CompuPro System 816
Multiuser System

■ PROFILE

Operating Systems ● CP/M 8-16 and MP/M 8-16; proprietary single- and multiuser operating systems, based on Digital Research's standard operating system, allows simultaneous use of 8- and 16-bit programs ● CP/M 2.2, CP/M-68K, CP/M-86, and MP/M-86 also available.

Data Management ● dBase II relational database management system from Ashton-Tate included in some packaged systems.

Communications/Networks ● supports all CP/M- or MP/M-based communications packages available from third-party vendors.
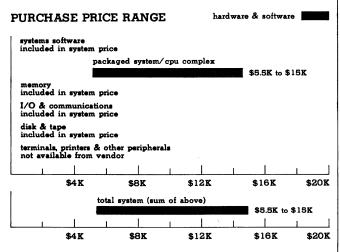
Languages ● mapForth with C, CBASIC-80, CBASIC-86, Pascal MT+ 80, Pascal MT+ 86, CB80, CB86, PL/1-80, PL/1-86, CIS COBOL 80, CIS COBOL 86, Level II COBOL 80, Level II COBOL 86, and MAC 80.

Models ● 7 models: 816/A, 816/B, 816/C, 816/D, 816/E, 816/F, and 816/Z; featuring choice of processors and storage capacities; single- and multiuser configurations available.

CPU ● 8- and 16-bit Intel 8085/8088, 16-bit Intel 8086/8087 and iAPX 286/10, 16-bit Motorola 68000, and 8-bit Zilog Z80B.

Memory ● 816/A: 128K to 1M bytes; 816/B: 256K to 1M bytes; 816/C: 512K to 1M-bytes; 816/D: 512K to 1M bytes; 816/E: 256K to 16M bytes; 816/F: 512K to 1M bytes; 816/Z: 64K bytes ● the S-100 bus provides addressing for up to 16M bytes of memory ● all the processors except the M68000 and Z80B can select and address 1M bytes of memory at a time.

Chassis Slots ● all 816 models use 20-slot desktop enclosure; rackmount version available as option; except model listed is with number of available chassis slots in the packaged configuration:

PURCHASE PRICE RANGE

hardware & software ■

systems software
included in system price

        packaged system/cpu complex

        ■■■■■■■■■■ $5.5K to $15K

memory
included in system price

I/O & communications
included in system price

disk & tape
included in system price

terminals, printers & other peripherals
not available from vendor

$4K	$8K	$12K	$16K	$20K

total system (sum of above)

        ■■■■■■■■■■ $5.5K to $15K

$4K	$8K	$12K	$16K	$20K

COMPUPRO SYSTEM 816 PURCHASE PRICING bar graphs illustrate price range for small to large systems, with solid bars reflecting software/hardware purchase pricing ● **SMALL SYSTEM** is based on 816/A packaged system (includes CP/M-816, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper, dual processors (8-bit Intel 8085 and 16-bit Intel 8088), 128K-byte memory, dual 1.2M-byte diskettes, 4 series ports, 1 Centronics port, 1 parallel port, and one-year warranty ● **LARGE SYSTEM** is based on 816/F packaged system (includes CP/M-86, MP/M-86, 16-bit Intel NAPX 286 processor, 512K-byte memory, single 1.2M-byte diskette, single 40M-byte hard disk, 12 serial ports, 1 Centronics port, 1 parallel port).

816/A, /B, and /C = 14; 816/D = 10; 816/E = 11; 816/F = 9; 816/Z = 16.

Ports ● Interfacer 3 I/O board provides 8 RS-232C ports ● Interfacer 4 I/O board provides 1 asynchronous port supporting 19.2K bps, 2 asynchronous or synchronous ports supporting higher speeds, 1 Centronics parallel port for printer connection and 1 universal parallel port for custom connections ● the System Support Board provides 1 RS-232C asynchronous serial port for use as a system console ● Interfacer 3 and the System Support Board are standard on the 816/B, /C, /D, and /F models; Interfacer 4 and the System Support Board are standard on the 816/A, /D, /E, /F, and /Z models (except System Support Board not included on 816/Z model) ● the non-standard board optionally available for any model.

Mass Storage ● dual 1.2M-byte 8.0-inch diskette; 40M-byte hard disk; 512K- to 4M-byte RAM disk optional; diskette interface supports 2 optional 1.2M-byte 8-inch diskettes, disk interface controls up to 3 additional hard disk drives; 2 controllers provide maximum of 320M bytes of disk storage.

Terminals/Workstations ● general recommendation of 12 terminals maximum unless configured for increased load; terminals not provided by CompuPro; serial ports provide compatibility with wide variety of commercially available terminals.

Printers ● supports wide variety of industry standard printers; general maximum of 3 printers unless specifically configured otherwise.

First Delivery ● September 1982.

Systems Delivered ● 10,000 installed or on order as of September 1983.

Comparable Systems ● Altos, Molecular, and TeleVideo are comparable to the 816/A, /B, and /C systems; Data General and Digital Equipment low-end minicomputers are comparable to the 816/D, /E, and /F models; the 816/Z is comparable to other Z80 based systems with a 64K memory.

Vendor ● CompuPro, a Godbout Company, 3506 Breakwater Court, Hayward, CA 94545 ● 415-786-0909.

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TABLE 1: COMPUPRO MODEL DIFFERENCES

	816/A	816/B	816/C	816/D	816/E	816/F	816/Z
Processor	8-bit 8085 16-bit 8088	8-bit 8085 16-bit 8088	8-bit 8085 16-bit 8088	16-bit 8086 8087 opt	32-/16-bit MC68000	16-bit iAPX 286	8-bit Z80B
Memory							
Min	128K	256K	512K	512K	256K	512K	64K
Max	1M	1M	1M	1M	16M	1M	—
Standard Ports							
Serial	4	9	9	12	4	12	3
Parallel	2	0	0	2	2	2	2
Open slots	14	14	14	10	11	9	16
RAM Disk	optional	optional	optional	1.5M bytes standard	1.5M bytes standard	1.5M bytes standard	not available
Bundled Software	CP/M 8-16, SuperCalc-86, dBase II, WRITE WP, HyperTyper, Field Companion	CP/M 8-16, MP/M 8-16, SuperCalc-86, dBase II, WRITE WP, HyperTyper, Field Companion	CP/M 8-16, MP/M 8-16, SuperCalc-86, dBase II, WRITE WP, HyperTyper, Field Companion	CP/M-86, MP/M-86, SuperCalc-86, SuperWriter 86	CP/M-68K, mapFORTH w/ 'C'	CP/M-86, MP/M-86	CP/M 2.2 dBase II, WRITE WP, HyperTyper, Field Companion

■ ANALYSIS

CompuPro is recognized as both a veteran and technical leader in the microcomputer field. September 1983 marked its 10-year anniversary as a manufacturer of high-performance computers. CompuPro began its corporate existence as CompuKit, a supplier of microcomputer kits. Its parent company, Godbout Electronics, had built a firm reputation as a components supplier. As demand for quality micro-products grew, CompuPro increased the range of available products to include memory boards, CPUs, motherboards, I/O controllers, and peripherals.

CompuPro was the first company to provide simultaneous 8- and 16-bit operation on the same bus (and then developed the operating software to support it), the first to use DMA techniques to improve disk access speeds, and the first to develop an electronic disk for high-performance operations. These products found a welcome home with the technically oriented user. They were widely used in the software development field, and in scientific and industrial applications.

In 1982, CompuPro began to sell complete systems, in addition to the individual boards. The CompuPro System 816 series was the first product to be configured, supported, and warranted by CompuPro. The System 816 features an S-100 bus (IEEE-696) and a variety of processors, memory types, and diskette and disk controllers, as well as compatibility with over 100 suppliers of S-100 products. As of September 1983,

CompuPro had a base of more than 10,000 System 816s installed or on order.

The System 816 product line is constantly evolving as new processors and products are announced. For sake of simplicity, the 7 models in the series may be divided into 2 subgroups. Three models are based on 1 processor configuration while the other 4 systems each include different processors. The systems are built using CompuPro boards in CompuPro enclosures. The S-100 bus design provides compatibility between the models to allow users to upgrade their systems as needs change.

The 816/A is the entry-level, single-user system with a dual-processor configuration. The next step is the 816/B, considered either a high-performance, single-user, or an entry-level, multiuser system. The 816/B uses the same processors as the 816/A. The 816/C follows this pattern but is configured to be a high-performance multiuser system supporting 3 users with the basic configuration.

The 816/D is the first System 816 model to use a different processor. It is based on the Intel 8086 processor with the companion 8087 math co-processor as an option. It is a multiuser system and includes 1.5M bytes of the M-Drive/H RAM disk to guarantee performance. The 816/E uses the Motorola 68000 processor in conjunction with 1.5M bytes of M-Drive/H RAM disk in the basic system. The 816/F, CompuPro's newest model, is based on the Intel iAPX 286/10 processor. It provides single- or multiuser operation and includes 1.5M bytes of M-Drive/H RAM disk to ensure maximum throughput. The 816/Z is a Z80 based system with 64K bytes of memory. It is a low cost, S-100 system for users who require the reliability level basic to CompuPro systems.

The CompuPro 10 is the first CompuPro system that is not a direct extension of the 816 product line. It is a multiuser system aimed at the business market, a new area for CompuPro. It is software compatible with some of the 816

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Series models. The main difference is that the CompuPro is not S-100 based and so is not inherently expandable to the same level as the 816 Series. This system is covered in a separate report.

☐ Strengths

The CompuPro reputation is built on providing state-of-the-art technology with reliability included as a basic design criterion. The CompuPro System 816 provides a selection of a significant number of the fastest processors on the market. CompuPro has been around longer than most of the other micro manufacturers and has long-term contracts with the chip suppliers, which explains the availability of the newer chips. Basic product reliability is such that a 1-year warranty is standard on all systems and 2-year coverage is available for a slight premium. In addition, 3 systems—the 816/C, /D, and /E—include the Xerox AmeriCare on-site service plan as the standard warranty provision for systems purchased from Full Service System Centers.

The S-100 bus and use of common boards within the 816 product line ensure that the user will not be left behind in the wake of new technology advances. All the systems can swap 1 processor for another, can add memory, storage, or I/O as needed, while retaining compatibility with existing peripherals. New software may need to be added if a user upgrades processors, but in many cases, slave processors may be used to maintain compatibility with earlier software.

☐ Limitations

The major limitation of the System 816 line is that it is not a desktop system meant to be installed by a first-time user. The 816 systems offer a wide range of choices to optimize system performance which means, however, that it is not inherently obvious which system is best for which job. Factory trained CompuPro representatives should be used to assist in sizing the system to the job.

Another significant problem with supplying state-of-the-art hardware is that, for a while, the hardware is developed faster than the supporting software. While this is not a problem for all of the processors used in the CompuPro 816, it is a factor with some of the newest models.

■ SOFTWARE

☐ Terms & Support

Terms ● CompuPro System 816 packaged systems include the appropriate CP/M- or MP/M-based operating system; all models include either all or a subset of the following packages: spreadsheet, database manager, word processor, typing tutor, and executive record keeper; optional software products are available on a one-time license fee basis.

Support ● Full Service Systems Centers provide the first level of contact for software support; they are factory-trained representatives of CompuPro; inquiries should be directed to the appropriate System Center; contact your dealer for follow-up and support.

☐ Software Overview

A variety of software items are included with the CompuPro System 816 packaged systems. These include the appropriate CP/M or MP/M operating systems, as well as some but not necessarily all of the following: a database manager, word processor software, an electronic spreadsheet, a typing tutorial,

and an executive record keeper. In addition to this bundled software, the Compupro System 816 supports over 3,000 CP/M-based business application programs. CompuPro also provides a wide variety of programming languages for use on its systems.

Each system includes the operating systems and available applications bundled into system price that most suit the particular processor in the chosen configuration. The System 816/A includes CP/M 8-16, SuperCalc-86 spreadsheet, dBase II database manager, WRITE word processor, HyperTyper typing tutor, and Field Companion executive record keeper; the Systems 816/B and /C add the MP/M 8-16 operating system to the bundled software listed above; the System 816/D includes CP/M-86 and MP/M-86 as the operating systems plus SuperCalc-86 spreadsheet and SuperWriter-86 word processor; the System 816/E includes CP/M-68K and mapFORTH with C: the System 816/F includes CP/M-86 and MP/M-86 as the basic operating systems, and the System 816/Z includes CP/M 2.2, dBase II database manager, WRITE word processor, HyperTyper typing tutor, and Field Companion executive record keeper.

The CP/M 8-16 and MP/M 8-16 operating systems provide single- or multiuser, multiprocessor support to run 8- and 16-bit programs simultaneously. CP/M 8-16 and MP/M 8/16 are proprietary versions of Digital Research's CP/M-86 and MP/M-86. Virtually all CP/M and MP/M software written for the Intel 8080, 8085, 8086, 8088, 8087, Zilog Z80, and the Motorola 68000 will run on one or more of the CompuPro System 816 models.

☐ Packaged Software

Not currently provided by CompuPro.

☐ Operating Systems

CP/M 8-16 ● single-user, single-tasking operating system designed to support dual processor systems using combinations of the Intel 8086 family of 16-bit processors and the Intel and Zilog families of 8-bit processors; a proprietary implementation of 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.

MP/M 8-16 ● multiuser, multitasking, multiprogramming operating system designed to support dual-processor systems using combinations of the Intel 8086 family of 16-bit processors and the Intel and Zilog families of 8-bit processors; a proprietary implementation of MP/M-86, an enhanced upward-compatible version of CP/M supporting up to 1M bytes of user memory; up to 16 users can be supported ● consists of Supervisor (SUP), Real Time Monitor (RTM), Memory Manager (MM), Character I/O Manager (CIO), Basic Disk Operating System (BDOS), Extended I/O System (XIOS), and Command Interpreter (SHELL) ● BDOS provides the capabilities for managing files and directories; 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; CIO supports up to 254 character-type devices (typically terminals and printers) ● RTM is the real-time nucleus of MP/M 8-16, which monitors the execution of processes, arbitrates conflicts for system resources; provides facilities for dispatching, queue, flag, and time 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 ● SHELL provides the interface between users and the system; reads and interprets user's commands and loads programs based on the user command line ● includes all commands (utilities) that are common to CP/M and MP/M-86, as well as additional commands unique to MP/M 8-16; some of the commands include MPMSTAT, which displays runtime system status; ATTACH, which attaches a program to a console; LOGOUT, which terminates a user's session ● requires 256K bytes of memory, an ASCII console, and a real-time clock; CP/M 2.2, CP/M-86, or CP/M 8-16 must also be implemented ● implementation by Gifford Computer Systems, Inc of MP/M-86 developed by Digital Research, Inc.

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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 • supports up to 16 logical devices, containing up to 512M bytes each; individual files may contain 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 included: 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.

CP/M 68K • features similar to CP/M 2.2 • included in purchase price of System 816/E.

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 low-level interface and the peripheral I/O for the system • supports up to 16 logical devices, containing up to 8M bytes each, for a maximum of 128M 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 facility; SUBMIT batch control utilities; ED command-oriented text editor; ASM-86 assembler; STAT system status utility; and GENCMD, which 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.

MP/M-86 • a version of MP/M II that can function on the larger 8086/8088-type microprocessor systems; requires the implementation of CP/M-86 to generate the MP/M-86 system; in addition to the 64K bytes of RAM required by the MP/M system, the MP/M-86 also requires 128K-byte RAM for implementation purposes; MP/M-86 incorporates a Supervisor function, which includes the Command Line Interpreter (CLI) and program loader used in the MP/M II system, and also has a program chaining facility; it is upward compatible with CP/M, CP/M-86, and MP/M • included in purchase price of System 816/D and 816/F.

☐ **Utilities**

CompuPro System 816 supports all CP/M-based utilities; available directly from CompuPro is a selection of Digital Research's utilities including Display Manager, Access Manager, MAC macro assembler, SID, and ZSID symbolic debugger, and XLT 8- to 16-bit assembly code translator; these utilities are available in 8080- and 8086-based formats.

☐ **Data Management**

dBase II • database management system by Ashton-Tate; uses English-like commands to ADD, DELETE, EDIT, DISPLAY, and PRINT; handles 64K records per file with up to 1K bytes per record and 32 fields per record; supports 7 key fields per file; included in Systems 816/A, /B, /C, and /Z packaged system prices:

NC lcns

☐ **Communications/Networks**

The System 816 models support all CP/M- or MP/M-based communications packages • available from third-party vendors.

☐ **Program Development/Languages**

The CompuPro System 816 supports all CP/M- and MP/M-based languages; a number of programming languages and aids are available through CompuPro; these include:

mapForth • specific language designed to run with CP/M 68K, includes "C" language compiler; included in System 816/E packaged system price.

CBASIC-80 • Digital Research standard:

$150 lcns

CBASIC-86 • Digital Research standard:

325

Pascal MT+ 80 • Digital Research standard:

350

Pascal MT+ 86 • Digital Research standard:

600

CB 80 • Digital Research standard:

500

CB 86 • Digital Research standard:

600

PL/1-80 • Digital Research standard:

500

PL/1-86 • Digital Research standard:

750

CIS COBOL 80 • Digital Research standard:

850

CIS COBOL 86 • Digital Research standard:

850

Level II COBOL 80 • Digital Research standard:

1,600

Level II COBOL 86 • Digital Research standard:

1,600

MAC 80 • Digital Research standard:

90

☐ **Applications Packages**

WRITE • word processing system by Proteus Engineering; similar to WordStar; designed for use in creative writing; includes 32 basic commands to allow users to enter, edit, save, copy, format, and print text files; all commands are single keystrokes; included in System 816/A, /B, /C, and /Z packaged system prices.

SuperWriter-86 • multifunction word processing packages with integrated spelling checker and form letter generator; included in System 816/D packaged system price.

SuperCalc-86 • 16-bit version of standard electronic spreadsheet package by Sorcim; provides basic grid of 63 columns x 254 rows; allows variable width columns; 16-digit precision provided in calculations; included in System 816/A, /B, /C, and /D packaged system prices.

LCNS: one-time license fee.

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HyperTyper ● typing tutorial by Summit Software Corp; designed to teach typing, increase typing skill, or transfer skills from typewriter to computer keyboard; included in System 816/A, /B, /C, and /Z packaged system prices.

Field Companion ● executive record keeper by Lorand Andahazy; menu-driven system to support the needs of service agents, sales representatives, and other professionals; includes modules to handle time log, expense accounting, customer list, products list, and quotations/invoices; included in System 816/A, /B, /C, and /Z packaged system prices.

☐ Other Facilities

The CompuPro System 816 supports all CP/M- and MP/M-based facilities available from third-party vendors.

■ HARDWARE

☐ Terms, Support & Documentation

Terms ● available for purchase only; 1-year warranty standard on boards and enclosure, 6-month warranty on diskette drives; all System 816 systems support the Certified System Component's high reliability program as an option; this upgrade provides a 2-year warranty on all system boards.

Support ● CompuPro Full Service System Centers provide complete hardware and software support, system installation, and training; Xerox Americare provides on-site service at no charge within a 100-mile radius on the 82 nationwide Xerox service centers for 816/C, /D, and /E systems purchased from any authorized Full Service System Center; for sites beyond 100 miles, pick-up and delivery service is available for a fee; walk-in service also available; other warranty provisions are handled by Full Service System Centers.

Documentation ● each CompuPro System 816 system is shipped with the applicable User's Manual as well as instruction manuals for individual boards and all bundled software packages.

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

CPU ● 7 x 18 x 22 inches; weight information not available.

Display ● not provided by CompuPro.

Keyboard ● not provided by CompuPro.

☐ Systems Overview & Configurability

The CompuPro System 816 product line includes 7 models incorporating several different processors, each suited to the specific configuration. All 816 systems conform to the IEEE-696 standard for S-100 bus computers and are packaged in a 20-slot chassis.

The 816/A, /B, and /C models are variations of the same configuration. These 3 systems include an 8-bit Intel 8085 and a 16-bit Intel 8088 processor to provide support for all 8- and 16-bit CP/M-based software. The 816/A is an entry-level, single-user system with 128K bytes of memory and CP/M 8-16. The 816/B is termed a high performance single-user system and it includes CP/M 8-16, MP/M 8-16, and 256K bytes of memory. The 816/C is a multiuser system supporting 3 users on the basic system with a recommended maximum of 7 workstations. This basic system includes 512K bytes of memory, CP/M 8-16, and MP/M 8-16. All 3 of these systems will support up to 1M byte of memory, 4.8M bytes of diskette storage, 160M bytes of hard disk storage, and 4M bytes of RAM disk.

The 816/D is a high-performance multiuser system based on the 16-bit Intel 8086 processor and the optional 8087 coprocessor. The basic model can support 5 users. The system includes 1.5M bytes of RAM disk and 2.4M bytes of diskette storage. The system can be expanded to 12 serial ports, 1 parallel port, and 1 Centronics port.

The 816/E is a single-user system with the M68000 processor, 512K bytes of memory, 4 serial ports, 1 parallel port, 1 Centronics port, 1.5M bytes of RAM disk, and 2.4M bytes of diskette storage. The system includes CP/M 68K as well as a C compiler and mapForth with a macroassembler. This system permits programs written in C under UNIX to be ported into a CP/M environment.

The 816/F uses the new 16-bit Intel iAPX 286 chip as its basic processor. The system also includes 512K bytes of memory, a single 1.2M-byte diskette, a single 40M-byte hard disk, 12 serial ports, 1 parallel port, 1 Centronics port, 1.5M bytes of RAM disk, CP/M-86, and MP/M-86. A math processor is available as an option.

The 816/Z is an 8-bit Zilog Z80B-based system with 64K bytes of memory, 3 serial ports, 1 parallel port, and 1 Centronics port. Dual diskettes are included in the basic system to provide 2.4M bytes of online storage. CP/M 2.2 is the operating system provided with the packaged system.

All CompuPro systems except the 816/Z include a number of user convenience features. These include a clock/calendar, interrupt controller, and interval timers. This board also provides battery backup for 2K of RAM as an option. A power fail signal is generated upon power interruption. A socket is included for either the 9511A math processor or the 9512 IEEE floating-point match chip.

CompuPro does not supply terminals and printers directly.

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

System Maximums ● due to the variety of systems in the System 816 product line and the extreme range of configurability provided by the S-100 bus, system maximums depend on the required performance specifics. With a 20-slot chassis, all the System 816 models have room for future expansion.

☐ Packaged Systems

816/A with Dual Diskettes ● 8-bit Intel 8085 and 16-bit Intel 8088 processors, 128K-byte memory, dual 1.2M-byte 8-inch diskettes, 4 serial ports, 1 Centronics port, 1 parallel port, CP/M 8-16, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper; available with 2-year CSC warranty:

$5,495 prch	$6,095 prch w/CSC

816/A with 40M-Byte Hard Disk ● 8-bit Intel 8085 and 16-bit Intel 8088 processors, 128K-byte memory, single 1.2M-byte 8-inch diskette, single 40M-byte hard disk, 4 serial ports, 1 Centronics port, 1 parallel port, CP/M 8-16, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper; available with 2-year CSC warranty:

8,990	9,590

816/B with Dual Diskettes ● 8-bit Intel 8085 and 16-bit Intel 8088 processors, 256K-byte memory, dual 1.2M-byte 8-inch diskettes, 9 serial ports, CP/M 8-16, MP/M 8-16, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper; available with 2-year CSC warranty:

6,995	7,795

816/B with 40M-Byte Hard Disk ● 8-bit Intel 8085 and 16-bit Intel 8088 processors, 256K-byte memory, single 1.2M-byte 8-inch diskette, 40M-byte hard disk, 9 serial ports, CP/M 8-16, MP/M 8-16, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper; available with 2-year CSC warranty:

10,490	11,290

816/C with Dual Diskettes ● 8-bit Intel 8085 and 16-bit Intel 8088 processors, 512K-byte memory, dual 1.2M-byte 8-inch diskettes, 9 serial ports, CP/M 8-16, MP/M 8-16, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper; available with 2-year CSC warranty:

8,995	9,995

816/C with 40M-Byte Hard Disk ● 8-bit Intel 8085 and 16-bit Intel 8088 processors, 512K-byte memory, single 1.2M-byte 8-inch diskette, 40M-byte hard disk, 9 serial ports, CP/M 8-16, MP/M 8-16, WRITE, SuperCalc-86, dBase II, Field Companion, HyperTyper; available with 2-year CSC warranty:

12,490	13,490

PRCH: purchase price. CSC: Certified System Component warranty option. NA: not available.

CompuPro System 816
Multiuser System

816/D with Dual Diskettes ● 16-bit Intel 8086 processor, 512K-byte memory, dual 1.2M-byte 8-inch diskettes, 1.5M-byte RAM disk, 12 serial ports, 1 Centronics port, 1 parallel port, CP/M 86, MP/M 86, SuperWriter-86, SuperCalc-86, available with 2-year CSC warranty:

13,995	15,595

816/D with Dual Diskettes ● 16-bit Intel 8086 processor, 8087 coprocessor, 512K-byte memory, dual 1.2M-byte 8-inch diskettes, 1.5M-byte RAM disk, 12 serial ports, 1 Centronics port, 1 parallel port, CP/M 86, MP/M 86, SuperWriter-86, SuperCalc-86, available with 2-year CSC warranty:

14,295	15,895

816/D with 40M-Byte Hard Disk ● 16-bit Intel 8086 processor, 512K-byte memory, single 1.2M-byte 8-inch diskette, single 40M-byte hard disk, 1.5M-byte RAM disk, 12 serial ports, 1 Centronics port, 1 parallel port, CP/M-86, MP/M-86, SuperWriter-86, SuperCalc-86, available with 2-year CSC warranty:

17,490	19,090

816/D with 40M-Byte Hard Disk ● 16-bit Intel 8086 processor, 8087 coprocessor, 512K-byte memory, single 1.2M-byte 8-inch diskette, single 40M-byte hard disk, 1.5M-byte RAM disk, 12 serial ports, 1 Centronics port, 1 parallel port, CP/M-86, MP/M-86, SuperWriter-86, SuperCalc-86, available with 2-year CSC warranty:

17,790	19,390

816/E with Dual Diskettes ● 16-bit Motorola 68000 processor, 256K-byte memory, dual 1.2M-byte 8-inch diskettes, 1.5M-byte RAM disk, 4 serial ports, 1 Centronics port, 1 parallel port, CP/M 68K with mapForth, assembler, and C language compiler, available with 2-year CSC warranty:

8,995	9,995

816/E with 40M-Byte Hard Disk ● 16-bit Motorola 68000 processor, 256K-byte memory, single 1.2M-byte 8-inch diskette, single 40M-byte hard disk, 1.5M-byte RAM, 4 serial ports, 1 Centronics port, 1 parallel port, CP/M 68K with mapForth, assembler, and C language compiler, available with 2-year CSC warranty:

12,490	13,490

816/F with 40M-Byte Hard Disk ● 16-bit Intel iAPX 286 processor, 512K-byte memory, single 1.2M-byte 8-inch diskette, single 40M-byte hard disk, 1.5M-byte RAM disk, 12 serial ports, 1 Centronics port, 1 parallel port, CP/M-86, MP/M-86:

14,995	NA

816/Z with Dual Diskettes ● 8-bit Zilog Z80B processor, 64K-byte memory, dual 1.2M-byte 8-inch diskettes, 3 serial ports, 1 Centronics port, 1 parallel port, CP/M 2.2, WRITE, SuperCalc, dBase II, HyperTyper, Field Companion; available with 2-year CSC warranty:

4,995	5,395

816/Z with 40M-Byte Hard Disk ● 8-bit Zilog Z80B processor, 64K-byte memory, single 1.2M-byte 8-inch diskette, single 40M-byte hard disk, 3 serial ports, 1 Centronics port, 1 parallel port, CP/M 2.2, WRITE, SuperCalc, dBase II, HyperTyper, Field Companion; available with 2-year CSC warranty:

8,490	8,990

☐ CPUs

Intel 8085 ● 8-bit data bus interface, 16-bit address bus; clock, I/O, and memory interface on the chip; incorporates system fetch and execution logic ● included in 816/A, /B, and /C packaged systems.

Intel 8088 Processor ● 8-MHz operation, 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 allow memory partitioning for multitasking, concurrent, or multiuser capabilities ● a pseudo-superset of the Intel 8080 instruction set in which translation to 8088 can be automated ● instruction set compatible with Intel 8086; included in System 816/A, /B, and /C packaged systems.

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 abd block move facilities ● powerful segmentation facilities allow memory partitioning for multitasking, concurrent, or multiuser capabilities ● a pseudo-superset of the Intel 8080 instruction set where translation to 8080 is straightforward ● instruction set compatible with 8088 ● included in 816/D packaged system.

Intel iAPX 286 Processor ● 16-bit data bus interface, 16-bit internal architecture, direct addressing to 16M bytes of memory and to 1G-byte virtual addressing per task; 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, extensive string and block move facilities ● powerful segmentation facilities allow memory partitioning up to 16,383 areas between 1K and 64K bytes in length for multitasking, concurrent, multiuser capabilities or virtual memory applications; memory management and attendant protection mechanisms are integrated within the CPU ● a pseudo-superset of the Intel 8080 instruction set where translation to iAPX 286 is straightforward ● a superset of the Intel 8086/8088; instruction set is similar but with more than 10 additional instructions; enhancements include single commands to push or pop all general registers, string input and output using DX register for port, procedure enter and exit (LEAVE) commands, immediate modes add to push, integer multiply and shift/rotate instructions, and check array against boundary command ● in addition to improved execution of original 8086/8088 instructions, more than ten added commands, and an additional interrupt type, the Intel iAPX 286 includes major hardware additions on a single chip; these additions include: a clock generator for internal and external clocks, two external and one internal 16-bit programmable timer/counters, two Direct Memory Access (DMA) channels with 2M-byte-per-second transfer rate, a local bus controller, a data-bus transceiver, programmable memory, and an I/O chip for up to 7 peripherals and 6 totally independent memory blocks, a programmable multilevel interrupt controller, and memory management circuitry ● these improvements upon the Intel 8086/8088 design give the Intel iAPX 286 faster and simpler hardware design ● included in 816/F packaged system.

Motorola 68000 Processor ● 16-bit internal (ALU) architecture, 16-bit data bus interface with 24-bit addressing to 16M bytes; CPU has 8 32-bit data registers and 8 32-bit address registers; 2 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, 5 basic addressing modes with pre- and post-incrementing, offsetting, and indexing, 7 levels of priority interrupt vectors, a trace mode with sophisticated trap operations for debugging; Motorola "HMOS" technology large-computer geometric architecture; included in System 816/E packaged system.

Zilog Z80B Processor ● 6-MHz operation, 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 Intel 8080; 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 in System 816/Z packaged system.

Intel 8087 Math Co-Processor ● 8-MHz operation, provides extension of Intel 8086/8088 for approximately 100 times faster hardware execution of floating-point mathematics ● 84-bit wide

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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; included in System 816/D packaged system.

☐ Memory

The CompuPro System 816 models offer a range of memory capacities, each suited to the processor and specific configuration ● the 816/A, /B, and /C all have a maximum memory of 1M-byte; standard memory sizes are as follows: 816/A=128K, 816/B=256K, 816/C=512K bytes; the 816/D includes a 512K-byte memory expandable to 1M bytes; the 816/E provides 256K-byte minimum memory, expandable to 16M bytes; the 816/Z includes a 64K-byte memory ● the IEEE S-100 standard provides 24 address bits to support 16M bytes of memory; only the 816/E with M68000 processor can directly address all 16M bytes of memory; the other systems, with the exception of the 816/Z, can select and address 1M bytes of memory at a time.

64K Memory Module ● 8- and 16-bit memory; operates at 10 MHz with 8088 and 8086 type processors, low power static RAM; included in packaged systems or available as add-on module:

$550 prch	**$650 prch w/CSC**

128K Memory Module ● 8- and 16-bit memory; operates at 12 MHz with 8088 and 8086 type processors; low power static RAM; included in packaged systems or available as add-on module:

995	**1,145**

256K Memory Module ● 8- and 16-bit memory; operates at 12 MHz with 8088 and 8086 type processors, low power static RAM; included in packaged systems or available as add-on module:

1,750	**1,950**

☐ I/O & Communications

The CompuPro models include either one or both of 2 I/O boards as the basic communications system; Interfacer 3 is an 8 channel, multiuser serial I/O board; it includes 8 RS-232C ports with 6 providing asynchronous operation at speeds to 19.2K bps; the 2 remaining Interfacer 3 ports provide synchronous or asynchronous operation at higher speeds. The Interfacer 3 is standard in the 816/B, /C, /D, and /F models ● Interfacer 4 is an advanced serial/parallel I/O board; it provides 1 asynchronous port supporting speeds to 19.2K bps, as well as 2 asynchronous or synchronous ports supporting higher transmission speeds; also included are 2 parallel ports—1 Centronics interface for printer connections and 1 universal parallel interface for custom connections; all serial ports are programmable from the CPU for all operating characteristics; Interfacer 4 is included in all 816/A, /D, /E, /F, and /Z system configurations ● the System Support Board, common to all CompuPro systems except the 816/Z, provides an additional RS-232C asynchronous serial channel with programmable characteristics; this allows 1 terminal to operate as a system console.

☐ Mass Storage

Diskette Subsystem ● dual, double-sided, double-density, 8-inch diskettes and controller; 2.4M bytes of total formatted storage; drives accept single- or double-sided, single- or double-density media ● 48 tracks per inch, 3-millisecond track-to-track access time; includes CP/M-80 and CP/M-86 operating systems, SuperCalc-86 spreadsheet package and dBase II database management system; housed in separate cabinet cable-connected to main system; included in packaged system price or available for:

$3,295 prch

Add-On Diskette Drives ● dual, double-sided, double-density, 8-inch diskettes as above, but without controller and software; housed in separate cabinet cable-connected to main system:

2,325

Hard Disk Subsystem ● includes 40M-byte hard disk with single 8-inch diskette for program loading and backup (see Diskette Subsystem for 8-inch diskette information) ● hard disk has 591 tracks per inch, 4096 tracks, 10 millisecond track-to-track access time, 5M-bps transfer rate, 3529 rpm; includes CP/M-80 and CP/M-86 operating systems; housed in separate cabinet cable-connected to main system; included in packaged system price or available for:

5,495

Hard Disk Subsystem with Dual Diskettes ● includes 40M-byte hard disk with dual, half-height, 8-inch diskette for program loading and backup (see Diskette Subsystem for 8-inch diskette information) ● hard disk has 591 tracks per inch, 4096 tracks, 10-millisecond track-to-track access time, 5M-bps transfer rate, 3529 rpm; includes CP/M-80 and CP/M-86 operating systems; housed in separate cabinet cable-connected to main system:

7,395

M-Drive/H RAM Disk ● .5M to 4M bytes of RAM disk available as option; provides disk operation at RAM speeds, said to increase system performance by up to 3500%; auto-format feature simplifies use; all CompuPro operating systems support M-Drive/H option.

M-Drive/H .5M-Byte RAM:

1,475

M-Drive/H .5M-Byte RAM (CSC):

1,675

☐ Terminals/Workstations

Not provided directly by CompuPro; serial ports are provided in packaged systems to provide compatibility with wide range of industry-standard terminals and workstations.

☐ Printer/Graphics

Not provided directly by CompuPro; serial, parallel, and Centronics printer ports are included in packaged systems to provide compatibility with wide range of commercially available printers and graphics devices.

● **END**