinet:

$2,295 prch

☐ Terminal/Workstation

The Epson QX-10 is a single user system featuring a choice of detachable keyboards to match the operating system environment; the detached video monitor is consistent for all versions of the system. The NEC 7220 Graphic Display Controller handles all display functions on the QX-10.

Display • detached 12-inch monochrome monitor; displays green characters on dark background; 25 lines of 8-characters; 16 x 8 dot cell; graphics resolution of 640 by 400 pixels • CP/M version provides standard character generator set; Valdocs characters are

PRCH: purchase price. Prices effective as of September 1983.

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Epson QX-10
Personal Computer System

formed as bit-mapped graphics • dedicated video memory of 32K bytes for standard character-generated display; 128K-byte video memory for graphic fonts provided with Valdocs; included in packaged systems.

Conventional Keyboard • detached keyboard, includes 103 keys with ten function keys, four system function keys, cursor control and editing keys, and 19-key numeric cluster with calculator functions; included in packaged system or available for:

$310 prch

HASCI (Human Application Standard Computer Interface) Keyboard • detached keyboard; includes Selectric-style center layout, four clusters of function keys to support Valdocs functions, cursor controls and editing keys, and 19-key numeric cluster with calculator functions; included in packaged system or available with upgrade to Valdocs system.

☐ Printers/Graphics

The QX-10 will support a variety of printers using the integral parallel interface. The Epson FX dot-matrix printer is specifically designed to support the full range of typefaces provided by Valdocs.

FX-80 Dot-Matrix Printer • 160 cps; single sheet, roll paper, or fanfold continuous sheets between 9.5 to 10 inches wide; supports italics and nine character sets; 80/132 columns; bit image graphics of 60/120/240 dots per inch:

$699 prch

FX-100 Dot Matrix Printer • 160 cps; single sheet, roll paper, or fanfold continuous sheets between 4 to 16 inches wide; supports italics and nine character sets; 136/233 columns; bit image graphics of 60/120/240 dots per inch:

895

☐ Other Peripherals

Interface provided in packaged system for user-supplied light pen; no software support currently provided.

• END

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Fortune Systems Corp Fortune 32:16
PS-10, PS-20, XP-20 & XP-30

■ PROFILE

Operating System • FOR:PRO single-/multiuser multitasking operating system based on Bell Lab's Version 7 and System III UNIX, and includes features from Berkeley 4.1 BDS.

Data Management • operating system provides standard data management facilities; Science Management Corporation's IDOL relational database management system.

Communications/Networks • general asynchronous communications; batch bisynchronous emulation for IBM 2780/3780, 3741, 2770, and 2968; interactive bisynchronous emulation for 3274.

Languages • CBASIC 16, ANSI-74 Level 2 COBOL, FORTRAN-77, Pascal, SMC BASIC, and "C."

Models • PS-10, PS-20, XT-20, and XP-30.

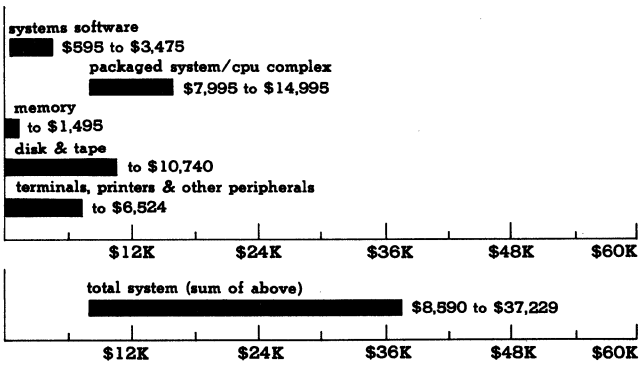
CPU • Motorola 68000 operating at 5.5-MHz cycle time.

Memory • all models can be expanded to 1M bytes of memory.

Chassis Slots • all models have 5 memory slots, one of which is used for error checking and correction; the PS models have 3 I/O expansion slots, while the XP models have 5; however, the PS models can be upgraded to XP systems.

Ports • standard asynchronous port; optional 2- or 4-port asynchronous controller and an optional 2- or 4-port intelligent communications controller.

PURCHASE PRICE RANGE hardware & software



FORTUNE 32:16 SYSTEMS PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing, and open bars reflecting 5-year service/maintenance fees associated with large system • **SMALL SYSTEM** is based on PS-10 **packaged system** (includes MC 68000 32-bit microprocessor, 512K bytes of memory, 16K bytes of ROM for Internal Systems functions, memory management unit, 800K-byte diskette drive, 10M-byte Winchester disk drive, 12-inch monochrome display and keyboard, and FOR:PRO operating system) and the following options: CBASIC 16 **programming language** • **LARGE SYSTEM** is based on XP-30 **packaged system** (includes MC 68000 microprocessor with 512K bytes of memory, 16K bytes of ROM for Internal Systems functions, memory management unit, 2 memory expansion slots, 5 I/O expansion slots, an RS-232 port, a 5.25-inch 800K-byte diskette with controller, a 5.25-inch 30M-byte Winchester disk drive with controller and multiuser FOR:PRO operating system) and the following options: CBASIC, FORTRAN-77, and COBOL **programming languages**, IDOL database management software, ITE Interactive Terminal Emulator, 256K-byte **memory**, disk expansion cabinet, 2 20M-byte **disk drives** and controller, 3 **terminals**, a 35-cps **letter-quality printer**, and dot-matrix 150-cps printer.

Mass Storage • all models could be expanded to include 120M bytes of hard disk storage and tape cartridge.

Terminals/Workstations • practical limit of approximately 12 on all models.

Printers • NEC letter-quality printers at speeds up to 55 cps; IDS Prism dot-matrix printers with speeds up to 150 cps.

First Delivery • second quarter of 1982.

Systems Delivered • information not available.

Comparable Systems • any microprocessor built around Motorola 68000 chip having prices between $5,000 and $15,000.

Vendor • Fortune Systems Corporation; 101 Twin Dolphin Parkway, Redwood City, CA 94065 • 415-595-8444.

Canada • distributed in large cities throughout Canada • call 415-592-5140 for local Canadian distributor.

Distribution • through manufacturer's direct sales force, OEMs, and Computerland stores.

■ ANALYSIS

Fortune Systems Corporation has designed the Fortune 32:16 for the small- to medium-size business market. The system is built around a Motorola 68000 microprocessor and uses an enhanced proprietary version of the UNIX operating system, which uses a menu-driven shell that makes UNIX transparent to the user. The native speed of the Motorola 68000 is 8 MHz; but the Fortune 32:16 series

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Fortune Systems Corp Fortune 32:16
PS-10, PS-20, XP-20 & XP-30

operates at 5.5 MHz, giving it more power than 8-bit micros, but not as much power as those systems operating at speeds closer to the maximum.

The Fortune 32:16 is available in both single-user and multiuser versions. When the series was first announced, a single-user floppy-based version was supposed to be available for under $5,000. That model has been dropped however. The latest models announced are broken into two models, the PS (Professional Series) and the XT (Expanded Series). The PS-10 and PS-20 models are single-user versions with 10M and 20M bytes of disk storage, respectively. Each includes 256K bytes of memory. The XP-20 and XP-30 are multiuser versions with 20M and 30M bytes of disk storage. Each of these models includes 512K bytes of memory.

The initial marketing strategy for the Fortune Systems was to use retail stores to distribute the Fortune 32:16. But the Fortune 32:16 is somewhat more sophisticated than other micros on the market. This fact coupled with obstacles common to many start-up microcomputer companies, such as delayed product shipments and a lag in setting up support functions, caused retailers without technical expertise not to push the sales of the 32:16. But with the recent ouster of Gary B. Friedman, founder and chairman of Fortune, the company has turned its attention toward those dealers with a system house orientation and toward retailers with either a business-solution focus, an outside sales force, or both. This is probably more in line with the niche in the market Fortune was looking for. After the initial start-up problems, Fortune has put together a good support staff, which has fixed most of the software problems that were in the initial releases. Hopefully, Fortune hasn't waited too long to do this.

☐ Strengths

The most obvious attribute of the Fortune 32:16 is the multiuser capability. This multiuser capability in a desktop microprocessor gives the 32:16 a leg up on most of the competition by providing almost minicomputer capabilities in a desktop.

The FOR:PRO (UNIX-based operating system) is quite a nice operating system especially for those users doing their own development. Fortune has also added their own menu-driven shell to the operating system helping to make the UNIX base a little easier to work with. Also included with the UNIX base are over 300 utilities for data management, text editing, and development tools.

The maximum memory of 1M bytes, as well as the 80M bytes of disk storage on the 32:16, allows for a lot of growth for most users.

☐ Limitations

Although the Fortune 32:16 is available as a single-user system, it appears that one of the major attributes is its multiuser capability. In addition, the operating system used (UNIX-based FOR:PRO) is much more sophisticated than those used on single-user systems. All this leads to a problem in the initial marketing strategy of Fortune, in which they sell their product through retail outlet stores. In many cases, retail dealers do not have the time nor the support staff to understand the system, and thus unknowledgeable first-time users might have a difficult time with the operation of the system. In September of 1983 Fortune made strides to correct this problem by shifting its distribution to more sophisticated dealers including value-added firms.

Another problem affecting the 32:16 is the delay in delivery of the announced software products. Many of the packages were months late. This in itself might not be a major stumbling block, but some of the newer releases were supposed to increase response time when multiusers were utilizing the system.

Documentation, especially in the area of the operating system, was initially not very good but has since been enhanced.

■ SOFTWARE

☐ Terms & Support

Terms • FOR:PRO operating system bundled with system price • optional software products are available on a one-time fee basis.

Support • corrective updates and enhancements from the manufacturer • support through distributors and dealers.

☐ Software Overview

All Fortune Systems have bundled into the standard system price Fortune's FOR:PRO operating system. FOR:PRO is a Fortune-enhanced version of Bell Lab's UNIX operating system.

Various languages and programming software are available for program/system development including: Digital Research's CBASIC 16; UC Berkeley-based versions of FORTRAN-77 and Pascal; COBOL and "C."

Standard data management facilities are handled through the operating system, with Science Management Corporation's IDOL providing a relational database management system. Fortune:Word and Fortune:Word Plus provide word processing facilities, and Multiplan supports the electronic spreadsheet applications.

Fortune's ITE (Interactive Terminal Emulator) and FTF (Fortune To Fortune) packages handle asynchronous communications with standard ASCII terminals and networking with other Fortune or UNIX-based systems, respectively. In addition, batch bisynchronous emulation is available for IBM 2770, 2780, 2968, 3741, and 3780 terminals.

A 7-package Business Accounting System is available as a total system or on an individual basis providing facilities for all standard accounting functions.

☐ Operating Systems

FOR:PRO • single-/multiuser, multitasking operating system • based on the University of California at Berkeley's version of Bell Laboratories' UNIX operating system • Fortune has modified and enhanced UNIX in the areas of ease of use, flexible or hard disk support, automatic configuration, performance improvements, additional utilities, and a global menu interface • supports up to 1M bytes of memory; supports programs written in BASIC, COBOL, FORTRAN-77, Pascal, and "C"; includes some 300 utilities for file management, text editing, and development tools • one of the major enhancements that was added is a shell program that presents users with a friendly, mistake-proof master menu containing 36 selections, arranged in 6 logical areas: business applications, professional tools, electronic office tools, communications, training/education, and system tools • included in basic system price.

☐ Data Management

IDOL (Interactive Definition-Oriented Language) • a menu-driven, information management tool that uses a dictionary approach to data definition • data elements are defined by name

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Fortune Systems Corp Fortune 32:16
PS-10, PS-20, XP-20 & XP-30

along with specific attributes without concern for how the data elements are to be stored; when record formats are defined, IDOL maintains a cross-reference of where each data element is used; users can then maintain data, and define online inquiries and reports without writing application programs:

$595 lcns

☐ Communications/Networks

The Fortune 32:16 supports asynchronous communications in interactive or batch mode, as well as in a networking environment using full-duplex asynchronous lines. Bisynchronous communication is also supported by emulation of IBM 2780/3780, 3741, 2968, and 2770 terminals with the ability to transmit data, using an RS-232C interface at speeds up to 19.2K bps. Also, IBM 327X bisynchronous and SDLC communications, as well as multiuser passthrough using COBOL, are also supported. The Fortune 32:16 can utilize the Xerox/DEC/Intel baseband networking standard.

1000185-01 ITE (Interactive Terminal Emulator) • asynchronous interactive terminal emulator • allows a user to interact with another system emulating a Model 33 TTY or standard ASCII terminal • supports interactive and batch modes:

$295 lcns

1000186-01 FTF (Fortune To Fortune) • asynchronous Fortune To Fortune communications • supports networking of Fortune and other UNIX-based operating systems; uses full-duplex asynchronous lines; provides CRC block validation • supports execution of applications on other UNIX-based systems:

295

1000188-01 Batch Bisynchronous Emulation • supports emulation of IBM 2770, 2780, 2968, 3741, and 3780 terminals • uses RS-232C interface at speeds up to 19.2K bps:

995

1001048-01 Interactive Bisynchronous Emulation • supports emulation of IBM 3274, 3275, and 3276 terminals • supports SDLC communications and multiuser passthrough via COBOL programs:

695

☐ Program Development/Languages

CBASIC 16 • a modified and enhanced version of Digital Research's CBASIC • includes features for automatic record locking that provides error-free utilization of data files in a multiuser environment; full implementation of the IEEE floating-point standard; and the ability to use "C" language subroutines from within CBASIC programs:

$595 lcns

FORTRAN-77 • based on FORTRAN developed by UC Berkeley • provides 3 major language tools: RATFOR, STRUCT, and EFL which greatly increase programmer productivity by translating and structuring FORTRAN source code and by providing additional programming aids; combines global and peephole optimization to produce efficient runtime code:

795

Pascal • based on Pascal compiler developed by UC Berkeley • conforms both to standard Pascal and to the full ISO Level I Pascal:

795

COBOL • ANSI-74 Level 2 implementation with various enhancements including an input screen generator and a 327X-type passthrough feature • compiler and runtime system:

1,195

"C" • a portable "C" compiler that has been optimized for use on Fortune systems:

795

SMC BASIC • (Science Management Corporation) an interpreter BASIC that interfaces completely with SMC's IDOL database management system:

295

☐ Application Packages

Fortune:Word • word processing package • provides functions for text editing, document management, printing, and limited calculations • text editing features include programmable function keys for operations such as delete, replace, search/replace, and move; a glossary feature that stores standard phrases which then can be inserted in text using a single keystroke; centering; pagination; super/subscript; and all standard cursor movement commands • document management features are maintenance of indexes for all documents entered by author, title, or subject matter; statistics maintenance on dates and time of document creation, as well as information on total worktime used to create a document, and number of pages or characters; and support of a document library where documents can be grouped by title or subject matter and can be password protected • some of the printing features include automatic placement of header or footer lines; left, right, and center adjusting; proportional spacing; hyphenation and discretionary hyphenation; automatic page numbering; and various formatting options • provides for adding and subtracting of column numbers; and supports functions such as list processing, generation of mailing lists, and printing of labels:

$595 lcns

Fortune:Word-Plus • provides all functions and features of Fortune:Word as well as additional features such as multiple print queues; artwork space reservation; chained and nested printing; overflow pages; automatic table of contents generation; and various additional text editing commands:

1,495

Multiplan • electronic spreadsheet, multipurpose financial modeling and forecasting tool • supports a spreadsheet 63 columns wide, 255 rows deep, and several pages thick; cells can be 3 to 32 characters wide and their contents can be centered or aligned left, right, or by fixed decimal point; column widths can be altered for single columns, a range of columns, or all columns in the document; supports displaying up to 8 windows simultaneously allowing the user to enter information and data in one area and view the effect it has on areas which would otherwise be off the screen; supports "what if" modeling; provides multiple-sheet editing feature which allows for the merging of selected data in the system with new documents being created; provides an ascending/descending sort; and includes a HELP facility • developed by Microsoft Corporation:

295

Fortune Business Accounting System • integrated accounting packages that can be purchased as a complete system or on an individual standalone basis • consists of order processing and inventory control, accounts receivable, accounts payable, general ledger, purchase orders, payroll, and fixed assets. The description for each module follows.

Order Processing & Inventory Control • automates the entire order process from confirming customer orders and checking customer credit to producing invoices and controlling inventory in multiple warehouse locations • functions include: matches all orders to available inventory and prepares detailed order acknowledgements; credit limit checking; supports online inquiry; multiple pricing methods including discounts by customer, discounts by item or category of item, six levels of quantity breaks, dollar volume discounts, and contract pricing by item and category; supports up to 5 warehouse locations per profit center; and provides extensive list of sales analysis reports:

595

Accounts Receivable • automates receivable process from invoice posting to receipt and crediting of customer payments • features provided are application of payment to oldest outstanding invoice against a specific invoice or posted on account; support of online inquiry; user-defined statement generation frequency; user-defined aging periods; selectable aged trial balance; support of multiple locations; and detailed

LCNS: one-time license fee. Prices effective as of October 1983.

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individual reports for each company or profit center and an overall company summary:

595

Accounts Payable • automates entire vendor payment process by providing a flexible payment selection process • features include: payments can be made for all outstanding invoices or can be selected by specific due date or discount eligibility date; automatically prints payment checks, indicating the exact invoices paid and discounts taken; supports online inquiry; automatically tracks all issued checks, reconciles them against bank statements and provides Outstanding Checks and Cancelled Check Summaries; combines payments in daily or monthly check register with summaries by check number, by date and amounts; provides Open Payables Report, Payables Aging Report, and Cash Requirements Report; supports multiple locations; and provides detailed individual reports by company with an overall company summary:

595

General Ledger • automates entire bookkeeping process from posting of individual financial transactions to producing up-to-the-minute balance sheets and income statements • features provided are: handles budget information for up to 12 individual accounting periods; automatically provides comparisons such as allocated versus actual expenses incurred, and actual income versus forecasts; provides a trial balance with completely printed audit trails; calculates and compiles profit and loss statements from posting data providing information on month-to-date, year-to-date, actual versus budget comparisons, and monthly, quarterly, or previous year's comparisons; provides company analysis including such things as Ratio of Current Assets to Current Liabilities, Acid Test Ratio, Equity Ratio, Current Asset to Fixed Asset Ratio, Debt to Equity Ratio, and Inventory Turnover; and provides individual journals, statements, and reports for each entity with automatic combination into an overall company summary:

595

Purchase Orders • automates the entire purchase order process from initial order to receipt of merchandise in multiple warehouse locations • features are: generates detailed printed purchase orders and tracks and reports on status of each order at any give time; automatically issues stock receipt and confirmation reports; supports online inquiry; automatically updates inventory on entry of shipping receipts; Unit of Measure Conversion feature which automatically converts the way merchandise has been brought into the way it will be sold; supports LIFO/FIFO, Market Value, or Average Cost inventory valuations; purchase order reports provided include Open Purchase Order Status Report, Deleted Quantity Reports, Merchandise Receipt Confirmation, Journals, and Purchase Order Register; supports multiple locations with detailed individual reports for each company or profit center and an overall company summary:

595

Payroll • automates entire payroll process from generating and updating employee records to calculating earnings and deductions, and printing employee checks • supports 10 different earnings; taxes can be determined from tables or by fixed amount per pay period or a combination of both methods; supports 6 standard voluntary deductions plus 5 miscellaneous deductions; reports provided are a Labor Distribution Report which automatically distributes payroll expenses to different departments or profit centers, Workers Compensation, Income Tax Tables, Nonemployment Insurance, Employee Listings, Form 941-A and Form W-2; supports multiple locations and provides detailed individual reports for each company or profit center as well as overall company summary:

595

Fixed Assets • automates the task of fixed asset accounting • features include support for 5 depreciation methods; the ability to transfer assets between profit centers within a company or between companies; online inquiry; maintenance information on asset depreciation • reports can list assets by type and number, by depreciation method used, or by asset value; supports multiple locations and provides detailed individual reports for each company or profit center as well as overall company summary:

595

■ HARDWARE

☐ Terms, Support & Documentation

Terms • available on a purchase-only basis from manufacturer • also available through OEMs and Computerland stores.

Support • mail-/carry-in corrective maintenance provided at no additional charge during initial 90-day warranty period • national service is available from Bunker-Ramo Customer Service throughout the U.S. in selected major metropolitan areas.

Documentation • online manuals and HELP menus; hard-copy manuals produced inhouse for Fortune Operating System.

☐ Physical Specifications (H x W x D); Weight

CPU • 5.8 x 22.3 x 13.9 inches; 30 pounds.

Monitor • 12.9 x 12.3 x 13.7 inches; 12 pounds.

Keyboard • 2.2 x 22.3 x 6.3 inches; 6 pounds.

☐ Systems Overview & Configurability

The Fortune 32:16 series is built around a Motorola 68000 microprocessor operating at 5.5-MHz clock rate. The product is broken into the PS (Professional System) PS-10 and PS-20 and the XT (Expanded Performance) XT-20 and XP-30. One of the design features is the ability to expand the smallest packaged system into the largest possible system by simply adding parts. The difference in all the models is the amount of memory provided by the system, as well as the disk storage included.

The entry-level PS-10 and PS-20 systems are both packaged with 512K bytes of memory, a 5.25-inch 800K-byte floppy disk drive, 12-inch monochrome display with detachable keyboard, 3 input/output expansion slots, and a single RS-232 serial port expandable to 5. Hard disk storage provided on the PS-10 is 10M bytes, while the PS-20 provides 20M bytes. The PS models will support up to 5 users by attachment of 2- and 4-port serial asynchronous controllers and CRTs. Upgrade kits are also available which will expand the PS models to XP models.

The larger XP-20 and XP-30 systems are both packaged with 512K bytes of memory expandable to 1M bytes, a 5.25-inch 800K-byte floppy disk drive, 12-inch monochrome display with detachable keyboard, 5 input/output expansion slots, and a single RS-232 serial port expandable to 12. Hard disk storage provided on the XP-20 is 20M bytes, while the XP-30 provides 30M bytes. The XP models will support up to 12 users by attachment of multiple 4-port serial asynchronous controllers and CRTs. Maximum hard disk storage is 120M bytes using 4 30M-byte hard disks.

All 32:16 models will support attachment of a serial printer and a 20M-byte 0.25-inch streamer tape cartridge.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems. Since PS Series models can be upgraded to XP Series, we will list the XP maximums.

XP Series System Maximums • 1M bytes of memory, practical limit of 12 terminals, 120M bytes of hard disk storage, and 2 printers.

☐ Packaged Systems

PS-10 • MC 68000 microprocessor with 512K bytes of memory, 16K bytes of ROM, memory management unit, 3 I/O expansion slots, an RS-232 port, a 5.25-inch 800K-byte diskette with controller, a 5.25-inch 10M-byte Winchester hard disk with controller, CRT, and single-user FOR:PRO operating system:

$7,995 prch

PS-20 • same as PS-10 except includes a 5.25-inch 20M-byte Winchester hard disk:

9,995

PRCH: purchase price. NA: not available. Prices effective as of October 1983.

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Fortune Systems Corp Fortune 32:16
PS-10, PS-20, XP-20 & XP-30

XP-20 • MC 68000 microprocessor with 512K bytes of memory, 16K bytes of ROM, memory management unit, 2 memory expansion slots, 5 I/O expansion slots, an RS-232 port, a 5.25-inch 800K-byte diskette with controller, a 5.25-inch 20M-byte Winchester hard disk with controller, and multiuser FOR:PRO operating system:
12,995

XP-30 • same as XP-20 except includes a 5.25-inch 30M-byte Winchester hard disk:
14,995

1001971-01 PS Second User Kit • 2 Port Comm A Board, FIS 1000 Work Station, and multiuser FOR:PRO:
2,995

1001970-01 PS to XP-20 Upgrade Kit • 2 additional memory and I/O controller slots, 20M-byte Winchester disk, and multiuser FOR:PRO:
6,995

1001970-02 PS to XP-30 Upgrade Kit • 2 additional memory and I/O controller slots, 30M-byte Winchester disk, and multiuser FOR:PRO:
8,995

☐ CPU

Motorola 68000 Processor • 16-bit internal (ALU) architecture, 16-bit data bus interface with 24-bit addressing to 16M bytes; CPU has eight 32-bit data registers and eight 32-bit address registers; two 32-bit stack pointers, a 16-bit status register and a 23-bit program counter • powerful 56 mnemonic instruction set includes 16- and 32-bit data manipulation, signed and unsigned multiply and divide, five basic addressing modes with pre- and post-incrementing, offsetting and indexing, seven levels of priority interrupt with 256 possible interrupt vectors, a trace mode, and sophisticated trap operations for debugging; Motorola "HMOS" technology large-computer geometric architecture.

☐ Memory

The Fortune 32:16 series provides 5 memory slots which include one for an error checking and correction board, and 4 for either 128K-byte or 256K-byte memory boards.

1000034-01 • 128K-byte memory board with parity • requires expansion slot:
$750 prch

1000031-01 • 256K-byte memory board with parity • requires expansion slot:
1,495

☐ I/O & Communications

There are 3 types of RS-232C serial communications available for attachment of various types of peripheral equipment. Available are a standard single asynchronous port, an optional 2- or 4-port asynchronous controller, and an optional 2- or 4-port intelligent communications controller. The intelligent communications controller includes its own Zilog Z80B microprocessor, buffer memory, and interprocessor communications port. In addition, an optional 1- or 2-port parallel I/O controller is available, that can function as an industry-standard (Centronics) printer interface or as an IEEE-488 General-Purpose Interface Bus. An Ethernet controller is also available supporting Ethernet local networking system.

☐ Mass Storage

The processor cabinet on the Fortune 32:16 can accommodate 2 mass storage devices (5.25-inch diskette or hard disk). A Disk Expansion cabinet is available to house additional hard or diskette drives. A hard disk controller which supports up to 4 hard disks is required and is included in the price of the hard disk systems.

Diskette Storage

1000058-01 • 800K-byte (formatted) diskette drive • 5.25-inch, double-sided, double-density, 96-track-per-inch diskettes • 250-millisecond average access time:
$995 prch

Hard Disk Storage

1001030-01 • 5M-byte (formatted) hard disk with controller • 75-millisecond average access time:
$3,995 prch

1000081-01 • 5M-byte (formatted) hard disk:
1,995

1001030-02 • 10M-byte (formatted) hard disk with controller • 75-millisecond average access time:
4,995

1000081-02 • 10M-byte (formatted) hard disk:
2,995

1001030-03 • 20M-byte (formatted) hard disk with controller • 75-millisecond average access time:
5,995

1000081-03 • 20M-byte (formatted) hard disk:
3,995

1001032-01 Disk Expansion Cabinet • provides storage for 1 or 2 5.25-inch diskettes or hard disks • includes power supply:
750

Tape

1000695-01 Tape Cartridge Expansion Cabinet • includes 20M-byte, 0.25-inch streamer tape cartridge, integral controller, a port parallel I/O controller, cables, and power supply:
$3,550 prch

☐ Terminals/Workstations

1000091-01 FIS 1000 Intelligent Workstation • 12-inch monochrome display and keyboard; 2000-character display (25 lines x 80 characters); vertical tilt from +15 degrees to -5 degrees, horizontal swivel 90 degrees; 256 upper- and lowercase characters standard; international character sets optional • 99-key, low-profile, detachable keyboard; sculptured standard typewriter keyboard layout; 15-key numeric pad; 9-key cursor control pad; 16 programmable function keys; full set of system-level function keys, including HELP, CANCEL, and DELETE:
$1,095 prch

☐ Printer/Graphics

1000440-05 NEC 3500R Letter-Quality Printer • bidirectional 35-cps thimble printer • includes 10-foot cable:
$1,900 prch

1001035-01 • bidirectional tractor:
295

1001036-01 • cut-sheet guide:
150

1001037-01 • cut-sheet feeder:
1,195

1000440-08 NEC 7710R Letter-Quality Printer • bidirectional 55-cps thimble printer • includes 10-foot cable:
3,195

1001043-01 • bidirectional tractor:
425

1001044-01 • cut-sheet feeder:
1,495

1000440-04 IDS Prism 80 • 150-cps dot-matrix printer • includes 10-foot cable:
1,339

1000697-04 • auto-sheet feeder:
149

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Fortune Systems Corp Fortune 32:16
PS-10, PS-20, XP-20 & XP-30

1000440-02 IDS Prism 132 • 150-cps dot-matrix printer • includes 10-foot cable:

1,539

1000697-05 • auto-sheet feeder:

149

• END

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Franklin Computer ACE
Models 1000 & 1200

■ PROFILE

Operating Systems • FDOS, Apple DOS compatible, by Franklin; CP/M by Digital Research; also runs under Apple DOS 3.3, DOS 3.2, and Apple Pascal operating system.

Data Management • no data management facilities come bundled; Franklin Data Perfect and third-party data management software is available.

Communications/Networks • software and hardware for communications or networking available from third-party vendors only.

Languages • Franklin BASIC on all systems; CBASIC by Digital Research bundled with CP/M option; CBASIC under CP/M is standard on ACE 1200; optionally available third-party languages include Apple Pascal, Integer, and Floating-Point BASIC.

Models • ACE 1000; FAMILY PACK; ACE PRO PLUS; ACE 1200; ACE 1200 OMS.

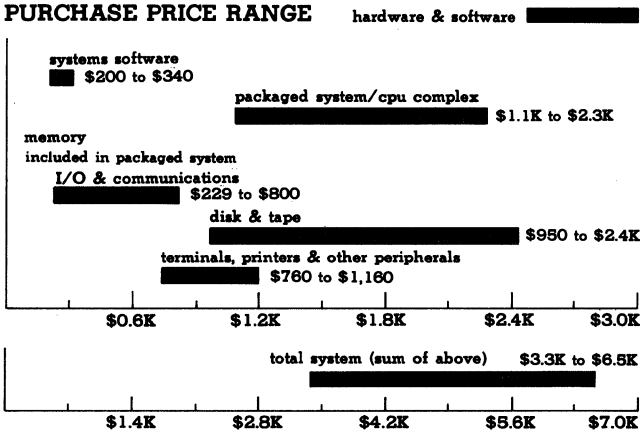
CPU • MOS 6502 at 1.022 MHz; Z80 at 6 MHz standard on ACE 1200 and optional on CP/M card for ACE 1000.

Memory • 128K bytes of RAM, 6 sockets for 12K EPROM on ACE 1200; 64K bytes of RAM and 6 sockets of 12K EPROM on ACE 1000.

Chassis Slots • 8 slots on ACE 1200 with 3 unused; 8 available slots on ACE 1000.

Ports • ACE 1200 has an RS-232C serial interface and a Centronics-compatible parallel interface; ACE 1000 has no interfaces standard.

PURCHASE PRICE RANGE hardware & software



FRANKLIN ACE 1000 & 1200 PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing, and open bars reflecting 5-year service/maintenance fees associated with large system • **SMALL SYSTEM** is based on **ACE 1000 packaged system** (includes FDOS, Franklin BASIC system software; 64K bytes of RAM; joystick/paddle connector; 8 unused expansion slots) and the following options: ACEWriter II word processor; ACECalc spreadsheet; one dual interface card; 2 ACE 10 disk drives; one dot-matrix printer; one ACE monitor • **LARGE SYSTEM** is based on ACE 1200 OMS packaged system (includes FDOS and Franklin BASIC, CBASIC, and CP/M system software; 128K bytes of RAM; one RS-232C serial port, one parallel port; one joystick/paddle connector; 80-column capability) and the following options: communications software, modem, 5 ACE 10 disk drives, 2 with controllers; ACE monitor and letter-quality printer.

Mass Storage • one to two 5.25-inch floppy disk drives depending on packaged system; Apple II-compatible hard disk drives available from third-party vendors.

Terminals/Workstations • single-user systems with integral keyboards, optional monitor or television, and integral or detached disk drives.

Printers • Apple-compatible dot-matrix and parallel printers provided by third-party vendors only.

First Delivery • June 1982 for the ACE 1000; December 1982 for the ACE 1200.

Systems Delivered • quantity not available from vendor.

Comparable Systems • the ACE 1000 and 1200 systems compete for market share with the Apple IIe and other Apple compatibles.

Vendor • Franklin Computer Corporation; 2138 Route 38, Cherry Hill, NJ 08002 • 609-488-0600; Telex: 837-385.

Canada • Franklin Computer Corporation, c/o G & M Associates; 1941 Leslie Street, Don Mills, ON M3B 2M3 • 416-445-8112.

Distribution • through approximately 1,600 retailers and mail-order houses nationally; distributing agents in Canada, Europe, and South America.

■ ANALYSIS

Franklin Computer was incorporated in August of 1981 in order to provide a microcomputer alternative to the ubiquitous Apple II personal computer. This year, Franklin posted $43 million in revenues from the sale of the ACE 1000, ACE 1200, and accessories. Success has not come without its difficulties, however. Franklin has only just recently settled a patent and copyright infringement suit filed against it by Apple Computer.

Its first micro, the ACE 100, was an early version of the present ACE 1000 and ACE 1200 systems and is no

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Franklin Computer ACE
Models 1000 & 1200

longer being manufactured. Other than its 2 present microcomputers, Franklin manufactures add-on expansion cards of various types for its own computers and for the Apple II. Franklin has also made public its intentions to produce an IBM PC compatible. This growth in their product line is consistent with Franklin's desire to shed its label as being solely a manufacturer of Apple II-compatible micros.

Under the terms of its settlement, Franklin has been forced to rewrite its operating system by April of this year and pay $2.5 million in damages to Apple Computer. Franklin is shipping a new operating system, but it is uncertain how compatible it is and whether it complies with Apple's patent and copyright restrictions.

It is unfortunate the name Franklin Computer has become almost synonymous with pioneering in this nation's courtrooms on matters of software and hardware patent and copyright litigation. News about Franklin has also been rich in new dealer program announcements and new pricing, not technological developments. This type of exposure has diluted public identification of Franklin as a technological force. Franklin has retained a new advertising agent, Ally and Gargano, and initiated a refreshed ad campaign. Hopefully, for Franklin, this effort will be successful in regaining lost ground.

☐ Strengths

The ACE 1000 and 1200 are designed to be durable business computers. With a capable 65-watt power supply, heavy duty power switch, and built-in fan, both micros can accommodate a full complement of expansion cards. The keyboard includes a numeric keypad and special spreadsheet keys and is designed for heavy use.

Color, for business graphics or games, is optional and fully Apple compatible. The color board has the capability to produce 48 colors and 256 hues. This is much enhanced over Apple II color graphics capabilities.

The ACE 1200 has the ability to use software from either CP/M or Apple II environments. This feature is optional on the ACE 1000. This allows compatibility with two of the most popular 8-bit operating systems.

Both the ACE 1000 and 1200 offer hundreds of dollars in savings over a comparably configured Apple IIe system.

☐ Limitations

Franklin documentation for either the ACE 1000 or 1200 is not complete. Franklin often refers a user to other publications that cover a particular topic in depth. This is a severe limitation for someone interested in programming or using the system heavily.

Several keys are labeled inappropriately. These are the special editing keys for which there are very few, if any, programs supporting them. These keys do generate control code sequences, buf their actual function in any particular program is largely undocumented. Their existence could cause confusion when using similar functions of a program that does not support these keys.

Since the majority of circuits in the Franklins are socketed, periodical maintenance will have to be performed to prevent faulty connections. This system board characteristic also allows speedy repair by replacement of a single malfunctioning chip.

■ SOFTWARE

☐ Terms & Support

Terms • software available for one-time license fee; as indicated below license fee is included as part of packaged system price.

Support • software support provided through Franklin support hot-line; some individual software vendors provide telephone support for their products.

☐ Software Overview

Franklin claims the ACE 1000 and 1200 are software compatible with the Apple II line of personal computers. A vast majority of software for the Apple will, in fact, run on the ACE microcomputers. Franklin indicates that over 16,000 such Apple II application packages are currently available. Apple's own operating systems will run as well. Additionally, the ACE 1200 computer is compatible with the CP/M world through the use of a fast 6-MHz Z80 card.

Franklin Floating-Point BASIC is almost exactly identical to Apple's BASIC. Programs written in Applesoft BASIC will often run without any modification under Franklin BASIC. The Franklin BASIC programming reference manual and documentation, unfortunately, are not up to par with Apple's.

A brand new version of FDOS, Franklin's Apple II-compatible operating system, has been released in accord with a settlement with Apple Computer. Franklin agreed to cease shipping its original operating system, a virtual clone of Apple DOS, by April of 1984. Apple has not yet made public any evaluation of FDOS for compliance with the settlement. How compatible it is with Apple DOS remains to be seen.

Under CP/M, the ACE 1200 runs CBASIC by Digital Research. This is one of the most commonly used business BASICs under CP/M. It can produce a compiled program from text source code and is one of the faster BASICs. Franklin's selection of a 6-MHz Z80 adds to the speed advantage of CBASIC. Because of the large disk capacity required by CP/M and its utilities, a second disk drive is highly recommended. Both CP/M and CBASIC come bundled with the ACE 80 CPU Card and with the ACE 1200.

For comprehensive technical reference while programming, Franklin documentation is not satisfactory. Some of the documentation even lacks a table of contents and an index. An alternative solution to the documentation shortcomings is for the user to purchase technical reference manuals from Apple. Because of the high degree of compatibility, most of the information will be valid. Purchasing Apple documentation is a cost that should not be necessary and diminishes the price advantage Franklin has over the Apple IIe.

☐ Packaged Software

Packaged software is not available from the vendor. Software is available individually or bundled in Franklin's hardware/software packages. Please refer to Packaged System section for further information.

☐ Operating Systems

The ACE 1000 and ACE 1200 run under a brand new operating system called FDOS. Written in response to recent litigation with Apple, FDOS is claimed by Franklin to be completely compatible with Apple operating systems. Optionally Apple DOS 3.3, 3.2, and Apple Pascal operating systems will run on the Franklins.

FDOS • Franklin Disk Operating System; Apple DOS 3.3-compatible operating system; provides enhanced support to 76K bytes of memory; successfully tested software includes VisiCalc, pfs:File, Bank Street Writer, and Zaxxon; supports Apple 3.3 disk map and file structure • vendor claims FDOS is faster and provides additional programming flexibility not found in Apple DOS • comes bundled with ACE 1000 and ACE 1200 systems.

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Franklin Computer ACE
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CP/M (2.2) • single-user, single-tasking, general-purpose operating system designed to support the Intel and Zilog families of 8-bit processors; features and facilities of this basic system are all upward compatible and are present in all other versions of CP/M; consists of 4 elemental structures: Basic I/O System (BIOS), Basic Disk Operating System (BDOS), Console Command Processor (CCP), and a Transient Program Area (TPA) • BIOS is the modifiable portion of the operating system enabling users to tailor CP/M systems to meet specific configurations; allows users to define all hardware-independent elements of the system by defining low-level interface and the peripheral I/O for the system • BDOS provides all the disk management control; supports up to 16 logical devices, containing up to 65,536 records, with up to an 8M-byte capacity • CCP provides the interface between the user's console and the rest of the CP/M system; it reads, interprets, and executes commands entered from the console; commands are both built-in commands and transient commands; transient commands are loaded into TPA and executed • TPA is the area designated to hold programs that are loaded from disk and then executed • standard utilities provided include: DDT interactive debugger; PIP file transfer utility; DUMP utility; SUBMIT/XSUB batch control utilities; ED command-oriented text editor; ASM assembler; and STAT system status utility • comes bundled with CP/M option and ACE 1200.

☐ Utilities

No utilities are provided other than disk and file handling utilities in the operating system. There are many utilities available for Apple-compatible systems from third-party vendors.

☐ Data Management

Data Perfect • data management system by LJK Enterprises; provides edit, update, sort, and reporting capabilities; information can then be accessed by ACEWriter for insertion into text files; designed for ease of use • comes bundled with ACE PRO PLUS; otherwise optional:

$140 lcns

☐ Communications/Networks

Franklin does not provide communications software. Its 2 microcomputers are compatible, however, with many Apple II terminal emulation packages. This software requires a modem, also available from third-party vendors.

☐ Program Development/Languages

Franklin Floating-Point BASIC • Apple II-compatible Floating-Point (FP) BASIC; full high- and low-resolution graphics support; ON ERR GOTO and ON/GOSUB statements; scientific and standard mathematical functions; floating-point and integer representation; string and numeric arrays; full disk random and sequential file support • comes bundled with ACE systems.

CBASIC • by Digital Research; business BASIC with IF/THEN/ELSE and WHILE loop enhancements; line numbering is optional for use with GOSUB and GOTO; source code can be written on a standard ASCII word processor and then compiled; standard BASIC functions; string and array subroutines; full disk file support in random or sequential mode • bundled with CP/M option.

☐ Application Packages

ACECalc • menu-driven electronic spreadsheet analysis program, compatible with VisiCalc by VisiCorp; can generate files compatible with ACEWriter; provides variable file widths, protected and hidden fields • can automatically generate a numbered directory or spreadsheet files; supports RAM up to 512K bytes using language card-compatible RAM cards; 63x254-column spreadsheet size • 23 functions including Min, Max, Go To, and Natural Log; requires ACE 1000 or 1200 with one or more 16-sector disk drives • bundled with ACE PRO PLUS and ACE 1200 OMS packaged systems; optional otherwise:

$170 lcns

ACEWriter II • menu-driven word processor with 80-, 70-, or 40-column display modes; can include ACECalc files into reports; automatic word wrap eliminates need to hit RETURN key at end of each line; global search and replace functions; type-ahead buffer; undo command can restore accidental deletions:

170

WordStar • word processor by MicroPro; disk-based word processor with document and non-document editing; features on-screen Help menus, control key sequence commands, printer support menu, block move and delete, search and replace; interfaces with SpellStar and MailMerge programs from main menu; includes tutorial • bundled with ACE 1200 OMS, not sold separately.

MailMerge • mail merge facility used from within WordStar by MicroPro; allows powerful mailing facilities by including text insertion from data files anywhere in a formatted document • comes bundled with the ACE 1200 OMS, not sold separately.

Personal Financier • financial applications package by Eagle Software Publishing designed for home accounting uses; menu driven • bundled with ACE PRO PLUS, not available separately.

☐ Other Facilities

Welcome Tutorial • disk tutorial with popular personal and business financial calculations; these include loan, mortgage, and future value of investment calculations • bundled with ACE PRO PLUS and ACE 1200 OMS systems; not available separately.

■ HARDWARE

☐ Terms, Support & Documentation

Terms • ACE 1000 and ACE 1200 systems are available for purchase; some individual dealers provide leasing options; 90-day warranty on parts and labor; repairs at factory and at individual service-providing dealers.

Support • support hot-line available from Franklin; optionally, individual dealers provide software and hardware support services.

Documentation • Franklin provides documentation for its operating system, system units, and bundled software; the user is referred to more complete third-party documentation for detailed information.

☐ Physical Specifications (H x W x D); Weight

ACE 1000

System Unit • 4.5 x 17.75 x 19.75 inches; 15 pounds.

Display • 11.75 x 12.25 x 12 inches; 14 pounds.

Keyboard • integrated with system unit.

ACE 1200

System Unit • 8 x 17.75 x 19.75 inches; 22.25 pounds (includes disk drives).

Display • 11.75 x 12.25 x 12 inches; 14 pounds.

Keyboard • integrated with system unit.

☐ Systems Overview & Configurability

Some industry observers have noted that the Franklin ACE 1000 and ACE 1200 are more compatible with the Apple II microcomputer than Apple's own IIe. In many cases software vendors have been forced to rewrite parts of their Apple II product before it would run on the Apple IIe. Modifications of this sort are less frequently required when porting software from an Apple II to a Franklin.

The Franklins offer 8 Apple II-compatible expansion slots for use by various cards. The ACE 1200 has 5 of these 8 slots populated in its initial configuration. There are many capabilities such as data acquisition, speech synthesis, music, local area networking, and communications that can be added to a Franklin ACE using an appropriate expansion card.

Internally the Franklin is quite different from the Apple, yet a high degree of compatibility is upheld. The Franklin main system unit

LCNS: one-time license fee. Prices effective as of February 15, 1984.

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Franklin Computer ACE
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board is larger than in the Apple II or IIe. Unlike the Apple IIe, the majority of Franklin ACE main circuits remain socketed for easy replacement. The level of integration is below that of the Apple IIe's. The Apple has approximately one-third the number of integrated circuits through its use of sophisticated very large-scale integration (VLSI) technology. Additionally, where Apple has opted for 64K-bit chips, Franklin still relies on older technology, 16K-bit RAM chips. Franklin has indicated that these component differences do not diminish system compatibility in any way.

The CPU card option, standard on the ACE 1200, harnesses the power of a fast, 6-MHz Zilog Z80 microprocessor. Included on the card are 64K bytes of its own RAM. This card permits Apple format CP/M programs to run on the ACEs. Because of the difference in track and sector mapping on the Franklin and Apple disk drives, CP/M programs of interest must be purchased in a special format. Apple and Franklin software retailers would have the most recent information on what CP/M programs are currently available from third-party CP/M software vendors.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

Franklin Computer ACE System Maximums • the ACE 1200 and 1000 have the same maximums, the ACE 1200 is actually an ACE 1000 with 5 expansion slots filled with peripheral cards and the ACE 1100 disk expansion unit; 858K bytes of floppy disk storage using 3 dual-disk controller cards and 6 ACE 10 drives; 128K bytes of RAM using RAM or Z80 CPU cards; 512K bytes of RAM maximum addressable with special software routines; 2 microprocessors, the MOS 6502 and the Zilog Z80; Apple-compatible color graphics resolution of 280x192 pixels in 6 colors; 2 joystick or 4 paddle input devices; up to 8 parallel and 8 serial port outputs filling all ACE 1000 expansion slots with ACE dual interface cards, 4 parallel and 4 serial ports on the ACE 1200 because 5 slots are already populated; third-party hard disk expansion to 10 or 20M bytes of online storage.

☐ Packaged Systems

ACE 1000 • based on MOS 6502 microprocessor running at 1.022 MHz; FDOS Apple-compatible operating system and Franklin BASIC; integral keyboard with upper- and lowercase, numeric keypad, and function keys; 8 Apple II-compatible chassis slots; 64K bytes of 250-nanosecond RAM; 6 sockets for 12K of EPROM; joystick/paddle connector; one text and 4 graphics modes:

$1,095 prch

Family Pack • includes the ACE 1000; ACE 10 disk drive; joystick; Time Is Money, SNACK ATTACK and FRIENDS, Checkers applications and game software; Franklin BASIC interpreter and manual; Window magazine on disk:

1,495

ACE PRO PLUS • includes ACE 1000 computer; ACE 10 external disk drive; Franklin video monitor; ACE Display 80-column card; ACEWriter word processor; ACECalc spreadsheet; Data Perfect database by LJK Enterprises; Personal Financier by Eagle Software Publishing; Welcome diskette:

1,495

ACE 1200 • based on MOS 6502 microprocessor running at 1.022 MHz and a Zilog Z80 microprocessor running at 6 MHz; Apple-compatible operating system; integral keyboard with upper- and lowercase, numeric keypad and function keys; one 5.25-inch, integral disk drive; 8 Apple-compatible chassis slots (3 unused); 64K bytes of RAM on motherboard, 64K bytes of RAM on CP/M card; 6 sockets for 12K EPROM; RS-232C serial port, Centronics-compatible parallel port; one joystick/paddle connector; one text and 4 graphics modes:

1,995

ACE 1200 Office Management System • includes ACE 1200 microcomputer; bundled with WordStar and MailMerge by MicroPro, ACECalc spreadsheet analysis, BASIC and CBASIC programming languages, and Welcome introductory program; includes 2 5.25-inch integral floppy disk drives:

2,295

☐ CPU

MOS 6502 • 8-bit microprocessor with 8-bit data bus by MOS Technologies; addresses 64K bytes with object code, data, and I/O in the same RAM area; 57 instructions, many of which can utilize any of 13 PDP-11-type addressing modes; arithmetic and logical data manipulation; decimal mode; true indexed addressing with 8-bit offset in either an X or Y register; zero page addressing; indirect-indexed and indexed-indirect table handling instructions; stack pointer for 256K-byte LIFO external RAM; maskable and nonmaskable interrupts; push and pull of status register from stack; set and clear carry; decimal mode and interrupt bits; running at 1 MHz.

Zilog Z80B Processor • 6-MHz microprocessor with 8-bit internal architecture, 8-bit data bus interface; direct addressing to 64K bytes of memory; 14 registers include 16-bit program and stack pointers, 2 index registers, and a duplicate set of an 8-bit accumulator and a 7-bit flag register; upwardly compatible with the Intel 8080, it provides binary coded decimal (BCD) arithmetic, double-precision operations, multiple indexing with address registers, multiple interrupt, increment, decrement, and move capabilities • in addition to being able to execute all 78 Intel 8080 instructions, 50 enhancements to the instruction set include advanced block move and search macros, relative jump, and 3 types of selectable response interrupts, for a total of 128 operations • included with the ACE 1200 and with the ACE 80 CPU Card.

ACE 80 CPU Card • 6-MHz Zilog Z80B card with 64K bytes of RAM; an upgrade for ACE 1000 included in ACE 1200 • includes CP/M and CBASIC by Digital Research; CP/M system utility disk with file maintenance, conversion, copying, and peripheral control routines; horizontal scrolling facilities for 40-column displays • also includes on-board clock timer and 2K EPROM; can convert files to and from FDOS or Apple DOS format:

$449 prch

☐ Memory

There are 64K bytes of RAM on the ACE 1200 and ACE 1000 main system boards. The ACE 1200 has an additional 64K bytes of RAM on its CP/M card for a total of 128K bytes. The entire 128K is not addressable simultaneously from either Apple-compatible or CP/M mode without special programming. Programs not customized for the ACE 1200 memory architecture can address a maximum of 64K bytes. Both systems come with 6 sockets for a possible total of 12K bytes of EPROM. With special programming and RAM card the ACE 1200 can address up to 512K bytes of RAM. Please see ACECalc description in the Application Packages section for an example.

☐ I/O & Communications

The ACE 1200 comes bundled with one RS-232C serial port and one Centronics-compatible parallel I/O port. Additional ports on the ACE 1200 or optional ports on the ACE 1000 can be added using available Apple-compatible chassis slots. A joystick/paddle connector is also provided. Both the ACE 1200 and the ACE 1000 have 8 expansion ports; all but 3 of which are filled on the ACE 1200. There are a variety of third-party vendor interfaces to local area networks in the form of expansion cards.

ACE Dual Interface Card • Apple II-compatible parallel and serial interface card; parallel interface is Centronics compatible and accommodates most parallel printers; serial interface is RS-232C and operates at switch- and program-selectable speeds of 45.5 to 38.4K bps; configuration switches allow programming of RS-232C signals without special cabling; menu-driven installation can select speed, character lengths, parity, and stop bit options:

$229 prch

☐ Mass Storage

The Franklin computers use Apple-compatible disk drives. Apple

PRCH: purchase price. Prices effective as of February 15, 1984.

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Franklin Computer ACE
Models 1000 & 1200

II-compatible hard disks are available from third-party vendors. Each pair of ACE 10 disk drives requires a disk controller card.

ACE 10 Disk Drive System • 5.25-inch single-sided floppy disk drive based on the Shugart SA 400 series; 16 sectors per track and 143K-byte formatted storage under DOS 3.3, Apple Pascal, and CP/M; 13 sectors per track and 116K bytes formatted under DOS 3.2; 256 bytes per sector; 48 tracks per inch, 35 tracks per diskette; 300 rpm; 100-millisecond latency; 10-millisecond track-to-track access time; 250K-bps data transfer rate; 3.625 high x 6 wide x 9 inches deep; 4 pounds; includes a dual-disk controller:

$549 prch

ACE Single Disk Drive • same specifications as above but without a disk drive controller:

399

ACE 1100 Disk Drive Unit • ACE 1200-style expansion top for the ACE 1000; comes with one ACE 10 disk system installed with room for a second drive; second drive requires additional cable below; technical specifications of the drive are identical to those of the ACE 10:

699

ACE 10 Drive Cable • shielded drive cable for external ACE 10 disk drives:

17

ACE 1100 Drive Cable • shielded drive cable for second ACE 1100 drive:

12

ACE TOP • ACE 1200-like cover for integrating ACE 10 disk drives into an ACE 1000:

199

☐ Terminals/Workstations

Basic Franklin computer systems do not come bundled with a monitor. The ACE 1000 and ACE 1200 can interface with a monitor or television. The ACE 1200 has integral drives identical to the ACE 1100 disk drive unit option for the ACE 1000. External drives are available for all systems. The keyboard on all Franklin systems is integral with the main system unit.

Display • 40 columns standard, up to 70 columns under special software support on the ACE 1000; 80 columns available on the 1000 using 80-column card; 80 columns standard on the 1200; 24 lines of text; upper- and lowercase characters created in 5x7 pixel matrix • normal, inverse, and flashing characters with full cursor control • graphics are Apple II-compatible 6-color high-resolution graphics with 280x192 pixels or 280x160 with 4 lines of text, and 16-color low-resolution with 40x48 pixels or 40x40 with 4 lines of text • output to either a standard monitor or to a television using an RF modulator.

ACE Color Kit • color upgrade to ACE 1000s; produces Apple-compatible color output to monitor or television; 48 colors, 256 hues; requires installation:

$65 prch

ACE Display 80-Column Card • full upper- and lowercase, 128-character ASCII, 80-column card; characters formed in 7x9 pixels in a 9x10 field; automatically switches between text or graphics and 80- or 40-column modes; 4 cursor-type options; reverse video; supports CP/M and Pascal • comes bundled with ACE 1200 computer; compatible with Apple II and ACE 1000:

199

Video Monitor • 12-inch P31 green phosphor monochrome CRT; 80 characters by 24 lines; controls for selecting brightness, contrast, horizontal/vertical adjustments, horizontal size, selection of 40- or 80-character display; NTSC (EIA, RS-170) composite video input; bandwidth greater than 15 MHz; 30-nanosecond rise time; 54- to 63-Hz vertical rate • 11.75 high x 12.25 wide x 12 inches deep; 14 pounds:

160

Keyboard • integral keyboard on the ACE 1000 and 1200; 72 keys including numeric keypad and reset; supports upper- and lowercase characters; indicator light Alpha Lock key; Num Lock key allows access to numeric keypad or editing function keys; PAUSE, BREAK, and Control keys; auto-repeat function on every key.

Joystick • joystick input device attaches to joystick/paddle interface on main system board; provides simultaneous X and Y axis input:

50

☐ Printer/Graphics Output

Franklin does not supply printers. An optional interface card, described in the I/O section, is available which permits both serial and parallel third-party printers to be connected. Apple II-compatible graphics output devices are also available from third-party vendors.

• END

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

■ PROFILE

Operating Systems • Digital Research CP/M for HP 120, HP 125 • Microsoft MS-DOS for HP 150.

Data Management • Condor relational-type database management system; Personal Card File database; general file/data management facilities provided by Series 100/BASIC programming language.

Communications/Networks • LINK file transfer and remote database access facility for communications between HP Series 100 and HP 3000 via asynchronous lines up to 9600 baud.

Languages • Series 100/BASIC, assembler.

Models • HP 120 and HP 125 both use 2 8-bit Zilog Z80A microprocessors, 1 as system execution processor and 1 as terminal/display processor • HP 150 uses 16-bit Intel 8088 microprocessor.

CPU • 16-bit Intel 8088 microprocessor on Model HP 150; dual 8-bit Zilog Z80A microprocessors on Models HP 120 and HP 125.

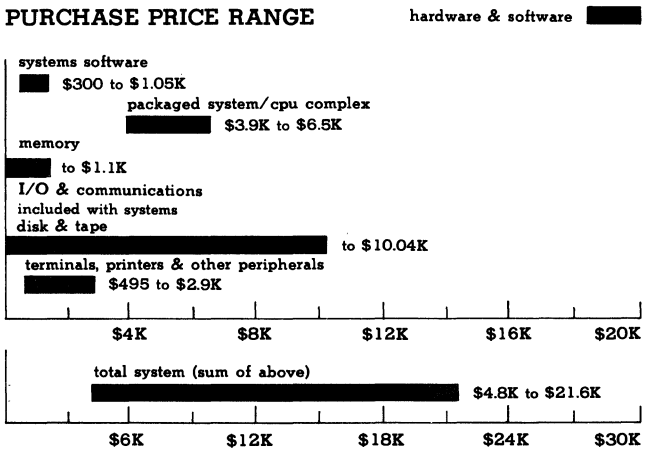
Memory • 64K bytes of main memory on HP 120, HP 125 • 256K to 640K bytes of main memory on HP 150.

Chassis Slots • 2 expansion slots for HP 150 for memory board or communications devices.

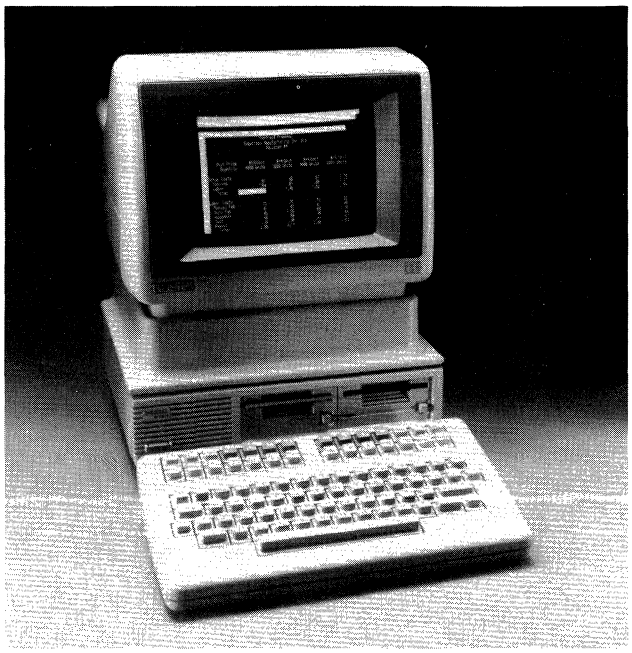
Ports • 2 RS-232C serial ports and an HP-IB port.

Disk • HP 150—up to 120M bytes of hard disk storage and 2.2M bytes of diskette storage on 8 combination Winchester/floppy drives • HP 120, HP 125—up to 30M bytes of hard disk storage and 540K bytes of diskette storage on 2 combination Winchester/floppy drives.

PURCHASE PRICE RANGE



HP 150 PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing • **SMALL SYSTEM** is based on 45650A HP 150 **packaged system** (includes MS-DOS operating system, P.A.M., CA1 course, CPU, 256K-byte main memory, CRT, keyboard, 2 RS-232C ports, 1 HP-IB port, dual 3.5-inch diskette drives) and the following options: BASIC **software**, integral thermal **printer** • **LARGE SYSTEM** is based on 45660A HP 150 **packaged system** (includes MS-DOS operating system, P.A.M., CA1 course, CPU, 256K-byte main memory, CRT, keyboard, 2 RS-232C ports, 1 HP-IB port, 15M-byte Winchester drive, and 3.5-inch diskette drive) and the following options: BASIC, WordStar, VisiCalc **software**; additional 384K-byte main **memory**; 3 additional 15M-byte Winchester **drives**; dot-matrix/letter-quality **printer**.



Terminals/Workstations • keyboard-initiated remote mode allows HP Series 100 to function as HP 3000 terminal; remote mode does not function concurrently with standalone computer mode.

Printers • integral thermal printers plus letter-quality printers and dot-matrix printers available.

First Delivery • HP 125—September 1981; HP 120—November 1982; HP 150—October 1983.

Systems Delivered • information not available.

Comparable Systems • HP 150—16-bit, single-user, desktop systems supporting MS-DOS; typically in the $3,000 to $7,000 price range • HP 120, HP 125—8-bit, single-user desktop business systems supporting CP/M; typically in the $1,900 to $5,000 price range.

Vendor • Hewlett-Packard, Personal Office Computer Division; 974 East Arques Avenue, Sunnyvale, CA 94086 • 408-735-1550.

Canada • Hewlett-Packard Canada, Ltd; 6877 Goreway Drive, Mississauga, ONT L4V 1M8 • 416-678-9430.

Distribution • hardware and system software nationwide through direct sales, authorized distributors and dealers, and service offices.

■ ANALYSIS

In a move to attain a larger share of the burgeoning micro market, Hewlett-Packard has decided to change from a vertical marketing strategy to one that is more in the mainstream business computer vein. The product it is

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

planning to use to achieve this goal is its latest micro offering, the HP 150.

The HP 150 joins 2 other products in the Series 100 product line, the HP 120 and the HP 125. However, unlike its 2 sister products which are "me too" CP/M based systems, the HP 150 is an innovative 16-bit system utilizing MS-DOS. What makes it unique is its touchscreen capability and the use of 3.5-inch diskette drives as the major mass storage device. HP's support of Sony's 3.5-inch drive solidifies the company's commitment to these devices becoming the new industry standard. It has been reported that HP will use these 3.5-inch drives in all future micro offerings and that they are presently selling more of them than the 5.25-inch drives.

The most outstanding feature of the HP 150, however, is its touchscreen facility. Designated HP Touch, this capability enables a user to interact with the system simply by pointing to the various commands of menu choices on the screen with his/her finger. This touchscreen concept has been around for a while, but up until now, none of the micro manufacturers have elected to use it with their systems. HP is known to be an innovator in the research and development of new technologies and in the marketing of those technologies. The unveiling of the HP 150 attests to that claim.

With the HP 150, Hewlett-Packard plans to compete directly with IBM, Apple, and the various other desktop micro vendors. HP knows from its not too successful venture with the HP 120 and HP 125 that the micro marketplace is already crowded. To combat this problem, the company is gearing up for a big advertising campaign and has established a new dealer program including higher discounts and cooperative selling. HP will concentrate on about 150 national accounts and work with dealers on other accounts. The company will continue to sell and support the 120 and 125 but its major emphasis will be on the HP 150. Presently, the HP 120 and HP 125 are used more in terminal environments interacting with the HP 3000 minicomputer.

HP is now pricing its Series 100 more in line with other products. At $3,995 for a 2 diskette drive system with a bundled operating system, the HP 150 is competitively priced. The almost 50 percent price reduction of the 120 and 125 also brings those products more in line with comparable systems.

☐ Strengths

The obvious attraction to the HP 150 is its touchscreen capability. Nontechnical users should be able to learn and operate the system by just touching the desired functions on the screen. To assist users with this facility, HP has developed a shell for the operating system. Called P.A.M., this interface was designed to make standard MS-DOS functions easier to use. It also provides the applications programs with a common user interface.

HP's decision to go with a standard operating system was also a smart move. Having to modify already developed software packages to utilize the touchscreen facility and 3.5-inch drive format is easier than having to develop software from scratch. This means more software will be available for the HP 150 in a shorter period of time.

The HP 150 is a compact unit packed with a lot of power. Inside its case is a "souped-up" Intel 8088 running at 8 MHz instead of the normal 5 MHz and a more than adequate amount of standard memory—256K bytes of dynamic RAM, 6K bytes of static RAM, and 160K bytes of ROM. Its CRT has a high resolution of 720x378 pixels for alphanumerics and 512x390 pixels for bit-mapped graphics. The display is driven by 2 controllers, one for each mode; the keyboard and touchscreen also have their own microprocessors. The 3.5-inch drives are supposed to be approximately 4 times more reliable than the 5.25s.

☐ Limitations

Daisychaining devices off the Series 100 HP-IB port can degrade system performance considerably. For example, even though drives can be supported through the port on the HP 150, the access time will get slower and slower the more drives that are added. Incorporating more direct expansion slots in the units would have been a better alternative.

The system's lack of IBM 3270-compatible communications support is also a noticable limitation. HP is planning to remedy this on the HP 150, however, with an IBM accessory card to be available in the near future.

■ SOFTWARE

☐ Terms & Support

Terms • the operating system is bundled with the hardware • program development and applications packages incur a one-time license fee • HP 120 and HP 125 software comes standard on 3.5-inch or 5.25-inch diskettes; software on 8-inch diskettes incurs additional $25 fee • HP 150 software comes standard on 3.5-inch diskettes; software on 5.25-inch diskettes incur an additional $25 fee.

Support • telephone support and consulting for Series 100 software is available through a Hewlett-Packard toll-free number.

☐ Software Overview

The HP 120 and HP 125 operating system is Digital Research's single-user, single-tasking CP/M 2.2. Hewlett-Packard supplies VisiCalc, BASIC, an assembly language, word processing, graphics, and data communications packages for these systems. These packages are integrated to support each other's functions; the word processing or VisiCalc facilities, for instance, could call on the Graphics program to develop pie charts.

The HP 150 supports Microsoft's MS-DOS. In order to take advantage of the HP Touch facility, MS-DOS has been enhanced with an HP-developed shell called P.A.M. (Personal Applications Manager). Programs from third-party vendors that are available from HP have also been enhanced to access the HP 150's touchscreen and softkey facilities. Other applications are presently being modified to run on the system and will be available by early 1984.

☐ Operating Systems

CP/M 2.2 • general-purpose disk/diskette operating system supports single-user interactive and batch processing; provides compatibility with CP/M software base • consists of 3 modules: Command Console Processor (CCP) intercepts, interprets, and executes user commands; Basic Disk Operating System (BDOS) performs fundamental system services, including file management; Basic Input/Output System (BIOS) serves as interface between CCP/BDOS and hardware using system-dependent input/output device handlers • developed by Digital Research • for HP 120 and HP 125 only • included with system.

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

MS-DOS 2.0 • general-purpose 16-bit operating system supports single-user, single-tasking, interactive, and batch processing • consists of a program interface, disk file manager, and character I/O handler • utilities include a translator for 8080 and Z80 code, a linker, and a library routine • keyboard softkeys, HP Touch user interface, and graphics display can all be accessed through MS-DOS • developed by Microsoft, Inc • for HP 150 only • included with system.

Personal Applications Manager (P.A.M.) • HP shell for MS-DOS • provides menus for most commonly used system commands; assist users in selecting applications, backing up and copying files and disks, and installing programs • for HP 150 only • included with system.

☐ Utilities

No separate utility packages available from HP.

☐ Data Management

45550A Series 100/Condor 20-1 • database management, inquiry and reporting system with relational-like capabilities • supports 32,767 records per file; 127 fields per record • system may be interfaced with Series 100/WORD word-processing and Series 100/Graphics graphics packages • developed by Condor Computer Corporation:

$300 lcns

45415A Series 100/Condor 20-1 • same as 4550A except modified to run on the HP 150:

300

45550E Series 100/Condor 20-2 • database management, inquiry and reporting system • includes all features of Condor 20-1 plus ability to handle multiple files making it possible to relate data between files • for HP 120 and HP 125 only:

600

45550H Series 100/Condor 20-3 • database management inquiry and reporting system • includes all features of Condor 20-1 and 20-2, plus ability to specify up to 8 data items as indexes and to produce more advanced computer reports with customized formats • for HP 120 and HP 125 only:

700

45416A Series 100/Condor 20-3 • same as 45550H except modified to run on the HP 150:

700

45422A Series 100/Personal Card File • database that resembles desktop files; for creating, storing, and changing files • for HP 150 only:

150

☐ Communications/Networks

45534B Series 100/DSN Link • provides bidirectional file transfer capability between HP 100 Series and HP 3000 or 2 HP 100 Series systems; remote files can be accessed, transferred, processed locally and output locally or transferred back to HP 3000 or another Series 100; transfer is initiated by depressing a soft key, then Series 100/DSN/LINK guides user through file transfer or query process using predefined soft key commands • supports half- and full-duplex transmissions from 110 to 9600 baud • for HP 120 and HP 125 only:

$300 lcns

45425A Series 100/DSN Link • same as 45534B except modified to run on HP 150:

200

☐ Program Development/Languages

45535A Series 100/BASIC • extended BASIC interpreter supporting random and sequential disk files with file manipulation statements; includes Boolean operators, nested IF/THEN/ELSE, formatted printing, trace facilities, error trapping, extensive program editing, automatic line generation and renumbering • handles integer, string, single-precision floating-point and double-precision floating-point operations, and matrices with up to 255 dimensions; calls up to 10 assembly language subroutines • for HP 120 and HP 125 only:

$330 lcns

45445A Series 100/BASIC • same as 45535A except modified to run on HP 150:

300

45536A Programming Package • assembler plus supporting utilities for system programming • for HP 120 and HP 125 only:

80

Applications Packages

45533B Series 100/WORD • word processing package with text editing, print formatting, and extended features • text editing features include: automatic carriage return at the end of line; insert/delete of characters, words, lines, sentences, or paragraphs through labeled function keys; horizontal scrolling with line widths up to 159 characters; block moves; search and replace; limited hyphenation • print formatting features include: true proportional spacing; left, right, and center justification; pagination; headings; footings; sub- and superscripts; user-specified margins and line spacing; underlining; boldface • extended features include: mail list sorts and merges with form letters; forms creation; 2-column printing; line numbering • oversize files are limited by disk space, not by memory • for HP 120 and HP 125 only:

$300 lcns

45560A WordStar 100 • screen-oriented integrated word processing package; includes simultaneous printing and editing, text formatting, underlining, screen-defined soft keys used as command keys • developed by MicroPro International Corp • for HP 120 and HP 125 only:

500

45400A Series 100/WordStar • same as 45560A except modified to run on HP 150 utilizing HP TOUCH:

500

45562A MailMerge 100 • WordStar option • file merging tool supporting mailing list management; includes multiple-copy facilities and chained printing • for HP 120 and HP 125 only:

150

45401A Series 100/MailMerge • same as 45562A except modified to run on HP 150 utilizing HP TOUCH:

250

45561A SpellStar 100 • WordStar option • automatic proofreading package verifies spelling • for HP 120 and HP 125 only:

250

45402A Series 100/SpellStar • same as 45561A except modified to run on HP 150 utilizing HP TOUCH:

250

HP 98592JA Perfect Pac • includes Perfect Writer word processor, Perfect Speller, Perfect Calc, and Perfect Filer programs • Perfect Writer provides character, word, sentence, and paragraph editing; up to 7 documents can be edited at one time; also features split-screen capability • Perfect Speller provides 50,000 word dictionary • Perfect Calc allows up to 7 separate spreadsheets to be online simultaneously with 2 viewable at the same time; features multiple editing, subsetting and merging, and an expandable function library; 17 applications programs included • Perfect Filer includes menu guides for the creation of customized data files and a forms capability for inputting and displaying data • for HP 120 and HP 125 only:

995

45478A PerfectPac • same as 98592JA except modified to run on HP 150 utilizing HP TOUCH:

995

LCNS: one-time license fee. NC: no charge. Prices effective as of October 1983.

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

98593JA Perfect Writer/Speller • for HP 120 and HP 125 only:
595

45477A Perfect Writer/Speller • for HP 150:
595

45420A Series 100/MemoMaker • simple word processor with basic cut-and-paste and on-screen correction capabilities; files are fully compatible with WordStar • for HP 150 only:
150

45531B Series 100/VisiCalc • spreadsheet analysis system for financial planning, forecasting, and budgeting; allows easy manipulation of rows and columns of numbers, including use of formulas to automatically generate rows or columns; 254 rows x 254 columns; supports averages, trigonometric functions, etc; allows "what-if" analysis; split-screen or full-screen formats; supports formatting and printing options • can interface to Series 100/Graphics • for HP 120 and HP 125 only:
200

45405A Series 100/VisiCalc • same characteristics as 45531B except modified to run on the HP 150:
250

45532B Series 100/Graphics • graphics system supports softkey-driven, fill-in-the-blank plotting; plotting by Hewlett-Packard plotters on paper or transparencies; handles bar charts, pie charts, X-Y charts, linear and logarithmic axes; user-specified text size, with choices; 4 fonts; position and color interfaces to Series 100/VisiCalc, HP 7470A and HP 7475A plotters, and HP printers • for HP 120 and HP 125 only:
200

45410A Series 100/Graphics • same characteristics as 45532B except modified to run on the HP 150:
300

45670A Series 100/MicroPlan • financial modeling system that performs 4 different types of consolidation of spreadsheets, creates tax tables, depreciation schedules, loan programs; computes cash flows, rates of return • for HP 120 and HP 125 only:
500

45465A MicroPlan • same characteristics as 45670A except modified to run on the HP 150:
500

45671A Series 100/MicroPlan Consolidation Module • consolidates business reports into corporate reports; extracts and merges key ports of several models • for HP 120 and HP 125 only:
300

45466A MicroPlan Consolidation • same as 45671A except modified to run on the HP 150:
300

45552A Series 100/BPI General-Accounting Package • double-entry bookkeeping system • supports general cash, invoice register, cash receipts, merchandise purchases, and cash sales journal entries; provides balance sheet, profit and loss, general ledger, accounts receivable, accounts payable, payroll, numerical, alphabetical payee, customer or vendor reports • 800 customer accounts; 200 vendor accounts; 10 billing departments • developed by BPI Systems, Inc • for HP 120 and HP 125 only:
450

45580A Series 100/Milestone • project management package; utilizes CPM (Critical Path Method) and PERT (Performance Evaluation and Review Technique) • for HP 120 and HP 125 only:
295

45581A Series 100/Datebook II • time management system for scheduling and tracking appointments for up to 27 people • for HP 120 and HP 125 only:
295

45581A Series 100/Personal Datebook • time management system for scheduling and tracking appointments for 1 person:
150

45585A Aardvark Professional Tax Plan • for HP 120 and HP 125 only:
350

45586A Aardvark Personal Tax Plan • for HP 120 and HP 125 only:
140

45603A Picture Perfect • presentation graphics program • not available in 8-inch diskette format • for HP 120 and HP 125 only:
625

☐ Other Facilities

Computer Tutor/150 • teaches users basic HP 150 concepts • included with HP 150.

■ HARDWARE

☐ Terms & Support

Terms • purchase only; 90-day warranty.

Support • several different maintenance plans are available: On-Site Maintenance Agreements have various levels of response time and coverage from next-weekday repair to 4-hour response, 24 hours per day, 7 days per week within 100 miles of the primary service office; Field Repair Center Maintenance contracts offer repair within 3 working days after the product is received; for multiple system sites, Volume On-Site Maintenance schedules weekly repair visits • service on-site or at a Field Repair Center is also available on a per incident rather than contract basis; HP Authorized Dealer Repair Centers provide maintenance at their location; pickup and delivery and loaner equipment can also be arranged • all systems have built-in self-test features for processor, terminal, integral printer, and data communications channels.

☐ Physical Specifications (H x W x D); Weight

Model 120

CPU • integrated with monitor.

Display • 11.3 x 12 x 12 inches; 18 pounds.

Keyboard • 1.4 x 11.8 x 7.1 inches; 3.8 pounds.

Model 125

CPU • integrated with monitor.

Display • 17 x 15 x 18.7 inches; 39 pounds.

Keyboard • 3 x 17 x 7.5 inches; 44 pounds.

Model 150

CPU • integrated with monitor.

Display • 11.3 x 12 x 12 inches; 22.3 pounds.

Keyboard • 2.5 x 18 x 8.9 inches; 4.7 pounds.

☐ Systems Overview & Configurability

The Series 100 is comprised of 3 desktop units: the older HP 120 and HP 125 which are 8-bit systems running under CP/M, and the recently introduced HP 150, a 16-bit system supporting MS-DOS.

The HP 150 is a compact unit occupying only 1.7 square feet of space. In its systems enclosure, it packs an Intel 8088 CPU, 256K bytes of RAM and 160K bytes of ROM, a 9-inch CRT, and its most impressive feature, touchscreen electronics. It also contains 2 RS-232C ports and an IEEE-488 port plus 2 free I/O slots for system expansion. The keyboard is detached and connects to the system via an 8-foot coiled cord.

To keep the unit compact, HP is offering 3.5-inch diskette drives in an enclosure just slightly larger than the system unit. An integral thermal printer which fits into the top of the HP 150 is also available. Additionally, HP offers various other peripherals for the

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

HP 150 including Winchester drives, 5.25-inch floppy drives, plotters, and dot-matrix and letter-quality printers.

The HP 150's touchscreen feature, referred to as HP TOUCH, allows users to employ their finger as a pointing device to implement commands. Because of an advanced optical technology used in HP TOUCH, pressure is not required to activate HP TOUCH. This means that a user does not have to actually make contact with the screen. Beams of light project slightly above the surface of the screen. When a user's finger breaks through the beams, the system acknowledges its presence by displaying in inverse video the item or command selected. However, the system does not react to the selection until the user withdraws his/her finger from the path of the light beam. HP TOUCH can be disabled with a keystroke or a host command.

The HP 120 and HP 125 are similar systems with the only major difference between them being their size. The HP 125 is a desktop unit with a 12-inch CRT, while the 18-pound transportable HP 120 features a 9-inch CRT and takes up 1.7 square feet of space, the same as the HP 150. Both computers include dual Z80A microprocessors, 64K bytes of RAM, CRT, and detached typewriter-style keyboard. Each system also has 2 RS-232C ports and an IEEE-488 connector. Like the HP 150, the 120 and 125 can be configured with 3.5-inch, 5.25-inch, and Winchester drives, plus 8-inch diskette drives.

In addition to serving as a personal computer, the Series 100 can also perform as a terminal. Using the Block/Format Mode utility which resides in ROM, the systems can run VPLUS/3000 data entry applications on an HP 3000 by emulating an HP 2622A Data Entry Terminal. Additionally, the HP 150 has a graphics mode which provides compatibility with the HP 2623A graphics terminal. Since Tektronix 4014 emulation is also standard, the HP 150 is capable of running industry-standard PLOT-10 software packages. An optional IBM 3278 emulator card for the HP 150 will be available in the first quarter of 1984.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

HP 150 System Maximums • 640K-byte main memory; 120M bytes of hard disk storage on 8 drives; 2 RS-232C ports, 1 HP-IB port; 1 free expansion slot.

HP 120, 125 System Maximums • 64K-byte main memory; 30M-bytes of hard disk storage on 2 drives; 2 RS-232C ports, 1 HP-IB port.

☐ Packaged Systems

45610A HP 150 Standard System • includes CPU, 256K-byte main memory, 9-inch CRT, detached keyboard, 2 RS-232C ports, 1 HP-IB port, HP TOUCH, MS-DOS, P.A.M., CA1 course, and 4 disk application programs:

$3,150 prch

45650A HP 150 Standard System • includes same as 45610A plus dual 3.5-inch 270K-byte diskette drives:

3,995

45655A HP 150 Standard System • includes same as 45610A plus 5M-byte Winchester and 3.5-inch diskette drive:

5,850

45660A HP 150 Standard System • includes same as 45610A plus 15M-byte Winchester and 3.5-inch diskette drive:

6,450

45600A HP 120 Standard System • includes CPU, 64K-byte main memory, HP-IB port, 2 RS-232C ports, 9-inch CRT, keyboard, CP/M operating system:

1,920

45605A HP 120 Packaged System • includes 45600A HP 120 Standard System plus 9121D 3.5-inch floppy drives, VisiCalc, Condor 20-1, and Graphics:

3,190

45500B HP 125 Standard System • same as HP 120, but with 12-inch CRT:

1,920

45505A HP 125 Packaged System • includes 45500B HP 125 Standard System plus 9121D 3.5-inch floppy drives, WordStar, MailMerge, and Condor 20-1:

3,190

☐ CPU

HP 150 CPU • 16-bit Intel 8088 microprocessor operating at 8 MHz; includes 16-bit internal architecture but only 8-bit data path • incorporated in the system architecture is a battery backup and real-time clock.

HP 120 & HP 125 CPU • includes dual 8-bit Zilog Z80A microprocessors operating at 3.68 MHz; one processor is dedicated to processing operating system commands and controlling devices that attach to the HP-IB port; other processor handles terminal functions and various I/O activates such as the keyboard and data communications.

☐ Memory

HP 150 Standard Memory • 256K bytes of dynamic RAM expandable to 640K bytes; 6K-byte static RAM display memory • 160K-byte ROM which contains terminal features • only 1 expansion slot can be used for additional main memory.

45630A Memory Option Board • 128K-byte RAM:

$610 prch

45631A Memory Option Board • 256K-byte RAM:

860

45632A Memory Option Board • 384K-byte RAM:

1,120

HP 120 & HP 125 Standard Memory • 64K bytes of RAM; 10K-byte display memory; 128K bytes of nonvolatile configuration memory (battery powered) • 32K-byte loader ROM • no expansion options.

☐ I/O & Communications

All Series 100 systems provide 2 RS-232C ports and an HP-IB port. The HP 150 also contains 2 expansion slots for adding a memory board and/or data communications devices.

HP-IB Interface • parallel ANSI/IEEE 488-1978 standard channel • handles up to 14 peripherals daisychained off the port • attaches disks, printers, plotters.

HP 150, HP 120 RS-232C Interfaces • asynchronous transmission; up to 19,200 baud on HP 150; up to 9600 baud on HP 120 • 25-pin connection.

HP 125 RS-232C Interface—Port 1 • asynchronous transmission up to 9600 baud; fully compatible with AT&T 103A full-duplex modems • 50-pin or 25-pin connection; accessory interfaces for 50-pin connection for current-loop and 300-baud modem.

HP 125 RS-232C Interface—Port 2 • same as port 1 except only 25-pin connection; accessory interfaces are not supported.

13265A Modem • 300 baud • requires 50-pin port • for HP 125 only:

$500 prch

13266A Current-Loop Interface • requires 50-pin port • for HP 125 only:

200

☐ Mass Storage

9121S 3.5-inch Diskette Drive • 270K-byte formatted 3.5-inch diskette drive • single-sided, double-density diskettes; 256 bytes per sector, 16 sectors per track, 66 tracks per surface, 600-rpm rotation speed, 415-millisecond average access time • supported only as an add-on drive:

$890 prch

PRCH: purchase price. Prices effective as of October 1983.

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

9121D 3.5-inch Diskette Drive • same characteristics as 9121S except dual drive:

1,270

82902M 5.25-inch Diskette Drive • 270K-byte formatted 5.25-inch diskette drive • single-sided, double-density diskettes; 256 bytes per sector, 16 sectors per track, 35 tracks per surface, 300-rpm rotation speed, 187-millisecond average access time • supported only as add-on drive:

1,520

82901M 5.25-inch Diskette Drive • same characteristics as 82902M except dual drive:

2,230

9895A 8-inch Diskette Drive • 2.3M-byte formatted dual 8-inch diskette drive • uses single- or dual-sided, single-density diskettes; 77 tracks per surface, 256 bytes per sector, 30 sectors per track, 0.5M bytes per side, 360-rpm rotation speed, 179-millisecond average access time • compatible with IBM 3740 single-sided sectored format; automatic sensing and read/write of either single- or dual-sided diskettes • for HP 120 and HP 125 only:

5,910

9134A Winchester Drive Unit • 4.6M-byte formatted, 5.25-inch Winchester disk drive • 75 tracks per surface; 30 sectors per track; 256 bytes per sector; 3600 rpms; 173-millisecond average access time:

3,500

9133A Winchester Drive Unit • same as 9134A plus 3.5-inch diskette drive:

4,260

9135A Winchester Drive Unit • same as 9134A plus 5.25-inch diskette drive:

4,760

9133V Winchester Drive Unit • 4.8M-byte formatted, 5.25-inch Winchester disk drive with 270K-byte 3.5-inch diskette • 305 tracks per surface; 31 sectors per track; 256 bytes per sector; 3600 rpms; 85-millisecond average access time:

3,040

9134XV Winchester Drive Unit • same characteristics as 9133V except Winchester drive has 14.5M-byte formatted capacity and no floppy drive • for HP 150 only:

3,345

9133XV Winchester Drive Unit • same characteristics as 9133V except Winchester drive has 14.5M-byte formatted capacity • for HP 150 only:

3,650

☐ Terminals/Workstations

The Hewlett-Packard Series 100 are single-user desktop computers/word processors that can function as terminals or workstations. The detachable keyboard and adjustable CRT serve as the primary user interfaces; these are integrated with the processor and communications logic into a single unit.

HP 150

The HP 50 provides HP 2622A Data Entry Terminal features and HP 2623A Graphics Terminal features as well as serves as an integral part of the HP 150 personal computer. A special feature of the HP 150 is its touchscreen capability called HP TOUCH.

Display • 9-inch diagonal screen displays 1920 green phosphor characters in 24-line x 80-column format; 25th and 26th lines for screen labeling of function keys; 27th line for system status and error messages • screen memory stores 2 pages of text • 7x10 dot matrix; non-interlaced raster scan; character set includes Roman 8, line drawing, math standard, total of 896 characters; supports 10 national character sets; blinking-underline or blinking-square cursor; inverse video, underline, blinking, half-bright, and security display enhancements • graphics resolution of 512x390 pixels; automatic fill of polygons up to 105 sides; 11 fully supported national graphics character sets; Tektronix 4014 emulation.

Keyboard • detached, 107-key, low-profile keyboard • includes 12 soft/function keys of which 8 have corresponding screen labels; separate 18-key numeric pad; cursor control keys; auto-repeat; N-key roll-over • attaches via 8-foot coiled cable.

HP TOUCH • touch-sensitive display feature enables user to touch the screen in place of hitting a key—divides the screen into over 1,000 touch areas, 27 vertical x 90 horizontal; applications can utilize the screen via host commands • standard system feature.

HP 125 & HP 120

Display • 1920 white phosphor HP 125 and HP 120 alphanumeric characters displayed in 24 lines of 80 characters each; 25th and 26th lines for labeling of soft keys or for messages and status information • contains 5-page, 120-line display buffer • 9-inch diagonal screen size for HP 120; 12-inch diagonal screen size for HP 125; 128 ASCII character set standard; 6 optional European sets incur no additional charge; 7x11 dot matrix; noninterlaced raster scan; display enhancements include underline and blinking cursor, inverse video, half-bright, underline • screen can be tilted for easy viewing.

Keyboard • detachable full ASCII keyboard, 8 screen-labeled soft keys, auto-repeat, N-key rollover, 14-key numeric pad (optional on HP 120).

☐ Printers/Graphics

Printer attachment can involve configuration trade offs, since both HP-IB and RS-232 interfaces are available, whereas other devices are dedicated to one or the other. Printers attaching to the HP-IB channel must contend with disks and plotters. Printers attaching to the 2 RS-232C serial interfaces are alternatives to data communications lines.

2671A Thermal Printer • 120 cps; bidirectional thermal printer with 9x15 dot matrix; 10- or 16.2-cpi pitch for 80 or 132 columns; 6-lpi vertical spacing; flat, fanfold, continuous, thermal-sensitive paper; no multipart forms; includes HP-IB interface • for HP 120 and HP 125 only:

$1,240 prch

45500B-050 Integrated Thermal Printer • same features 2671A except on 80 columns • for HP 125 only:

1,210

2674A Integral Thermal Printer • dot-matrix printer; 120 cps; 80 columns at 10 cpi; graphics capability; rolled or fanfold thermal paper • for HP 150 only:

495

2601A Daisywheel Printer • 40 cps with plastic, 32 cps with metallized print wheel; bidirectional letter-quality printer, 10, 12, or 15 cpi; 132 columns at 10 cpi; 6-lpi vertical spacing; standard friction platen for cut forms up to 16 inches wide, optional forms tractor for multipart continuous forms from 3.25 to 15.25 inches in width; optional proportional spacing print wheels; choice of 25 printwheels includes OCR-A, OCR-B, and foreign character sets; includes RS-232C interface:

3,520

26010A Bidirectional Tractor Feed:

565

26010A Dual Sheet Feeder:

2,290

2602A Daisywheel Printer • same as 2601A except prints at 20 to 25 cps • includes RS-232C interface:

1,545

2602A-046 HP-IB Interface:

150

26020A Bidirectional Tractor Feed:

285

82905B Serial Printer • dot-matrix impact printer; 80 cps bidirectional • 7x9 dot matrix; 80 columns; single sheet or fanfold and multipart forms, up to 10 inches wide; include HP-IB

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Hewlett-Packard HP 100 Series
HP 120, HP 125 & HP 150

interface:

795

82906A Serial Printer • same as 82905B except prints bidirectionally at 160 cps and includes graphics capabilities:

995

2932A Serial Printer • dot-matrix impact printer; prints 200 cps; 136 columns at 10 cpi; uses letter-quality or fanfold and multipart forms; graphics capabilities; includes RS-232C interface; HP-IB interface available at no charge:

2,495

2934A Serial Printer • same as 2932A except also offers letter-quality printing at 100 cps:

2,895

7470A Graphics Plotter • 2-pen, 8.5x11-inch plot area using roll paper or transparencies; automatic pen changing fiber tip:

1,095

7475A Graphics Plotter • 6-pen; draws up to 15 inches per second; .001-inch resolution; 8.5x11-inch plot area using roll paper or transparencies; automatic pen changing fiber tip:

1,895

• END

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Honeywell microSystem 6/10
Professional Business System

■ PROFILE

Operating Systems • Honeywell GCOS 6 MOD 400 Release 3.0; Digital Research CP/M-86; Microsoft MS-DOS

Data Management • none available from Honeywell

Communications/Networks • asynchronous communications, VIP7300 and VIP7700 emulation; BSC 3270 emulation; Honeywell RNP and DSA network interface; IBM BSC and SNA network interface

Languages • Advanced COBOL; Advanced BASIC; Advanced Assembler; BASIC Interpreter and Compiler; Pascal Compiler; CBASIC-86; GWBASIC

Models • CPX9808 desktop system with 1 diskette drive; CPX9809 desktop system with dual diskette drives; CPX9810 floorstanding unit with hard disk drive

CPU • Honeywell's proprietary 16-bit microprocessor; 16-bit Intel 8086 microprocessor optional

Memory • 128K bytes or 512K bytes of RAM

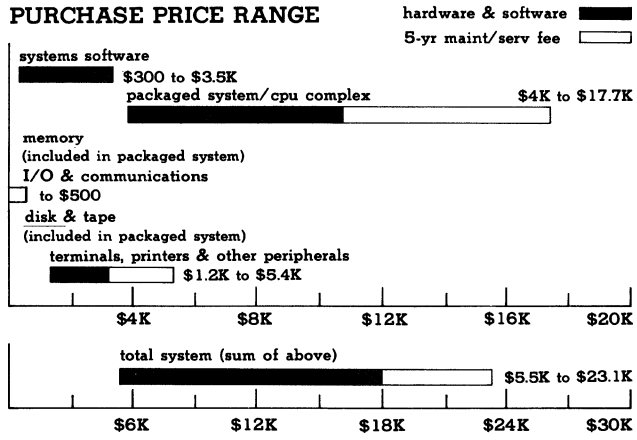
Chassis Slots • 3 open slots available

Ports • 2 asynchronous ports standard; 1 optional synchronous port

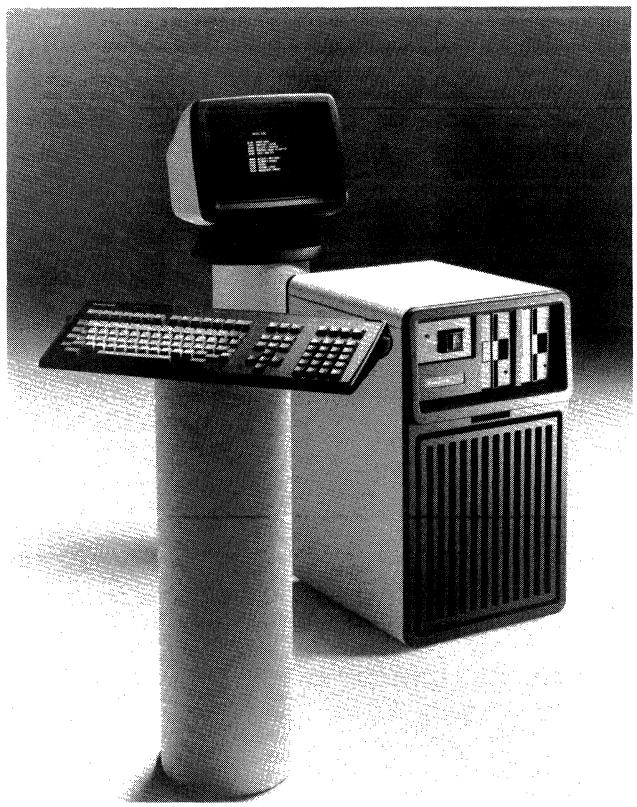
Mass Storage • 650K bytes to 1.3M bytes of diskette storage; 20M bytes of Winchester hard disk storage

Terminals/Workstations • CPX9808 and CPX9809 desktop units are single-user systems; CPX9810 floorstanding unit will support 1 additional terminal

PURCHASE PRICE RANGE



HONEYWELL MICROSYSTEM 6/10 PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing, and open bars reflecting 5-year service/maintenance fees associated with large system • **SMALL SYSTEM** is based on CPX9808 microSystem 6/10 **packaged system** (includes operating system CPU, 128K-byte RAM, 2 asynchronous serial ports, CRT, and keyboard) and the following options: BASIC language **systems software**, 1 80-column and 100-cps dot-matrix **printer** • **LARGE SYSTEM** is based on CPX9810 microSystem 6/10 **packaged system** (includes MOD 400 operating system, CPU, 512K-byte RAM, 2 asynchronous ports, workstation extension kit, 640K-byte diskette, 20M-byte hard disk, CRT, and keyboard) and the following options: COBOL and BASIC languages, DSA network software, word processing, electronic spreadsheet, and other **systems software**; Intel 8086 processor; synchronous **communications** interface; and a 35-cps letter-quality **printer**.



Printers • dot-matrix and letter-quality printers available from Honeywell

First Delivery • May 1983

Systems Delivered • Honeywell proprietary information

Comparable Systems • Burroughs B 20, Data General Desktop Generation, and IBM PC, PC/XT, XT/370

Vendor • Honeywell Information Systems, Inc; 200 Smith Street, Waltham, MA 02154 • 617-895-6000

Canada • Honeywell Limited; 155 Gordan Baker Road, Willowdale, ONT M2H 3N7 • 416-499-6111

Distribution • through Honeywell direct sales and service offices; through resellers for turnkey systems

■ ANALYSIS

With the announcements of its first micros, Honeywell brings to market systems which are fully compatible with the Honeywell line of DPS 6 minicomputers and which are associated with extensive networking capabilities. Designated the microSystem 6/10 and microSystem 6/20, these products are targeted towards Fortune 1000 companies and large organizations who are looking for the best of 2 worlds—individual processing power within

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Honeywell microSystem 6/10
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departments but with better management and control. Because of the differences in hardware architecture and peripherals, the microSystem 6/20 will be covered in a different report.

The operating system used by the microSystem 6/10 is the latest version of the GCOS 6 MOD 400 which runs on Honeywell's DPS 6 and Level 6 minicomputers. For users who wish to utilize industry-standard personal computer software, Honeywell provides an optional Intel 8086 processor board which includes both the MS-DOS and CP/M-86 operating systems plus GW Basic.

In addition to promoting the 6/10 as a standalone system, Honeywell is also targeting environments that are building distributed data processing networks. The microSystem 6/10 is capable of serving as an interactive and RJE end point in Honeywell RNP and DSA networks as well as in IBM BSC and SNA networks. In these environments, 6/10 users can utilize files downloaded from the host system as well as enter data into a central Honeywell or IBM database.

The system features self-diagnostic routines for isolating the source of equipment failure. It is constructed with customer-replaceable components for simple installation and maintenance. According to Honeywell, any component can be replaced by the user in 5 minutes.

In many ways, the microSystem 6/10 is comparable with the Burroughs B 20 Series Model 21, the Data General Desktop Generation Models 10 and 10/SP, and the IBM PC, PC/XT, and XT/370. All units are designed to function standalone or in distributed networks supporting their own proprietary networking environment. Additionally, the microSystem 6/10 and the Burroughs B 21 will also support IBM's SNA and BSC protocols.

All units except the IBM PC and PC/XT utilize their own proprietary operating systems in addition to running under MS-DOS and/or CP/M-86. Furthermore, the 6/10, the DG models, and the XT/370 are all upward compatible with either their mini or mainframe family members. On a price comparison basis, the Microsystem 6/10 costs less than both the IBM units and the Burroughs B 21 systems, and has more sophisticated communications capabilities than the DG systems.

☐ Strengths

Honeywell's decision to make its micro upward compatible with its DPS 6 product line shows far-sightedness on Honeywell's part. By doing so, they have implemented a sophisticated level of communications and networking facilities on a micro system that few micros presently offer but are slowly migrating towards.

Not only was Honeywell looking to the future when it designed the microSystem 6/10 but also to the present—and the impact of industry-standard software. By offering a personal computing option supporting both MS-DOS and CP/M-86 operating systems, Honeywell has ensured that the 6/10 will not be locked into software products just for the MOD 400.

Other interesting features of the 6/10 are its ability to accept files downloaded from a host system and the use of membrane-capacitance technology instead of mechanical switches underneath the keys on the keyboard for better reliability.

☐ Limitations

System expandability is the biggest limitation of the microSystem 6/10. A maximum memory of 512K bytes is relatively small for a 16-bit system, and for the 6/10 this limitation has an even greater impact. Because of the system's DPS 6 compatibility, all DPS 6 software should run on the 6/10. However, it doesn't; the constraining factor is the memory size. Some of the programs are just too big for 512K to handle.

■ SOFTWARE

☐ Terms & Support

Terms • available for a one-time charge license fee.

Support • Honeywell provides assistance during startup and for routine operation of the software; includes 24-hour-per-day telephone access to Honeywell's National Response Center and workday access to the Technical Assistance Center at no charge.

☐ Software Overview

The microSystem 6/10 is capable of running both Honeywell DPS 6 minicomputer software and MS-DOS and CP/M-86 microcomputer software. The system is heavily endowed with sophisticated communicatins products which bring the 6/10 into Honeywell's Distributed Systems Architecture (DSA) network environment as well as IBM's SNA world.

☐ Operating Systems

SMS9000/SMS9500 MOD 400 Executive & Utilities • diskette/disk versions • menu-driven system supporting multitasking, real-time, or data communications applications in one or more online streams • supports COBOL, FORTRAN, Pascal, RPG, BASIC, and assembler programming languages • allow access to sequential, relative, random, and indexed sequential files on various device types • features time slicing; mail facility; symbolic debugger; batch and interactive program development; checkpoint/restart capability; code sharing via reentrant programs; buffer pooling; file recovery; and support of communication protocols and program products interfacing with Honeywell hosts, IBM hosts, and DPS 6/Level 6 systems • includes over 150 utilities; most interesting are PRIME-INDEX for priming the index; REORG-INDEX for reorganizing an index sequential file using a single command; and UNSP for automatically monitoring queues • included with systems.

MS-DOS • general-purpose 16-bit operating system supports single-user, single-tasking, interactive, and batch processing • consists of a program interface, disk file manager, and character I/O handler • utilities include a translator for 8080 and Z80 code, a linker, and a library routine • requires 32K-byte main memory • developed by Microsoft, Inc • included with Personal Computing Option.

CP/M-86 • general-purpose single-user operating system • supports interactive and batch processing; provides compatibility at a source-language level with CP/M-80 software base • consists of 3 modules: Command Console Processor (CCP) intercepts, interprets, and executes user commands; Basic Disk Operating System (BDOS) performs fundamental system services including file management, Basic Input/Output System (BIOS) serves as interface between CCP/BDOS and hardware using system-dependent input/output device handlers • utilities include: PIP for file transfer, reformatting, and concatenation; ED for creation and modification of ASCII files; ASM-86 for assembly of 8088/8086 programs; DDT-86 for program testing and debugging; SUBMIT for batch submission of multiple parameterized, prototype commands: STAT for alteration and display of I/O device and file status; GENCMD for processing object files in standard Intel hexadecimal format; LMCMD for

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Honeywell microSystem 6/10
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processing object files in standard Intel executable binary format • requires 56K-byte main memory • developed by Digital Research • included with Personal Computing Option.

☐ Utilities

Sort/Merge Facility • supports up to 16 sort key fields; sequence based on either ascending or descending sequence by key; ASCII or numeric fields; and exits for user processing of input and output records • can also be called from COBOL, FORTRAN, or assembly language programs.

SMU9000 • for dual diskette-based CPX9809:
$100 lcns

SMU9501 • for hard disk-based CPX9810:
100

SMU9504 Screen Editor • full-screen, interactive text editor for creating, modifying, and maintaining files and application source programs:
100

☐ Data Management

Data Entry Facility II (DEF II) • provides forms-mode, source data entry capability with validation and editing functions • includes modules for data entry, data validation and editing, forms development, tables development, file printing, supervisory functions, file recovery/restoration, search, and modify (record/field), and utilities • facilities are available for user to create, modify, delete, print, or view forms • users can develop verification and extraction tables to control the data entry function • user develop application programs with COBOL.

SMC9007 • for dual diskette-based CPX9809 system:
$400 lcns

SMC9510 • for hard disk-based CPX9810 system:
500

☐ Transaction Management

SMS9502 Transaction Control Language (TCL) Facility • allows users to execute multiple transactional-type applications concurrently; new transaction-oriented applications can also be developed • included are 3 basic types of programs, a TCL compiler for program development, a single runtime TCL Processor which initiates processor and terminal(s) in the system for a transaction and then turns control to the next transaction when the first is completed, and multiple transaction descriptions which call on TCL (transaction control language) statements to supply the system with data on the required data files, screen forms, and application programs and their sequence needed by a transaction for hard disk-based CPX9810 system only:
$200 lcns

☐ Communications/Networks

In addition to operating as a standalone system, the microSystem 6/10 can act as a 3270 or VIP terminal as well as serve as an end point in DSA, SNA, or BSC networks.

File Transfer Facility • enables 2-way transmission of files between microSystem 6/10 and DPS 6 Level 6 and DPS 8 systems • requires 512K-byte memory.

SMC9008 • for dual diskette-based CPX9809 system:
$375 lcns

SMC9501 • for hard disk-based CPX9810 system:
375

SMC9000 VIP7300 Terminal Emulator • emulates Honeywell VIP7300 Series of asynchronous terminals • requires 512K-byte memory • for dual diskette-based CPX9809:
150

SMC9001 VIP7700 Terminal Emulator • emulates Honeywell VIP7700 Series of synchronous terminals • requires 512K-byte memory • for dual diskette-based CPX9809:
150

SMC9004 TTY Emulator • provides access to networks requiring TTY-type devices • requires 512K-byte memory • for dual diskette-based CPX9809:
60

Honeywell Distributed Systems Architecture (DSA)

Provides overall framework for Honeywell's distributed systems and communications products • conforms to the reference model of the International Standards Organization (ISO) open system architecture; supports X.25 packet-switched and X.21 circuit-switched network interface protocols • available for the hard disk-based CPX9810 only • supports DSA full satellite routing capabilities.

SMC9518 DSA Basic Network Services • provides basic DSA communications management and interface services • provides transport control which handles end-to-end control during transmission; network control which handles routing logic, including X.25 public data network interface; link control which manages data transmission over a link between 2 entities (standard protocol for link control is High-Level Data Link Control (HDLC) as defined by International Standards Organization (ISO)); and physical control interface between terminals and processors • is the software prerequisite for all other packages within the DSA Distributed System Satellite Network:
$750 lcns

SMC9519 DSA Remote Batch Facility • enables microSystem 6/10 to perform remote job entry to a DPS 6 or DPS 8 host:
350

SMC9520 DSA Application Interface Facility • enables application on microSystem 6/10 to communicate directly with applications on DPS 6 Level 6 or DPS 8 systems:
50

SMC9522 DSA Electronic Mail Facility • enables microSystem 6/10 operators to send and receive messages from operators of other 6/10, DPS 6/Level 6 of DPS 8 systems:
400

SMC9523 DSA Network Operator Interface • provides access to the network for administration and control:
100

SMC9527 DSA Local Message Facility • enables user-written COBOL applications to communicate with each other using higher level (session control) layers:
50

External Network Interfaces • group of separately available software packages, each providing an interface to a specific external network • all require SMC9518 • packages include SMC9528 Telenet (USA); SMC9529 Tymnet (USA); and SMC9536 Uninet (USA) • each network interface individually priced:
300

SMC9537 RNP/6 LHDLC (Logical High-Level Data Link Control) Basic Software • provides an interface between the modules and the communications lines that allow RNP/6 nodes to communicate with various network processors connected to large systems and other RNP/6 systems • bit-oriented, synchronous; permits half- or full-duplex, multileaving transmission over dial-up or dedicated lines • prerequisite for other RNP/6 programs:
250

SMC9538 RNP/6 Remote Concentration Facility (RCF) • enables 6/10 to function as a terminal concentrator in multifunction situations • prioritizes access to processing and communications resources according to real-time requirements • serves to off-load host Front-End Processor:
350

SMC9539 DNP/6 Remote File Facility (RFF) • transmits files between remote 6/10 and various network processors connected

LCNS: one-time license fee. Prices effective as of April 1983.

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to host systems; files can also be transmitted between RNP/6 nodes • supports full-duplex transmisison, multiple simultaneous file transfers, multileaving with batch/job entries, and concentration of communication traffic • operates in a multifunctional environment providing continuous terminal operations and concurrent execution of application programs:

150

SMC9540 RNP/6 Remote Batch Facility (RBF) • for transmitting batch jobs from a remote 6/10 to various network processors connected to a host • supports multileaving of several data streams simultaneously • supports use of both sides of full-duplex communications link, providing multiple job input and output concurrently; can be multiplexed over half-duplex facilities:

350

SMC9541 RNP/6 Application Transport Interface • for application-to-application communications between host and satellites or satellites and satellites • consists of a set of standard micros and subroutines for performing communications functions and a set of runtime subroutines that can be called from Advanced COBOL or Advanced Assembler languages:

50

SMC9542 RNP/6 Electronic Mail Facility • for distribution of messages:

400

IBM SNA Support

IBM SNA support is available for the hard disk-based CPX9810 system only.

SMC9506 SNA Transport Facility • provides SNA protocol services for SNA Interactive and RJE Facilities • features include locally attached or remote, dialed or leased, and point-to-point or multipoint communications facilities; multiple links per host; multiple hosts; concurrent attachment to BSC or SNA networks • prerequisite for SNA facilities listed below:

$250 lcns

SMC9507 SNA Interactive Terminal Facility • enables 6/10 systems to connect into a SNA network, appearing to the host as IBM 3277/78 display stations attached to IBM 3274 Model 1C controller:

350

SMC9508 Remote Job Entry (RJE) Facility • enables 6/10 systems to appear to a host and SNA network as an IBM 3777-3 terminal:

350

SMC9509 File Transmission-6 • for transmitting databases, word processing documents and print files from an IBM host to Honeywell satellites:

150

IBM BSC Support

SMC9006 BSC 3270 Standalone Emulator • emulates IBM 3270 terminal • requires single diskette drive:

$150 lcns

SMC9543 BSC Transport Facility • for transmitting character data files between 6/10 and IBM host systems using BSC 2780 or 3780 protocols; does not support transmission of files with binary data or packed decimal fields • prerequisite for BSC software listed below • for hard disk-based CPX9810 only:

200

SMC9503 HASP Multileaving Facility • allow 6/10 to operate as remote multileaving workstation communicating with IBM 370 host:

375

SMC9504 2780/3780 Workstation Facility • enables 6/10 to perform remote job entry by appearing as an IBM 2780 or 3780 workstation:

375

SMC9505 Programmable Facility/3271 • meant to emulate 3270 connection to IBM 370 host • primarily for development of new applications:

350

☐ Program Development/Languages

SML9500 Advanced COBOL • implements ANSI X3.23-74 specifications (without Report Writer or Data Communications module included) with extensions; provides LEVEL 4 (high) of the Federal Information Processing Standards (FIPS) and certification by the Federal Compiler Testing Center (FCTC) • extensions include reentrant object programs, additional data types, optional listings, interspersed diagnostics, diagnostic severity control, and object code suppression • runs under MOD 400:

$700 lcns

SMC9501 Advanced FORTRAN • implements ANSI X3.9-1977 specifications • extensions include free-form source input; additional data types which are fixed and double fixed, fractional and double fractional, and double integer (32-bit integer precision); tasking subroutines; date and time subroutines; bit manipulation functions; and include statements • supports calls from and to programs written in other languages • generates optimized reentrant object code • utilizes the hardware Scientific Instruction Power (SIP) or the software (SIP) Simulator for compilation as well as object code execution • runs under MOD 400:

500

SML9502 BASIC Interpreter Compiler • multiuser language processor used to interactively develop and execute BASIC programs • features include extensive string manipulation support; mathematical functions; double-precision floating-point operations; matrix facilities; and debugging facilities • operates in 4 modes which are Command, Execution, Compile, and Immediate (when compiler is used as a calculator) • can interface with other modules written in BASIC or other languages as well as interfacing with GCOS 6 software • runs under MOD 400:

300

SML9503 Pascal Compiler • complies with International Standards Organization (ISO) specifications • produces reentrant object code programs • includes an online debugger, source formatter, cross-reference listing; error diagnosis and correction, and program execution monitoring • runs under MOD 400:

350

SML9504 Advanced Assembler/Macro Preprocessor • reentrant assembler; reentrant object code optional; includes microinstruction facility which handles combinations of actual system instructions and assembler pseudo-instructions; pseudo-instructions for control of the assembler; and scientific and commercial instruction sets • process mnemonic op codes, symbolic names, constants, and expressions • addressing techniques include program counter-relative; indirect program counter-relative; direct stock frame relative; push/pop stack frame-relative; and program counter-relative with displacement, indexed; runs under MOD 400:

100

SML1000 CBASIC-86 • compiles source code file created by a text editor or word processor into an intermediate file composed as pseudo-code (p-code) instructions • runtime monitor interprets the p-code directives and performs the operation • features extended precision decimal arithmetic, expanded file processing, comprehensive string processing, assembly code interface, debugging capabilities, and cross-reference lister • requires 64K-byte RAM • runs under CP/M-86:

300

SML3000 GW BASIC • implementation of BASIC-86; emphasis is on business graphics support • allows users to call machine language subroutines, merge multiple programs, and transfer control to certain program lines • creates circles and lines; paints the screen • runs under MS-DOS • bundled with Personal Computing Option.

☐ Applications Packages

SMH9500 OAS Document Processing • includes document/

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word processing, indexing, calendar, calculator, and supervisory or system administration function • provides for global search and replace; column move; pagination; forms fill-in; footnote control; section numbering; sorting; and background processing:

$500 lcns

SMD9500 OAS Records Processing • for establishing office-level document databases and user-designed forms to create, maintain or access the database documents • creates master lists, sublists, form documents, and selective processing subsets:

300

SMU9502 OAS Document Transfer • for sending documents between OAS systems and non-OAS systems using Honeywell's DSA or IBM's SNA or BSC • requires SMC9518 or SMC9537 and 9539:

150

SMH9501 OAS InfoCalc • electronic spreadsheet • each workbook may contain up to 100 worksheets of 60 rows x 40 columns • features create/edit option; print option; index option; create word processing document option:

250

■ HARDWARE

☐ Terms & Support

Terms • available for purchase only • 90-day warranty on parts and labor.

Support • programs can range from customer self-maintenance to demand, on-site service with maintenance costs ranging anywhere from 6 percent to 14 percent of the list purchase price • Honeywell National Response Center is available 24 hours per day for users who wish to report equipment failures; during normal working hours, users can be switched to the Technical Assistance Center (TAC) for remote diagnostics and to discuss any hardware or software questions.

☐ Physical Specifications (H x W x D); Weight

CPU • 6 x 20.5 x 15 inches; 45 pounds (desktop) • 26 x 15 x 18.8 inches; 124 pounds (floor unit).

Display • 12 x 13 x 13 inches; 15 pounds.

Keyboards • 2 x 21 x 7 inches; 6.5 pounds.

☐ Systems Overview & Configurability

The microSystem 6/10 incorporates a Honeywell 16-bit microprocessor that is fully compatible with the firm's DPS 6 line of minicomputers. It is available in 3 configurations which differ in their disk storage and memory capacity. The 2 diskette-based models come in desktop enclosures while the hard disk-based version is contained within a floorstanding unit which can also support a second workstation. Memory is either 128K bytes or 512K bytes.

The diskette subsystem consists of 1 or 2 5.25-inch double-sided, double-density 650K-byte drives. These drives are the same as those used in the DPS 6 systems and DPS 6-based Office Automation Systems. The hard disk drive is an 8-inch Winchester 20M-byte fixed disk subsystem.

The system monitor is detached from the unit and is designed with tilt and swivel capabilities. It has a 12-inch green phosphor screen that displays 24 lines of 80 characters plus a 25th status line. The character generator, which can contain a table of up to 256 symbols, is loaded via diskette. The detached, low-profile keyboard has an adjustable tilt and connects to the monitor via a 5-foot coiled cord. Its entire character set can be programmed for different character configurations and it uses interchangeable templates for customizing the keyboard to a particular application. The electronics within the keyboard is based on membrane-capacitance technology.

The microSystem 6/10 comes with a serial printer port that will support 1 of 3 Honeywell printers. Its standard asynchronous communications port can attach a communications line, or, in the case of the hard disk system, a second workstation. Three option slots are available for a 384K-byte memory expansion card; a synchronous communications option; and either a Personal Computing Option which contains a 16-bit Intel 8086 microprocessor or an integrated synchronous modem.

The synchronous communications option allows interfacing to Honeywell RNP or DSA networks as well as to IBM BSC or SNA networks.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

System Maximums • 512K bytes of RAM, 20M-byte hard disk, 640K-byte diskette drive, Personal Computing Option, 2 asynchronous ports, and 1 synchronous port.

☐ Packaged Systems

CPX9808 microSystem 6/10 • desktop unit with 16-bit processor, 128K bytes of RAM, 650K-byte diskette drive, CRT, keyboard, and 2 asynchronous serial ports:

$3,995 prch **$595/$400/$215 maint**

CPX9809 microSystem 6/10 • same as CPX9808 except with 512K bytes of RAM, 2 diskette drives, and MOD 400 operating system:

5,495 **755/515/285**

CPX9810 microSystem 6/10 • floorstanding unit with 16-bit processor, 512K bytes of RAM, 20M-byte hard disk, 640K-byte diskette drive, CRT, keyboard, workstation extension kit, 2 asynchronous serial ports, and MOD 400 operating system:

9,995 **1,365/945/545**

CPK9800 Upgrade Kit • to upgrade CPX9808 to CPX9809:

1,895 **160/115/70**

CPK9801 Upgrade Kit • to upgrade CPX9808 or CPX9809 to CPX9810 • requires 512K bytes of RAM and Workstation Extension Kit:

7,795 **735/520/315**

☐ CPU

The microSystem 6/10 utilizes a Honeywell 16-bit LSI 6 microprocessor as the main CPU. A separate processor control I/O operations and provides functional compatibility with DPS 6 peripherals. The system can be expanded to include an Intel 8086 microprocessor for running industry-standard micro software.

Honeywell LSI 6 Processor • 16-bit microprocessor with memory management unit and real-time clock • DPS 6 instruction set • 64 priority levels.

Intel 8086 Processor Option • 16-bit data bus interface, 16-bit internal architecture; direct addressing to 1M-byte memory • 16-bit register set with symmetrical operations, 24 operand addressing modes; 8-bit and 16-bit signed and unsigned arithmetic with binary and decimal operands • software compatible with 8088 • comes packaged with MS-DOS, CP/M-86, GW BASIC • requires 1 expansion slot; cannot coexist with DCD9801 integrated modem:

$875 prch **NC/NC/NC maint**

☐ Memory

Standard Memory • 128K bytes of parity checking RAM with CPX9808; 512K bytes with CPX9809.

CPC9802 Memory Expansion • to expand CPX9808 from 128K bytes to 512K bytes:

$1,200 prch **NC/NC/NC maint**

☐ I/O & Communications

The system's I/O processor supports 3 communications ports: 2

PRCH: purchase price; includes 90-day warranty. MAINT: annual fee for on-site/dispatch/mail-in options. NA: information not available. NC: no charge. Prices effective as of April 1983.

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asynchronous ports and 1 optional synchronous port. Three option slots are available: 1 for memory expansion; another for the synchronous communications option; and the third for either the Personal Computing Option or a modem.

Printer Port • asynchronous RS-232C interface • included with system.

Auxiliary Communications Port • asynchronous RS-232C or RS-422 interface; 4,000-foot direct-connect capability with RS-422 interface • for second workstation or external asynchronous device • included with system.

DCM9806 Synchronous Interface • RS-232C interface; half- or full-duplex • supports HDLC; Honeywell's PVE, RNP, LHDLC; IBM's SDLC, BSC, SNA • includes 25-foot modem cable:

$500 prch	NC/NC/NC maint

DCD9801 Integrated Synchronous Modem • 2400 baud; auto-call; AT&T compatible • cannot coexist with CPF9801 Personal Computing Option:

1,000	NC/NC/NC

VCW2625 Direct Connect Cable • 50-foot, RS-422A cable to DPS 6:

50	NC/NC/NC

☐ Mass Storage

Integral Diskette Drives • 5.25-inch double-sided, double-density; 650K-byte formatted capacity • 31K-byte-per-second transfer rate; 160-millisecond average seek time; 100-millisecond average latency time • 1 included with CPX9808 and CPX9810; 2 included with CPX9809.

DIU9801/02 Diskette Drive • second 650K-byte drive for CPX9808/CPX9810:

$800 prch	$160/$115/$70 maint

Integral Hard Disk Drive • 8-inch nonremovable Winchester disk • 19.5M-byte formatted capacity; 800K-bps transfer rate; 50-millisecond average access time; 8.33-millisecond average latency time • included with CPX9810.

☐ Terminals/Workstations

The diskette-based models of the microSystem 6/10 are single-user systems which include a monitor and keyboard. The disk-based floorstanding unit provides the same monitor and keyboard but has the added capability of attaching a second workstation. Four models are available as the second workstation.

Display • 12-inch green phosphor, non-glare screen with adjustable base for tilting • displays 24 lines x 80 characters; 25th status line; 7x9 character matrix; available with underline and block cursor plus blinking versions of both; character generator contains up to 256 symbols and is loaded via diskette • included with system.

Keyboard • detached, low-profile keyboard with adjustable tilt • includes numeric keypad, separate cursor control set; color-coded keys; software-loadable character set; interchangeable templates • included with system.

DKF9806 Workstation Extension Kit • includes video base and extender cable for placing monitor and keyboard up to 15 feet from the system unit:

$200 prch	NC/NC/NC maint

VIP7202 Second Workstation • VIP7201 with a standard keyboard • 12-inch green phosphor screen displays 24 lines x 80 characters; 26 displayable graphic symbols • detached keyboard contains numeric keypad and cursor control keys; 7 dual function keys • interface via RS-232C or RS-422 at speeds up to 19,200 bps:

830	200/140/80

VIP7381 Second Workstation • VIP7301 with a standard keyboard • 12-inch green phosphor screen displays 24 lines x 80 characters, 25th status line; contiguous, vertical, horizontal graphics for forms and charts • detached conversational keyboard contains 96 keys, color coded; n-key rollover, numeric keypad, and separate cursor control block • interface via RS-422 or optional RS-232C:

1,900	222/155/90

VIP7383 Second Workstation • VIP7303 with OAS keyboard • 12-inch green phosphor screen displays 24 lines x 80 characters; 25th status line not used when operating with OAS software • detached word processing keyboard contains 91 keys; 14 function keys; generates 127 ASCII codes • interface via RS-422 or optional RS-232C:

1,900	222/155/90

VIP7387 Second Workstation • VIP7307 with data-entry keyboard • 12-inch green phosphor screen displays 24 lines x 80 characters; 25th status line under DEF-II software; fully addressable cursor • detached keyboard contains 94 keys; 12 dual function keys, n-key rollover, dedicated keys for DEF-II software • interface via RS-422 or optional RS-232C:

1,900	222/155/90

☐ Printers

PRU7072 Dot-Matrix Printer • 80 columns, 100 cps:

$1,195 prch	$222/$175/$125 maint

PRU7077 Dot-Matrix Printer • 132 columns, 100 cps:

1,495	278/205/135

PRU7017 Letter-Quality Printer • 136/163 columns at 10/12 cpi; 6/8 lpi; 35 cps bidirectional; 16-inch friction platen • RS-232C interface:

3,200	444/352/240

PRF9616 Forms Tractor • for PRU7017 letter-quality printer:

400	44/30/18

PRF0006 Sheet Feeder Adapter • for PRU7017 letter-quality printer:

200	NA/NA/NA

PRF1005 Dual Tray Sheet Feed • for PRU7017 letter-quality printer; requires PRF0006:

1,800	366/260/155

CBL9817 Printer Sharing Switch • for 2 microSystem 6/10s:

500	34/24/15

• END

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Honeywell microSystem 6/20
Multistation Office System

■ PROFILE

Operating Systems • Honeywell GCOS 6 MOD 400 Release 3.0

Data Management • DM6 IDS/II database management system; INFO6 file management system; TOTAL 6 database management system

Communications/Networks • Honeywell RNP and DSA networks; IBM BSC and SNA protocols; file transfer facilities

Languages • intermediate, reentrant, runtime, and advanced COBOL; advanced FORTRAN; BASIC interpreter and compiler; Pascal compiler; advanced assembler; RPG II; Interactive RPG II

Models • 1 model—CPX9102—available with various options

CPU • Honeywell's proprietary 16-bit microprocessor

Memory • 512K bytes expandable to 1M bytes

Chassis Slots • 2 memory and 1 I/O expansion slots

Ports • 5 RS-422 ports included with system

Mass Storage • 650K-byte diskette storage; 40M bytes or 80M bytes of hard disk storage

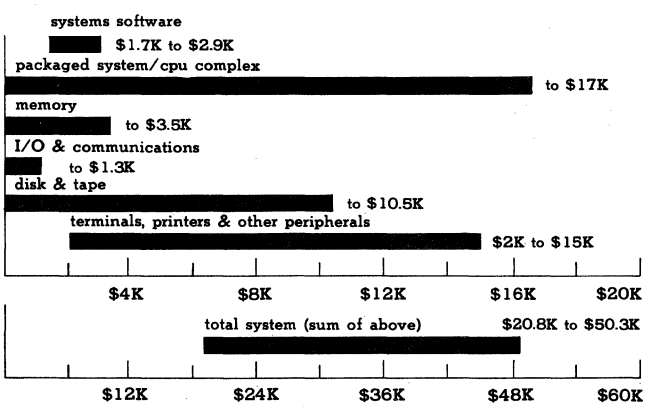
Terminals/Workstations • maximum of 4 per system

Printers • 100-cps and 400-cps dot-matrix printers; 35-cps and 55-cps letter-quality printers available from Honeywell

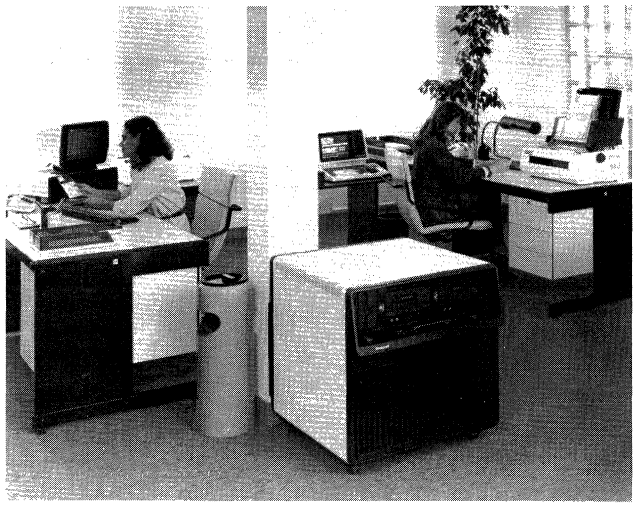
First Delivery • September 1983

Systems Delivered • Honeywell proprietary information

PURCHASE PRICE RANGE — hardware & software



MICROSYSTEM 6/20 PURCHASE PRICING bar graphs illustrate price ranges for small to large systems, with solid bars reflecting software/hardware purchase pricing, and open bars reflecting 5-year service/maintenance fees associated with large system • **SMALL SYSTEM** is based on microSystem 6/20 **packaged system** (includes CPU, 512K-byte main memory, 40M-byte hard disk, 650K-byte diskette drive, 5 RS-422 ports, 1 communications expansion slot) and the following options: integrated executive **systems software** package; **terminal** with standard keyboard and cable; 80-column, 100-cps dot-matrix **printer** • **LARGE SYSTEM** is based on microSystem 6/20 **packaged system** (includes CPU, 512K-byte main memory, 40M-byte hard disk, 650K-byte diskette drive, 5 RS-422 ports, 1 communication expansion slot) and the following options: office automation system expanded package **systems software**; 512K-byte **memory** add-on; synchronous/asynchronous **controller** and 2 ports, 25-foot modem cable; second 40M-byte hard **disk** and power supply; 4 multifunction **terminals**; 1 55-cps letter-quality **printer** with forms tractor.



Comparable Systems • Altos 16-bit systems; Alpha Micro AM-1000; Burroughs B 20 Model 22; CIE Systems 680/30; CompuPro 16-bit systems; Cromemco System One; Data General Desktop Generation Models 20 and 30; Nabu 1600; Onyx C8002A; Sage IV; Wicat System 155

Vendor • Honeywell Information Systems, Inc; 200 Smith Street, Waltham, MA 02154 • 617-895-6000

Canada • Honeywell Limited; 155 Gordan Baker Road, Willowdale, ONT M2H 3N7 • 416-499-6111

Distribution • through Honeywell direct sales and service offices

■ ANALYSIS

Following on the heels of its microSystem 6/10 announcement in April, Honeywell recently closed the gap between its new entry-level system and its multiuser DPS 6 mini systems by introducing 2 new family members. The microSystem 6/20, which is the next level up from the microSystem 6/10, was designed to be employed as a departmental office system typically supporting up to 4 users. The next level system, the DPS 6/40, typically will support between 4 and 18 users and is targeted more towards environments with heavier data processing and communications environments. (Information on this system will be incorporated in the DPS 6 report in our Computer Systems service.) Like the 6/10, these 2 models are hardware and software compatible with the DPS 6 product line.

The 6/20's use of the GCOS 6 MOD 400 operating system enables it to communicate with any DPS 6 model as well as the new microSystem 6/10. Its distributed processing features can be targeted in 2 directions: having the 6/20 function as an end point serving 4 workstations in a Honeywell DSA or RNP network as well

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as in an IBM SNA or BSC environment; or having it act as a master station in a cluster environment with 4 microSystem 6/10s attached to it.

Of the 16-bit multiuser micro systems that are comparable with the microSystem 6/20, some offer more hard disk storage, others more memory. Some can handle more users but do not have any communications capabilities. Overall, as far as price, features, storage and memory expansion, and performance are concerned, the microSystem 6/20 is positioned roughly in the middle of its competition. Where it is unique is in its upward-compatibility with the Honeywell minicomputer family. The only other micros currently on the market that can support the same software and peripherals as 16-bit and 32-bit minis are the Data General Desktop Generation and the DEC professional 300.

Because the microSystem 6/20 system is rich in networking capabilities, the closest comparable micro is the Burroughs B 22, the more powerful member of the B 20 Series. Both the Honeywell 6/20 and the Burroughs B 22 were designed to function standalone or in distributed networks; to utilize their own proprietary operating systems; to support IBM SNA and BSC protocols; and to employ other members of their micro families as workstations in a multiuser environment. Additionally, both systems will allow a user to transfer files between their micro workstations in a loosely coupled cluster environment as well as transfer files to a remote or local host. In choosing between these 2 vendors' systems, a user would have to decide which trade-offs to make. For example, the B 22 supports more users, the 6/20 more software. The B 22 comes with an integrated display and keyboard, while the 6/20 offers a user a choice of several different types of terminals.

☐ Strengths

The major appeal of the microSystem 6/20 is its ability to utilize the same software that is common to the larger DPS 6 systems. For companies that are constantly expanding, this should prove to be a prime consideration in their decision to purchase a multiuser micro system. At some point in the future, when the demand for a more powerful system is warranted, the need for software conversions and operator retraining will not be an issue. The user can move up to a DPS 6 mini and use the same software.

This concept also works in reverse. For those Honeywell shops who are looking to incorporate micros in some of their departments or branch offices, there won't be an added expense of buying new software nor will there be any compatibility problems. In either case, whether migrating up or down the Honeywell product line, the transition should be a smooth one.

☐ Limitations

Some multiuser micros come up short on memory allocation per user. This shouldn't be a problem on the 6/20 when it is used for transaction processing or modest batch tasks. However, for larger batch operations or for supporting some of the larger MOD 400 applications, 1M bytes of memory on a 4-user system could prove to be insufficient.

The 6/20's lack of the personal computing option that is available on its sister product, the 6/10, is also a drawback to the system. Without this feature, the 6/20 cannot run MS-DOS- or CP/M-86-compatible software.

■ SOFTWARE

☐ Terms & Support

Terms • some software available for an annual license fee; other software available for initial license fee • with annual license fee primary price includes support; secondary price licenses the copying and use of the packages on designated secondary sites that receive their support through a primary site • with initial license fees there is a charge for annual support.

Support • Honeywell provides assistance during startup and for routine operation of the software; includes 24-hour-per-day telephone access to Honeywell's National Response Center and workday access to the Technical Assistance Center at no charge.

☐ Software Overview

The microSystem 6/10 runs under a scaled-down version of Honeywell's MOD 400 operating system, the same operating system that Honeywell employs for its DPS 6 minicomputer family. This means that most of the software products written for the DPS 6 will also run on the 6/20 (subject to memory restrictions). Included in this proliferation of software products are support for Honeywell's DSA network and IBM's SNA environment.

☐ Packaged Software

The following integrated software packages are preconfigured applications, including standard CLM command sequences. They are shipped on a microSystem 6/20 removable disk pack and are ready for immediate execution. The price is for annual license fee.

Office Automation Integrated Packages

SMS1061 Office Automation System (OAS) Basic Package • supports up to 4 word processing workstations and a letter-quality printer in a freestanding environment • includes MOD 400 Release 3.0 Executive; MOD 400 Utilities; User Productivity Facility; OAS Document Processing:

$2,510/$1,880 lcns

SMS1071 Office Automation System (OAS) Expanded Package • same as SMS1061 except also includes OAS Records Processing:

2,885/2,165

Data Entry Integrated Packages

SMS1021 Data Entry Development System Package—HIS Communications • for developing data entry screens for execution in centralized or distributed environments • includes MOD 400 Release 3.0 Executive; MOD 400 Utilities; User Productivity Facility; DEF-II Data Entry Facility; Sort/Merge Utility; Advanced COBOL; HIS Communications and File Transfer Facility:

$3,150/$2,365 lcns

SMS1031 Data Entry Development System Package—IBM Communications • same as SMS1021 except includes BSC Transport Facility and HASP Multileaving Facility instead of HIS Communications and File Transfer Facility:

3,260/2,365

SMS1041 Data Entry Execute-Only System Package—HIS

LCNS: either initial license fee which is a one-time charge or annual license fee. Each software listing will specify which type of fee it is. Two prices signify primary/secondary licenses. Annual support is included with primary annual license fee at no additional charge. Prices effective as of July 1983.

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Communications • for executing data entry applications in centralized or distributed environments • includes MOD 400 Release 3.0 Executive; MOD 400 Utilities; User Productivity Facility; DEF-II Data Entry Facility; Sort/Merge Utility; HIS Communications and File Transfer Facility:

2,125/1,595

SMS1051 Data Entry Execute-Only System Package—IBM Communications • same as SMS1041 except includes BSC Transport Facility and HASP Multileaving Facility instead of HIS Communications and File Transfer Facility:

2,235/1,680

Integrated Executive System Package

SMS1081 MOD 400 Load & Run System—HIS Communications • for utilizing MOD 400 immediately without first configuring the system • includes MOD 400 Release 3.0 Executive; MOD 400 Utilities; User Productivity Facility; Sort/Merge Utility; HIS Communications and File Transfer Facility:

$1,780/$1,335 lcns

SMS1091 MOD 400 Load & Run System—IBM Communications • same as SMS1081 except includes BSC Transport Facility and HASP Multileaving Facility instead of HIS Communications and File Transfer Facility:

1,890/1,420

☐ Operating Systems

SMS1411 MOD 400 Release 3.0 Executive & Utilities • menu-driven system supporting multitasking, real-time, or data communications applications in 1 or more online streams • supports COBOL, FORTRAN, Pascal, RPG, BASIC, and assembler programming languages • allows access to sequential, relative, random, and indexed sequential files on various device types • features time slicing; mail facility; symbolic debugger; batch and interactive program development; checkpoint/restart capability; code sharing via reentrant programs; buffer pooling; file recovery; and support of communication protocols and program products interfacing with Honeywell hosts, IBM hosts, and DPS 6/Level 6 systems • includes over 150 utilities; most interesting are PRIME-INDEX for priming the index; REORG-INDEX for reorganizing an index sequential file using a single command; and UNSP for automatically monitoring queues • price is annual license fee:

$1,375/$1,030 lcns

☐ Utilities

SHF1091 Sort/Merge Facility • supports up to 16 sort key fields; sequence based on either ascending or descending sequence by key; ASCII or numeric fields; and exits for user processing of input and output records • can also be called from COBOL, FORTRAN, or assembly language programs • price is for annual license fee:

$170/$130 lcns

SHP1141 Screen Editor • full-screen, interactive, text editing facility for creating, modifying, and maintaining files and application source programs • features include: text manipulation directives; full-screen viewing; automatic line renumbering after deleting or adding lines; full user control of tab setting including automatic tab setting to conform to standard language format rules; extensive use of function and labeled keys; and text regions up to 256 characters wide • price is for annual license fee:

100/75

STS1911 TPS 6 Screenwrite • for writing programs; defining and initializing screen formats; processing screen messages; and accessing the integrated file system • used with TPS 6 Transaction Processing System • price is for annual license fee:

460/345

SHU9581 Interactive RPG II Screen Format Generator • defines screen displays and application control of formats • dynamically positions 1 or multiple formats at various screen positions and can change and control the accenting in any format field • price is for initial license fee (one-time charge):

1,100/825

SHU9601 RPG II IBM System/34 OCL Runtime Facility • consists of 2 units: an input processor which is used to accept System/34-compatible OCL source code, process substitution parameters and conditional statements, and creates an OCL job stream; and an OCL statement processor which is used to control workstation and OCL file requirements • price is for initial license fee (one-time charge):

550/410

SHU9591 RPG II Source Entry Utility • screen editor for the interactive development and maintenance of the RPG II and Screen Format Generator programs • for creating and updating source programs, screen specifications, OCL, and Execution Control Language (ECL) • price is for initial license fee:

1,100/825

SHV9011 RPG II IBM System/34 File Conversion Utility • menu-driven utility for transporting data files, RPG programs, screen specifications, and procedures from the IBM System/34 to the 6/20 and converting the data into a format acceptable to the Honeywell system • price is for initial license fee (one-time charge):

825/620

☐ Data Management

Data Management 6 Integrated Data Store/II (DM6 IDS/II) • a subset of the CODASYL database management system • consists of host language, schema, subschema, device/media control language (DMCL), data manipulation (DML), privacy and security administration, and utilities • database can be accessed via COBOL or assembler language using system macros • schema nonprocedural language used to define database structure and access methods for storage and retrieval of records • subschema, written in data definition language (DDL) controls the user's views of the data and limits functions available to users to preserve integrity of database • DMCL permits users to manage memory space by specifying such things as page size, number of database keys per page, area sizes, and database size • DML is logical extension of COBOL to access database • the File System's Access Control Lists protect all or parts of the database from unauthorized use and unauthorized level of access • utilities include save/restore, copy file, copy volume, and file dump • database can include up to 4.29 billion records • 2 versions offered: one includes program development as well as runtime services; and the other contains the runtime services only • price is annual license fee.

SHD1161 DM6 IDS/II • includes program development:

$2,410/$1,810 lcns

SHD1171 DM6 IDS/II Runtime Service • runtime services for Integrated Data Store:

1,320/990

SHD9181 DM6 Interactive Query Facility (DM6 IQF) • terminal-oriented query and report writing facility; also provides data dictionary and security features • English-like commands entered in either form or command mode • supports IDS/II database • 3 execution modes: interactive, report, and assistance • price is for initial license fee (one-time charge):

3,080

SHD9081 INFO 6 • complete online data entry, inquiry, update, report writing, and computational file management system • can be run concurrently with any other application including itself • multiple access to single data file; first access has read/write privileges and next-in restricted to read-only • access protection down to item level • error messages are both audio and visual to guide user; beeper on terminal warns operator that an error has occurred • price is for initial license fee (one-time charge):

5,000

SHD9071 TOTAL 6 • based on Cincom TOTAL • network structured; modular design • provides data independence from applications; eliminates data redundancy • offers data integrity

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and security by preventing destruction of files and records by application programs and preventing unauthorized file access • includes "before image" logging to disk or tape for file recovery in case of system failure • allows file sharing at the record level; sequences updates to the same record • provides both single-entry and variable-entry data sets • up to 2,500 different record types within a variable-entry data set • includes Database Definition Language (DBDL) and Data Manipulation Language (DML) accessed by calls from COBOL, FORTRAN, and assembler statements • modules include Database Definition Utility (DBGEN), Database Format Utility (DBFMT), Database Management System (TOTAL), DML Runtime Interface (DATBAS), and Database Descriptors (DBMOD) for each data set used • price is for initial license fee (one-time charge):

12,705

SHC1491 Data Entry Facility II (DEF II) • provides forms mode, source data entry capability with validation and editing functions • includes modules for data entry, data validation and editing, forms development, tables development, file printing, supervisory functions, file recovery/restoration, search, and modify (record/field), and utilities • facilities are available for user to create, modify, delete, print, or view forms • users can develop verification and extraction tables to control the data entry function • users develop application programs with COBOL • price is for annual license fee:

345/260

☐ Transaction Management

STS1901 TPS 6 Transaction Processing System • includes a transaction monitor; integrated database; restart/recovery facility; terminal management capability; application and development aids (e.g., trace and debug); and supporting features (e.g., printer spooler) • serves as a standalone TPS operating concurrently with other GCOS 6 applications; can also be used as a 2-level TPS communicating with other 6/20s • the disk-resident file management subsystem handles key files and detail files; data in a key file can be accessed directly by key; data files can be accessed only by following a logical chain from a key file; files can be deleted, modified, or mixed with other files; files can be either extendable or non-extendable; applications can access the GCOS 6 indexed, indexed sequential, and relative files • application programs are written to run under TPS in the Screenwrite language or COBOL or both; most customers use both • requires TPS Screenwrite Translator or COBOL compiler to generate application module • lock-out feature at the record level limits access to a record to 1 terminal at a time • price is for annual license fee:

$1,290/$965 lcns

STS1941 TPS 6 Query/Report Writer (QR6) • non-procedural, query and report writing facility for non-data processing personnel; provides for ad hoc access to the TPS 6 database • menu-driven; table-driven; query-by-example to give users a relational view of the database • price is for annual license fee:

635/475

SHS1201 Transaction Control Language (TCL) Facility • allows users to execute multiple transaction-type applications concurrently; new transaction-oriented applications can also be developed • included are 3 basic types of programs, a TCL compiler for program development, a single runtime TCL Processor which initiates processor and terminal(s) in the system for a transaction and then turns control to the next transaction when the first is completed, and multiple transaction descriptions which call on TCL (transaction control language) statements to supply the system with data on the required data files, screen forms, and application programs and their sequence needed by a transaction • price is for annual license fee:

80/60

SHD1141 DM6 Transaction Processor (DM6 TP) • provides concurrent processing of message mode and/or forms mode transactions; designed to run concurrently with users engaged in non-transaction processing operations • provides automatic management of files, resources, terminals, and system privacy • supports concurrent access to IDS/II database files and other user-specified files • consists of 5 elements: generation facility; object time package; user-written transaction processing routines; runtime administration function; and an optional forms definition facility • price is for annual license fee:

1,500/1,125

SHD1151 DM6 TP Runtime Service • runtime service only of DM6 TP • controls the processing of transactions and coordinates the receipt and delivery of messages for an application communicating with a larger number of terminals:

950/710

☐ Communications/Networks

The microSystem 6/20 can operate as a freestanding unit capable of communicating with any DPS 6 system as well as operate as an end point in a Honeywell or IBM network.

SMC1111 Honeywell Communications/File Transfer Facility • for transmitting files between 6/20s or DPS 6/Level 6, DPS 7, DPS 8, Level 66, Level 64, or Level 62 computers • supports various file types including binary or ASCII, fixed relative, sequential, index sequential, and UFAS and GFRC (Level 66) • polled VIP emulator (PVE) allows the connection of a 6/20 to a dedicated switched, synchronous, half-duplex, communications link which is operated according to the polled VIP protocol at speeds of 2000, 2400, 4800, or 9600 bps • scheduled to be available second quarter 1984 • price is for annual license fee:

$40/$30 lcns

Honeywell Distributed Systems Architecture (DSA)

DSA provides an overall framework for Honeywell's distributed systems and communications products. It conforms to the reference model of the International Standards Organization (ISO) open system architecture and supports X.25 packet-switched and X.21 circuit-switched network interface protocols. DSA will be available on the 6/20 during the second quarter 1984. Prices for all packages are annual license fees.

SMC2301 DSA Basic Network Services • provides basic DSA communications management and interface services • provides transport control which handles end-to-end control during transmission; network control which handles routing logic, including X.25 public data network interface; link control which manages data transmission over a link between 2 entities (standard protocol for link control is High-Level Data Link Control (HDLC) as defined by International Standards Organization (ISO)); and physical control interface between terminals and processors • is the software prerequisite for all other packages within the DSA Distributed System Satellite Network:

$435/$330 lcns

SHC2311 DSA Remote Batch Facility • enables microSystem 6/10 to perform remote job entry to a DPS 6 or DPS 8 host:

195/145

SHC2331 DSA Application Interface Facility • allows users to write their own programs incorporating communications within a DSA network • utilizes standard COBOL communications verbs and complies with ANSI X3.23-1974 standards:

85/65

SHC2391 DSA Local Message Facility • enables user-written COBOL applications to communicate with each other using higher level (session control) layers • can also be used on standalone 6/20 which is not connected to DSA network:

55/40

SHC2341 DSA Terminal Presentation Facility • allows a VIP7300 connected to a 6/20 node to emulate the block mode/forms mode of a VIP7800:

130/95

SHC2351 DSA Electronic Mail Facility • enables microSystem 6/20 operators to send and receive messages from operators of other 6/10, 6/20, DPS 6/Level 6 or DPS 8 systems:

250/190

SHC2361 DSA Network Operator Interface • provides access

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to the network for administration and control:

65/45

SHC2381 DSA Network Control Facility • for centralizing administrative and control functions on the network:

550/415

SHC2371 DSA Log File Facility • consists of 3 elements: administrative storage facility for creating log files of network event records; log file editor for printing contents of log file records; and log file accounting for detecting connections using the records and log file:

125/95

SHC2111 TPS 6 Distributed Processing Facility • executes in conjunction with TPS 6 and offers 2-level transaction processing:

70/50

External Network Interfaces • group of separately available software packages, each providing an interface to a specific external network • all require SHC2301 packages include SHC2171 Italpac (Italy); SHC2181 Uninet (USA); SHC2191 Infoswitch (Canada); SHC2031 Telenet (USA); SHC2041 Tymnet (USA); SHC2051 Datapac (Canada); SHC2081 Austpac (Australia); and SHC2091 UK-PSS (UK) • each network interface individually priced:

1,040/780

GCOS 6 Remote Network Processor/6 (RNP/6)

RNP/6 provides networking facilities and transport mechanisms for linking processors in a distributed environment. It enables the microSystem 6/20 to function as a remote node to DPS 88, DPS 8, 66/DPS; or DPS 6; to communicate directly with another 6/20; or to be connected to a Datanet 8 network processor for transition to Honeywell's DSA. RNP/6 will be available on the 6/20 during the second quarter 1984. Prices for all programs are annual license fee.

SMC2611 RNP/6 LHDLC (Logical High-Level Data Link Control) Basic Software • provides an interface between the modules and the communications lines that allow RNP/6 nodes to communicate with various network processors connected to large systems and other RNP/6 systems • bit-oriented, synchronous; permits half- or full-duplex multileaving transmission over dial-up or dedicated lines • prerequisite for other RNP/6 programs:

$165/$125 lcns

SHC2641 RNP/6 Remote Concentration Facility (RCF) • enables 6/20 to function as a terminal concentrator in multifunction situations • prioritizes access to processing and communications resources according to real-time requirements • serves to off-load host Front-End Processor:

135/100

SHC2621 RNP/6 Remote File Facility (RFF) • transmits files between remote 6/10 and various network processors connected to host systems; files can also be transmitted between RNP/6 nodes • supports full-duplex transmission, multiple simultaneous file transfers, multileaving with batch/job entries, and concentration of communication traffic • operates in a multifunctional environment providing continuous terminal operations and concurrent execution of application programs:

135/100

SHC2631 RNP/6 Remote Batch Facility (RBF) • for transmitting batch jobs from a remote 6/20 to various network processors connected to a host • supports multileaving of several data streams simultaneously • supports use of both sides of full-duplex communications link, providing multiple job input and output concurrently; can be multiplexed over half-duplex facilities:

195/145

SHC2651 RNP/6 Application Transport Interface • for application-to-application communications between host and satellites or satellites and satellites • consists of a set of standard micros and subroutines for performing communications functions and a set of runtime subroutines that can be called from Advanced COBOL or Advanced Assembler languages:

85/65

SHC2701 RNP/6 Electronic Mail Facility • for distribution of messages:

250/190

IBM SNA Support

IBM SNA support will be available for the microSystem 6/20 during the second quarter of 1984. All prices are for annual license fees.

SMC1921 SNA Transport Facility • provides SNA protocol services for SNA Interactive and RJE Facilities • features include locally attached or remote, dialed or leased, and point-to-point or multipoint communications facilities; multiple links per host; multiple hosts; concurrent attachment to BSC or SNA networks • prerequisite for SNA facilities listed below:

$160/$120 lcns

SHC1941 SNA Interactive Terminal Facility • enables 6/20 systems to connect into a SNA network, appearing to the host as IBM 3277/78 display stations attached to IBM 3274 Model 1C controller:

130/95

SHC1961 Remote Job Entry (RJE) Facility • enables 6/20 systems to appear to a host and SNA network as IBM 3777-3 terminals:

195/145

SHC2261 File Transmission-6 • for transmitting databases, word processing documents, and print files between an IBM host and Honeywell satellites • resides on the remote system; works in conjunction with the File Transmission-Host program:

40/30

SHC1901 File Transmission-Host • for transmitting files between an IBM host and Honeywell satellites • resides on host system; works in conjunction with File Transmission-6 program:

2,435

IBM BSC Support

IBM BSC support will be available on the microSystem 6/20 during the second quarter of 1984. Prices are for annual license fee.

SMC1091 BSC Transport Facility • for transmitting character data files between 6/20 and IBM host systems using BSC 2780 or 3780 protocols; does not support transmission of files with binary data or packed decimal fields • prerequisite for BSC software listed below:

$40/$30 lcns

SHC1261 HASP Multileaving Facility • allows 6/20 to operate as remote multileaving workstation communicating with IBM 370 host:

110/85

SHC1221 2780/3780 Workstation Facility • enables 6/20 to perform remote job entry by appearing as an IBM 2780 or 3780 workstation:

110/85

SHC1241 Programmable Facility/3271 • meant to emulate 3270 connection to IBM 370 host • primarily for development of new applications:

130/95

☐ Program Development/Languages

SHL1331 Advanced COBOL • implements ANSI X3.23-74 specifications (without Report Writer or Data Communications module included) with extensions; provides Level 4 (high) of the Federal Information Processing Standards (FIPS) and certification by the Federal Compiler Testing Center (FCTC) • extensions include reentrant object programs, additional data types, optional listings, interspersed diagnostics, diagnostic severity control, and object code suppression • price is for annual license fee:

$1,025/$770 lcns

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SHL1491 Reentrant COBOL • price is for annual license fee:
1,025/770

SHL1251 Intermediate COBOL • based on ANSI X3.23-74 specifications • programs generated by the compiler are reentrant • supports packed decimal (COMP) and 32-bit signed binary (COMP-2) data types, callable Sort/Merge utility • interfaces with IDS/II database management routines and generates transaction processing routines (TPRs) that define user applications to run within the Transaction Driver System (TDS) • price is for annual license fee:
850/635

STS1921 TPS6 COBOL Runtime Library • for use with TPS6 Transaction Processing System • price is for annual license fee:
120/90

SHL1271 Advanced FORTRAN • implements ANSI X3.9-1977 specifications • extensions include free-form source input; additional data types which are fixed and double fixed, fractional and double fractional, and double integer (32-bit integer precision); tasking subroutines; date and time subroutines; bit manipulation functions; and includes statements • supports calls from and to programs written in other languages • generates optimized reentrant object code • utilizes the hardware Scientific Instruction Power (SIP) or the software (SIP) Simulator for compilation as well as object code execution • price is for annual license fee:
540/405

BASIC • multiuser language processor used to interactively develop and execute BASIC programs • features include extensive string manipulation support; mathematical functions; double-precision floating-point operations; matrix facilities; and debugging facilities • operates in 4 modes which are Command, Execution, Compile, and Immediate (when compiler is used as a calculator) • can interface with other modules written in BASIC or other languages as well as interfacing with GCOS 6 software.

SHL1301 BASIC Interpreter • price is for annual license fee:
220/165

SHL1311 BASIC Interpreter/Compiler • price is for annual license fee:
430/325

SHL9501 Pascal Compiler • complies with International Standards Organization (ISO) specifications • produces reentrant object code programs • includes an online debugger, source formatter, cross-reference listing; error diagnosis and correction, and program execution monitoring • price is for initial license fee (one-time charge):
2,420/1,815

SHL1411 Advanced Assembler • reentrant assembler; reentrant object code optional; includes microinstruction facility which handles combinations of actual system instructions and assembler pseudo-instructions; pseudo-instructions for control of the assembler; and scientific and commercial instruction sets • process mnemonic op codes, symbolic names, constants, and expressions • addressing techniques include program counter-relative; indirect program counter-relative; direct stock frame-relative; push/pop stack frame-relative; and program counter-relative with displacement, indexed • price is for annual license fee:
320/240

SHL1261 RPG II • for writing application programs to produce reports • supports a subset of RPG II offered on IBM System/3 and System/32 • features coded, fixed-format specification forms; fixed logic cycle; static and dynamic table handling; access to standard data management facilities by object programs; linkage of external routines written in RPG, COBOL, FORTRAN, or BASIC • price is for annual license fee:
565/425

Interactive RPG II System • allows applications written for the IBM System/34 to be transported to the microSystem 6/20; also provides a degree of compatibility with IBM System/3 and System/32 • all prices are for initial license fees.

SHL9521 Interactive RPG II Compiler • transforms source code into object format • supports data structures; array handling; compile and object time tables and arrays; look-ahead fields; also supports sequential, indexed, and random file organizations:
1,650/1,240

SHL9531 Interactive RPG II Runtime Interpreter • translates the instructions generated by the RPG II compiler into native 6/20 instructions • permits a 6/20 display station to operate as an IBM System/34 workstation:
770/580

☐ Applications Packages

SHH1011 OAS Document Processing • includes document/word processing, indexing, calendar, calculator, and supervisory or system administration function • provides for global search and replace; column move; pagination; forms fill-in; footnote control; section numbering; sorting; and background processing • price is for annual license fee:
$940/$705 lcns

SHD1201 OAS Records Processing • for establishing office-level document databases and user-designed forms to create, maintain, or access the database documents • creates master lists, sublists, form documents, and selective processing subsets • price is for annual license fee:
375/285

SHU1621 OAS Document Transfer • for sending documents between OAS systems and non-OAS systems using Honeywell's DSA or IBM's SNA or BSC • requires SMC2301 or SMC2611 and SMC2621 • price is for annual license fee:
100/75

☐ Other Facilities

SHP1131 User Productivity Facility • for helping users learn and run applications and utilities on the GCOS 6 operating system • provides tailored menus, forms, and help files to guide users through system capabilities • software tools allow users to add their own applications to the menu structure and modify the Facility for their installation • price is for annual license fee:
$195/$145 lcns

■ HARDWARE

☐ Terms & Support

Terms • available for purchase only • 90-day warranty on parts and labor.

Support • programs can range from customer self-maintenance to demand, on-site service with maintenance costs ranging anywhere from 6 percent to 14 percent of the list purchase price • Honeywell National Response Center is available 24 hours per day for users who wish to report equipment failures; during normal working hours, users can be switched to the Technical Assistance Center (TAC) for remote diagnostics and to discuss any hardware or software questions.

☐ Physical Specifications (H x W x D); Weight

CPU • 30 x 28.6 x 28.9 inches; 274 pounds (system cabinet).

Display • various terminals are available for use with this system.

Keyboard • not applicable.

☐ Systems Overview & Configurability

The microSystem 6/20 is a multistation office system capable of supporting up to 4 users and a printer. It is housed in a 30-inch high floorstanding cabinet whose parts consist of an operator's control panel, a 650K-byte diskette drive, a 40M-byte cartridge disk unit, a system power supply, and the basic system electronics. The heart of the system is a 16-bit LSI 6 microprocessor with 512K bytes of error correcting memory.

For users who want more than 512K, the system provides 2 memory expansion slots which will accommodate 256K-byte boards to extend memory to 1M byte. The system's disk/diskette controller handles both the floppy drive and the 40M-byte

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cartridge disk. Additionally, it will support another 40M-byte cartridge drive. However, if a second cartridge drive is added, a second power supply must also be added. A workstation/printer controller for handling 5 RS-422 ports and an I/O expansion slot for accommodating either an optional dual-line communications controller or an optional network controller round out the system features.

Honeywell offers the user a choice of data entry, multifunction, and word processing VIP workstations for attachment to the 6/20. The new microSystem 6/10 personal computer workstation can also be configured with the system. In the area of communications, Honeywell provides a dual-line communications controller which supports 2 RS-232C ports using BSC, PVE, or TTY protocols, and a networking controller which supports 1 synchronous RS-232C ports using HDLC or SDLC protocol. This latter option will not be available until mid 1984.

The 6/20 operates on a standard 120-volt outlet. The operator panel provides pushbutton control for automatic system startup, memory-to-diskette information transfer, and disk-to-disk copying.

Maximum configurability is stated below; minimum configurations are discussed under Packaged Systems.

System Maximums • 1M-byte memory; 80M-byte hard disk storage; 650K-byte diskette drive; 5 RS-422 ports for workstations and/or printers; and 1 communications port.

☐ Packaged Systems

CPX9102 microSystem 6/20 • floorstanding unit with 16-bit processor, 512K-byte memory, 40M-byte cartridge disk, 650K-byte diskette drive, 5 RS-422 ports, and 1 communications expansion slot:

$17,000 prch	$1,450/$1,165/$815 maint

☐ CPU

The microSystem 6/20 incorporates a Honeywell 16-bit LSI 6 microprocessor with bidirectional bus architecture for CPU-I/O controller interfacing in a multitasking environment.

Honeywell LSI 6 Processor • 16-bit microprocessor with 16-bit data path; DPS 6 instruction set; memory management unit • short address format/long address format; 2M-byte direct addressing range • 64 priority levels.

☐ Memory

Standard Memory • 512K-byte RAM with error detection and correction • 2-byte parallel access mode • n-channel MOS in 64K chips.

CMM9030 • 256K-byte memory expansion • maximum of 2 per system:

$1,750 prch	$125/$100/$70 maint

The 6/20 provides a workstation/printer controller for handling up to 5 workstations and/or printers in any combination plus an I/O expansion slot for supporting either a dual-line communications controller or a networking controller.

Workstation/Printer Controller • controls up to 5 RS-422 interfaces; RS-422 ports can adapt to RS-232C devices • included with the system.

DCC9010 Dual-Line Communications Controller • supports 2 RS-232C lines; asynchronous or synchronous; 9600 bps; BSC, PVE, or TTY protocols • auto-dial and modem cable for first line included:

1,250	138/107/77

CBL9611 • 25-foot modem cable for second line or for auto-dial:

80	NC/NC/NC

DCC9050 Networking Controller • supports 1 synchronous RS-232C port; 19.2K bps; HDLC/SDLC protocols • includes modem cable • available second quarter 1984:

2,200	198/154/110

DRK9010 • RS-422 to RS-232C interface converter:

200	22/16/10

☐ Mass Storage

Integral Cartridge Disk Drive • 8-inch rigid disk; 20M-byte fixed, 20M-byte removable • 1.2M-bps transfer rate; 43.55-millisecond average access time; 8.55-millisecond average latency time; 35-millisecond average seek time • included with system.

CDU9652 • second 40M-byte cartridge disk • requires PSS9050:

$9,500 prch	$525/$410/$290 maint

PSS9050 • auxiliary power supply for second disk:

1,000	100/80/50

Integral Diskette Drive • 5.25-inch, double-sided, double-density; 655K-byte formatted • 31.25K bps; 132-millisecond average seek time; 100-millisecond average latency time • included with system.

☐ Terminals/Workstations

The 6/20 can support up to 4 terminals or workstations including Honeywell's microSystem 6/10 personal computer.

VIP7201 Workstation • 12-inch green phosphor screen displays 24 lines x 80 characters; 26 displayable graphic symbols • detached keyboard contains numeric keypad and cursor control keys; 7 dual function keys • interface via RS-422 at speeds up to 19,200 bps:

$795 prch	$200/$140/$80 maint

VCW2604 Cable • 25-foot RS-422 direct-connect cable; for VIP7201:

50	NA/NA/NA

VIP7300 Series • 12-inch green phosphor screen displays 24 lines x 80 characters; 25th status line; 120 displayable symbols; horizontal and vertical graphics; asynchronous, full-duplex, up to 9600 bps • various detached keyboards • include 25-foot RS-422 direct-connect cable:

1,900	222/155/90

VIP7301 • standard conversational keyboard • 96 keys; n-key rollover, numeric keypad, separate cursor control block.

VIP7303 • word processing keyboard • 91 keys; 14 function keys, generates 127 ASCII codes • displays 25th status line not used.

VIP7305 • multifunction keyboard • interchangeable overlays • 113 keys; ANSI 4.23 layout; 12 function keys; n-key rollover; numeric keypad; separate cursor control block.

VIP7307 • data entry keyboard • 94 keys; 12 function keys, n-key rollover, dedicated keys for DEF-II software, separate numeric keypad.

VIP7823 Workstation • 12-inch green phosphor screen with screen save feature; displays 24 lines x 80 characters, 25th status line; 72-line vertical scrolling; buffered printer adapter • detached multifunction keyboard • interchangeable overlays; ANSI 4.23 layout • 113 keys; 12 function keys • includes 25-foot RS-422 cable:

2,350	250/180/115

CPX9809 microSystem 6/10 • desktop personal computer with 16-bit microprocessor; 512K-byte RAM; dual 650K-byte diskette drives; CRT; keyboard; 2 asynchronous serial ports, MOD 400 operating system • requires VCW2625 cable; SMC9000 VIP7300 terminal emulator software:

5,495	755/515/285

VCW2625 • direct-connect cable • 50-foot, RS-422 cable:

50	NA/NA/NA

PRCH: purchase price, includes 90-day warranty. MAINT: annual fee for on-site/dispatch/mail-in options. NA: information not available. NC: no charge. Prices effective as of July 1983.

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☐ **Printers**

PRU7070 Dot-Matrix Printer • 80 columns; 100 cps bidirectional; 9x7 matrix • 3- to 15-inch forms width • includes RS-422 25-foot cable:

$1,195 prch	**$222/$175/$125 maint**

PRU7075 Dot-Matrix Printer • same as PRU7070 except 132 columns:

1,495	**278/205/135**

PRU7270 Dot-Matrix Printer • 132 columns; 400 cps bidirectional; 7x7 matrix • 3- to 15-inch forms width; prints original and up to 4 copies • 96 international ASCII; 7 national character sets • includes RS-422 25-foot cable:

3,450	**450/350/250**

PRU7006 Letter-Quality Printer • 55-cps bidirectional word processing printer; removable thimble; 136/160 columns at 10/12 cpi; 6/8 lpi • 16-inch friction platen • includes RS-232C 50-foot cable:

5,300	**655/NA/NA**

PRU7007 Letter-Quality Printer • same as PRU7006 except 35 cps:

2,450	**444/NA/NA**

PRF1004/9616 Forms Tractor • for 55/35 cps LQP:

400	**44/30/18**

PRF0005/0006 Sheet Fed Adapter Plate • for 55/35 cps LQP:

200	**NA/NA/NA**

PRF1005 Dual-Tray Sheet Feeder • for either 55 or 35 cps LQP:

1,800	**366/260/155**

• END

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