



# CompuPro CompuPro 10

## ■ PROFILE

**Operating Systems** • MP/M 8-16, proprietary multiuser operating system based on Digital Research's MP/M-86 Version 2.X; allows simultaneous use of 8- and 16-bit programs.

**Data Management** • dBase II relational database management system from Ashton-Tate.

**Communications/Networks** • ArcNet network interface available as option.

**Languages** • BASIC, Pascal, PL/1, COBOL, assembler, Forth.

**Models** • single model with choice of storage capacities; multiuser, multiprocessor configuration featuring both 8- and 16-bit operation.

**CPU** • 16-bit Intel 8088 with 4 8-bit Zilog Z80B slave processors.

**Memory** • 1M-byte RAM; provides 64K bytes per user plus 768K-byte RAM main memory.

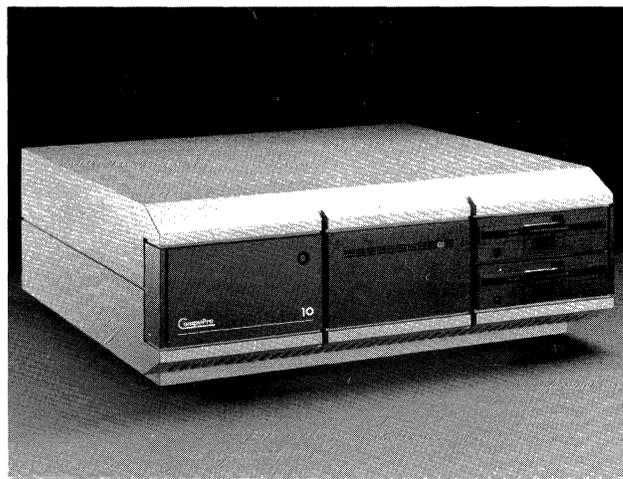
**Chassis Slots** • no available chassis slots; expansion options planned into system design.

**Ports** • 7 serial and 1 parallel port.

**Mass Storage** • dual 800K-byte 5.25-inch diskettes; 40M-byte hard disk; 1M- or 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.

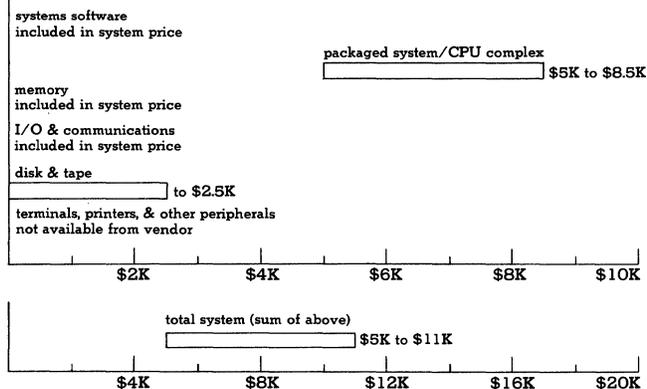
**Terminals/Workstations** • multiuser system with support for up to 4 terminals; terminals not provided by CompuPro.

**Printers** • supports wide variety of industry standard printers; 1 Centronics printer port and 2 serial printer ports included in packaged system.



## PURCHASE PRICE RANGE

hardware & software



**COMPUPRO 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 diskette-based packaged system (includes MP/M 8-16, dBase II, WRITE, SuperCalc-86, HyperTyper, Field Companion, one 16-bit main CPU, four 8-bit slave processors, 1M-byte memory, dual 800K 5.25-inch diskettes, two serial printer ports, one parallel printer port, four terminal RS-232-C ports, and one modem RS-232C port). • **LARGE SYSTEM** is based on hard-disk-based packaged system (includes MP/M 8-16, dBase II, WRITE, SuperCalc-86, HyperTyper, Field Companion, one 16-bit main CPU, four 8-bit slave processors, 1M-byte memory, dual 800K 5.25-inch diskettes, single 40M-byte hard disk, two serial printer ports, one parallel printer port, four terminal RS-232-C ports, and one modem RS-232-C port 1M-byte RAM disk option).

**First Delivery** • November 1983.

**Systems Delivered** • information not currently available.

**Comparable Systems** • a number of single-user systems are based on comparable 8- and 16-bit processors; however, the choices are significantly reduced for multiuser systems; the Dynabyte Monarch (Zilog Z80 and Intel 8086) and PolyMorphic Systems Models 8813 and 8810 (Zilog Z80 and Intel 80186) use similar processors but do not provide simultaneous 8- and 16-bit operation; CompuPro feels its architecture and software capabilities move the CompuPro 10 into comparison with the low-end Digital Equipment, Data General, and Wang minicomputers.

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

**Canada** • Distributors: DynaComp Business Computers; 210 W Broadway, Vancouver, BC V54 3W2; 604-872-7737 • CSC System Center Ltd; 2403 Canoe Avenue, Cognitlan, BC V3K 6A9; 604-941-0622.

**Distribution** • worldwide sales through more than 70 Full-Service System Centers; Comcen Technology, Ltd. is exclusive European distributor; Automation Statham PTY, Ltd. is the exclusive Australian distributor; the CompuPro 10 is not currently marketed through Byte Industries and its 1,500 dealers.

## ■ 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.



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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 direct memory access (DMA) techniques to improve disk access speeds, and the first to develop an electronic disk for high-performance operations. The CompuPro products were based on state-of-the-art hardware featuring some of the fastest processors commercially available as well as an impressive level of reliability. They were widely used in the software development field, and in scientific and industrial applications.

In 1982, CompuPro began to sell complete systems, rather than 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, diskette and disk controllers, as well as compatibility with over 100 suppliers of S-100 products.

The addition of the CompuPro 10, a departure from the earlier S-100-based systems, shows the impact of market awareness on CompuPro's product planning. The CompuPro 10 is aimed at the commercial and business market, a new area for CompuPro. It is software compatible with the 816 Series. The main difference is that the CompuPro 10 is not S-100 based and so is not inherently expandable to the same level as the 816 Series. The CompuPro 10, aimed at the business user, provides a cost-effective entry-level system (less than \$1,800 per user including terminals) with the same quality and reliability associated with the CompuPro product line.

### Strengths

The CompuPro 10 is one of the very few multiuser systems that doesn't require anything 'extra' to support more than one user. Right out of the box, the system includes enough ports to support 4 users with 2 serial printers, 1 parallel printer, and a modem. Multiuser operating software is included as part of the basic packaged system. There are no surprises and no unexpected costs. In fact, the only real big choices are whether a hard disk is required and whether a RAM disk would speed up the particular application. The ArcNet interface networking option is an extra bonus, but one not essential to basic multiuser operation.

Different approaches to providing multiuser systems are offered by a number of different suppliers. These include shared logic systems, networks with shared resources, and multiprocessor systems. CompuPro has chosen the multiprocessor design as it provides increased performance and reliability. Also, no one user can usurp or crash the system for any reason. When compared to networking a number of single-user systems together to provide multiuser operation through shared resources, the CompuPro 10 is an extremely cost-effective alternative.

Also, it should be noted that the CompuPro 10 was the first microcomputer to include the Xerox AmeriCare service plan as its standard warranty provision. This step is indicative of CompuPro's appreciation for the business community's concern for quality service. The 1-year warranty is a testament to the reliability of the machine in that such a plan could be included at no extra cost to the user.

### Limitations

The CompuPro 10 is rather limited when compared to the other CompuPro systems. As it is a departure from the company's S-100 bus-based configurations, the CompuPro 10 is not as expandable or open-ended as the 816 Series models. Of course, a system limited to 5 processors, 1M-byte memory, 8 ports, 1.6M bytes of integral diskette storage, 2.4M-byte add-on diskette storage, 160M bytes of hard disk, 4M bytes of RAM disk, and networking isn't exactly shabby, but it is limited.

The real limitation to the CompuPro 10 is that, in the commercial and business market, CompuPro is not yet recognized as a major contender. As IBM has not yet announced a multiuser system, CompuPro can at least avoid Big Blue comparisons. Also, no one manufacturer has dominated the multiuser market although several are vying for the position. The multiuser market is predicted to grow at an incredible rate as microcomputers provide cost-effective business solutions formerly available only through the sometimes too-expensive minicomputer.

CompuPro is a privately held company, a fact that some perceive as a drawback. Privately held companies are very often overlooked by industry surveyors who research the leaders in the micro field. Publicly held companies are required to supply financial information to the various stock exchanges, information that helps the market surveyors to rank the companies' yearly performance. With a 10-year proven track record of quality products in the scientific and industrial markets, CompuPro is now gaining a significant level of press and industry recognition. This is critical as CompuPro now faces the formidable task of establishing itself as a new entry in the business market.

## ■ SOFTWARE

### Terms & Support

**Terms** • the CompuPro 10 packaged system includes the MP/M 8-16 operating system, spreadsheet, database manager, word processor, typing tutor, and executive record keeper; optional software products are available on a one-time license fee basis.

**Support** • the Full Service Systems Centers provide the first level of contact for all software support; they are qualified, factory-trained representatives of CompuPro; all inquiries should be directed to the appropriate System Center.

### Software Overview

A variety of software items are included with the CompuPro 10 packaged systems. These include the MP/M 8-16 operating system, a database manager, word processing software, an electronic spreadsheet, a typing tutorial, and an executive record keeper. In addition to this bundled software, the CompuPro 10 supports over 3,000 CP/M-based business application programs. CompuPro also provides a wide variety of programming languages for use on its systems.

The MP/M 8-16 operating system provides multiuser, multiprocessor support to run 8- and 16-bit programs simultaneously. MP/M 8-16 is a proprietary version of Digital Research's MP/M-86. Virtually all CP/M and MP/M software written for the Intel 8080, 8086, and 8088 will run on the CompuPro 10.

The software bundled with the CompuPro 10 packaged systems include dBase II data base manager, WRITE word processing package, SuperCalc-86 electronic spreadsheet, HyperType typing tutorial, and Field Companion executive record keeper.



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### Packaged Software

Not currently provided by CompuPro.

### Operating Systems

**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 processor 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) which 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; included in packaged system price.

### Utilities

The CompuPro 10 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 1K bytes per record and 32 fields per record; support 7 key fields per file; included in packaged system price.

### Communications/Networks

A total of 8 ports are included as standard in the CompuPro 10 packaged system. The ports are designated as follows: 4 RS-232C terminal ports, 2 serial RS-232C printer ports, 1 Centronics parallel printer port, and 1 RS-232C modem port. An optional ArcNet interface allows the CompuPro 10 to link into local area networks based on the ArcNet standard.

### Program Development/Languages

The CompuPro 10 supports all CP/M-based languages. A number of programming languages and aids are available through CompuPro. These include several different versions of BASIC, Pascal, PL/1, COBOL, assembler, and Forth.

### 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 packaged system price.

**SuperCalc-86** • 16-bit version of standard electronic spreadsheet package by Sorcim; provides basic grid of 63 columns by 254 rows; allows variable-width columns; 16-digit precision provided

in calculations; included in packaged system-price.

**HyperType** • typing tutorial by Summit Software Corp.; designed to teach typing, increase typing skill, or transfer skills from typewriter to computer keyboard; included in packaged system price.

**Field Companion** • executive record keeper by Lorand Anda-hazy; 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 packaged system price.

### Other Facilities

The CompuPro 10 supports all CP/M-based facilities.

## ■ HARDWARE

### Terms, Support & Documentation

**Terms** • available for purchase only; 1-year warranty standard on boards and enclosure, 6-month warranty on diskette drives.

**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 of the 82 nationwide Xerox service centers for systems purchased from any authorized Full Service system Centers; for sites beyond 100 miles pick-up and delivery service is available for a fee; walk-in service also available.

**Documentation** • each CompuPro 10 system is shipped with a User's Manual as well as instruction manuals for all applicable software packages: MP/M 8-16, dBase II, Write, SuperCalc, HyperType, and Field Companion.

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

**CPU** • 7 x 22 x 18 inches; 50 pounds.

**Display** • not applicable.

**Keyboard** • not applicable.

### Systems Overview & Configurability

The CompuPro 10 is a low-cost multiprocessor, multiuser, fully integrated system capable of supporting both 8- and 16-bit simultaneous operation. The system provides more than enough memory to satisfy most applications. A basic 64K is provided for each user with 768K RAM as the system's main memory. Depending on the particular application, up to 512K bytes of the main memory may be used as a software-based disk emulator to significantly increase throughput.

The multiprocessor architecture uses the central 8088 processor to handle overhead tasks, such as disk, printer, and communications support. The individual Z80B processors handle individual user tasks. This approach provides each user with a combination of a dedicated processor and 64K of memory. This then provides a performance level similar to many single-user systems.

Eight ports of various types are included as part of the packaged system. Dual mini-diskettes provide the basic storage choice, with a 40M-byte hard disk optionally available. Other optional storage choices include dual 8-inch diskettes and up to 3 additional hard disks. A hardware-based electronic disk option allows the addition of 1M or 4M bytes of RAM disk. The networking interface option allows the CompuPro 10 to access an ArcNet local area network to provide resource sharing and further increase the system's capabilities.

CompuPro does not supply terminals and printers directly. This allows users, with the help of the System Center or dealer, to configure a system to meet their particular needs. The wide choice of terminals, printers, and add-on peripherals allows a type of customization not available with many other systems.

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

**System Maximums** • 1M-byte main memory, 1.6M-byte mini-diskette storage, 2.4M-byte 8-inch diskette storage, 160M-byte hard disk storage, 4M-byte RAM disk storage, 4 RS-232C terminal ports, 2 RS-232C serial printer ports, 1 Centronics parallel printer port, 1 RS-232C modem port, and ArcNet local area network interface.



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## ☐ Packaged Systems

**Model 10** • 16-bit Intel 8088 processor, 4 8-bit Zilog Z80B slave processors, 1M-byte RAM, 2 serial RS-232C printer ports, 1 Centronics parallel printer port, 4 terminal RS-232C ports, 1 modem RS-232C port, 2 diskette drives with 1.6M-byte total storage capacity, MP/M 8-16, spreadsheet, database, word processing, typing tutor, and executive record keeper:

\$4,995 prch

**Model 10 with Hard Disk** • 16-bit Intel 8088 processor, 4 8-bit Zilog Z80B slave processors, 1M-byte RAM, 2 serial RS-232C printer ports, 1 Centronics parallel printer port, 4 terminal RS-232C ports, 1 modem RS-232C port, 1 40M-byte hard disk drive, 2 diskette drives with 1.6M-byte total storage capacity, MP/M 8-16, spreadsheet, database, word processing, typing tutor, and executive record keeper:

8,490

## ☐ CPUs

The CompuPro 10 includes a master 16-bit Intel 8088 processor plus 4 8-bit Zilog Z80B user processors. A Intel 8087 math co-processor is optionally available. When a user wants to run a 16-bit program, the Z80 acts as a terminal handler and passes the appropriate data to the 8088. This operation is completely transparent to the user.

**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 packaged systems.

**Zilog Z80 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 packaged systems.

**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 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 CompuPro 10 includes 1M-byte non-expandable RAM memory as part of its packaged system. The standard memory provides parity with 150 nanosecond access time. The 1M-byte memory provides each user with a 64K work space. This leaves 768K bytes for use with the main processor. This will support up to 350 pages of text or a 400- to 500-column by 300- to 400-row spreadsheet.

**M-Drive** • 512K bytes of the main memory may be used as a software-based disk emulator to dramatically increase disk throughput; the M-Drive software is loaded into the system and provides the user with a disk volume 'M' for program and data storage; the only concern with such a system is that the user must transfer all programs and data back to a physical disk storage device before powering down the system.

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

## ☐ I/O & Communications

The CompuPro 10 includes 8 ports as part of the basic packaged system. Seven of these ports are standard RS-232C interfaces. CompuPro has assigned these ports to specific functions to simplify the process of interfacing additional equipment to the CompuPro 10. The 7 RS-232C ports are divided into 4 terminal ports, 2 serial printer ports, and 1 modem port. The terminal ports operate at speeds to 800,000 bps, while the serial printer and modem ports provide transmission speeds to 19,200 bps. The eighth port is a standard Centronics parallel printer port.

The ArcNet local area network interface option allows the CompuPro 10 to link into an ArcNet network. The ArcNet system is based on a token passing protocol with token passes at a rate of nearly 30,000 per second. Coaxial cable provides the basic transmission medium for the ArcNet system. ArcNet permits up to 255 computers and their peripherals to be interconnected.

## ☐ Mass Storage

**Integrated Dual Diskette Drives** • dual, double-sided, double-density 5.25-inch half-height diskettes and controller; 800K bytes per drive, 1.6M bytes of total formatted storage; capable of reading common 5.25-inch formats: IBM, Morrow, Kaypro, Osborne • 96 tracks per inch, 3-millisecond track-to-track access time, 250K-bps transfer rate, 300 rpm • included in packaged system.

**Integrated Hard Disk** • single 5.25-inch 40M-byte hard disk added to dual diskettes in basic CompuPro 10 system • 591 tracks per inch, 10-millisecond track-to-track access time, 5M-bps transfer rate, 3529 rpm • included in packaged system or available as separate purchase:

\$3,995 prch

**M-Drive RAM Disk** • 512K bytes of standard 1M-byte memory may be used as RAM disk; operation is software selectable to meet user's particular needs; please refer to the memory portion of this report for further information.

**M-Drive/H RAM Disk** • 1M or 4M bytes of RAM disk available as option; provides disk operation at RAM speeds, said to increase system performance by 3500%; auto-format feature simplifies use; all CompuPro operating systems support M-Drive/H option.

1M-Byte M-Drive/H:

2,495

4M-Byte M-Drive/H:

15,950

**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:

3,295

**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:

5,495

## ☐ Terminals/Workstations

Not provided directly by CompuPro, 4 RS-232C terminal 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, 2 serial RS-232C printer ports and 1 Centronics parallel printer port are included in packaged systems to provide compatibility with wide range of commercially available printers and graphics devices.

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