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PRODUCT DATA

CompuPro has maintained an enviable reputation for technological innovation since introducing its first computer products in 1974. For high level business, industrial, and scientific computing applications - 8 and/or 16 bits, single or multi-user - **CompuPro** delivers performance, quality, and reliability.

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Registered trademarks: CompuPro; CompuPro a Godbout Company; CP/M; Digital Research. Trademarks: SYSTEM 816A; SYSTEM 816B; SYSTEM 816C; SYSTEM 816D; SYSTEM 816-O8; SYSTEM 816-O16; FLOPPY DISK SUB SYSTEM; CPU 8085/88; CPU 8086/87; CPU 286; CPU 16032; CPU 68K; CPU-Z; RAM 16; RAM 17; RAM 21; M-DRIVE/H; DISK 1; DISK 2; DISK 3; SELECTOR CHANNEL; INTERFACER 1; INTERFACER 2; INTERFACER 3; INTERFACER 4; SYSTEM SUPPORT 1; MPX-1; STD CPU-Z; and STD RAM-16; CompuPro a Godbout Company; SuperCalc-86 and Super Writing; SORCIM: dBASE; Ashton-Tate: CP/M 80; CP/M-86; MP/M-86 and Digital Research; Digital Research.

COMPUPRO
PRODUCT
DATA

In 1974, **Godbout Electronics** offered the first memory board kit for microcomputer enthusiasts. The response was so positive that the company, which had mostly been involved in the electronic components business, started placing more and more emphasis on computer products. Eventually, **Godbout's** line grew to include not just memory but also CPU boards, motherboards, interfacers, and more; this led to the creation of a a separate division, **CompuPro**, to handle the burgeoning demand for these high quality, cost-effective computer peripherals.

Now **CompuPro** is recognized world-wide as one of the leading sources of high-performance computers for business, scientific, and industrial applications. **CompuPro** was the first to put simultaneous 8 and 16 bit processing on the same bus, the first to significantly speed up disk operations through DMA techniques, and the first to create a "solid-state disk drive" for exceptionally fast performance.

To forestall obsolescence, **CompuPro** products are modular and adhere to the IEEE 696/S-100 specification for S-100 computers. As a result, all boards work flawlessly with each other, as well as with boards from other manufacturers that meet this industry-recognized specification. Compliance with the standard also allows for easy upgrading of existing computers as newer devices with greater capabilities become available.

Other advantages of **CompuPro** products include a choice of board formats (assembled and tested, or qualified under the Certified System Component high-reliability program), one of the best warranties in the business (one full year and two years for CSC products), use of the highest quality components, and the experience that comes from **CompuPro**'s extensive involvement with computer technology for close to a decade.

For those who want a pre-packaged system available "off the shelf", **CompuPro** now offers a range of Systems from single user entry level, to multi-user multi-tasking for both 8 bit and 16 bit programs. These systems are available from the growing network of **CompuPro Full Service Centers**, which also offer system and software customization, technical assistance, field service contracts, and other services.

For high level business, industrial, and scientific applications, **CompuPro** has earned a reputation for performance, quality, and reliability. Your **Full Service Systems Center** can answer any further questions you might have about putting **CompuPro**'s expertise to work for you and your business, as well as acquaint you with any new products introduced since the printing of this catalog.

$$\left(\text{ompuPro}\right)^{\textcircled{R}}$$

Full Service Systems Centers

ARIZONA

S-100
14425 N. 79th Street #B
Scottsdale, AZ 85260
(602) 991-7870

CALIFORNIA

COMPUTER CENTER, INC
1514 University Ave
Berkeley, CA 94703
(415) 845-6366

MENTZER COMPUTER SYSTEMS
1441 Rollins Road
Burlingame, CA 94010
(415) 340-9363

LOGIC SYSTEMS
5830 Jameson Ct.
Carmichael, CA 95608
(916) 971-3133

PRIORITY 1
9151 Deering Ave.
Chatsworth, CA 91311
(213) 709-5464

BYTE SHOP OF HAYWARD
1122 B Street
Hayward, CA 94541
(415) 886-4732

AMERICAN COMPUTERS & ENGINEERS
2001 So. Barrington Ave #204
Los Angeles, CA 90025
(213) 477-6751

GIFFORD COMPUTERS
2323 Corinth Ave.
Los Angeles, CA 90064
(213) 477-3921

ACC
883 Steirlin Rd. #B110
Mountain View, CA 94043
(415) 969-4969

COMPUTER CENTER, INC.
2100 Broadway
Oakland, CA 94612
(415) 839-3230

SYSTEM INTERFACE CONSULTANTS
17440 Revello Dr.
Pacific Palisades, CA 90272
(213) 454-2100

ADVANCED INFORMATION MGMT.
145 Kentucky Street
Petaluma, CA 94952
(707) 763-7283

BEST COMPUTER STORES
5516 Springdale Ave.
Pleasanton, CA 94566
(415) 463-2233

GIFFORD COMPUTERS
230 California Street #207
San Francisco, CA 94104
(415) 391-4570

GIFFORD COMPUTERS
1922 Republic Ave
San Leandro, CA 94577
(415) 895-0798

COMPUTER HOUSE
501 B Street
San Rafael, CA 94901
(415) 453-0865

DATA BANK
629 State Street
Santa Barbara, CA 93101
(805) 962-8489

DATA BANK
600 S. Broadway
Santa Maria, CA 93456
(805) 922-1333

MATRIX COMPUTERS
720 Mendocino Ave.
Santa Rosa, CA 95401
(707) 542-0571

PRAGMATIC DESIGNS INC
950 Benicia Ave.
Sunnyvale, CA 94086
(408) 736-8670

FLORIDA

MICRO COMPUTER TECHNOLOGY
1549 W. Brandon Blvd
Brandon, FL 33511
(813) 685-7659

HAWAII

CAPACITY PLUS COMPUTERS
250 Alamaha Street N14
Kahului Maui, HI 96732
(808) 877-3496

ILLINOIS

COMPUTERS PLUS
201 N. Main Street
Athens, IL 62613
(217) 636-8491

LILLIPUTE COMPUTER MART INC.
4446 Oakton Street
Skokie, IL 60076
(312) 674-1383

INDIANA

GENERAL SOFTWARE INC.
1454 South 25th Street
Terre Haute, IN 47803
(812) 234-9421

MARYLAND

JR SYSTEMS
8227 Woodmont Ave #200
Bethesda, MD 20814
(301) 657-3598

MASSACHUSETTS

NEW ENGLAND ELECTRONIC EXCH.
138 Arlington Street
Boston, MA 02116
(617) 491-3000

KEY MICRO SYSTEMS
822 Boylston Street
Chestnut Hill, MA 02167
(617) 738-7306

NEW YORK

John D. Owens Assoc.
12 Schubert Street
Staten Island, NY 10305
(212) 448-6283

NORTH CAROLINA

GENERAL SEMANTICS INC.
127 S. Elm St. Dixie Bldg.
Greensboro, NC 27402
(919) 288-1117

OKLAHOMA

GIFFORD COMPUTERS
6161 North May #177
Oklahoma City, OK 73112
(405) 840-1175

OREGON

MICROWEST COMPUTER PRODUCTS
811 East Burnside #117
Portland, OR 97214
(503) 238-6274

RHODE ISLAND

KEY MICRO SYSTEMS
1606 Nooseneck
Coventry, RI 02816
(401) 828-7270

WISCONSIN

BYTE SHOP OF MILWAUKEE, INC
4840 S. 76th Street
Greenfield, WI 53220
(414) 281-7004

CANADA

DYNACOMP BUSINESS COMPUTERS
3258 Beta Avenue
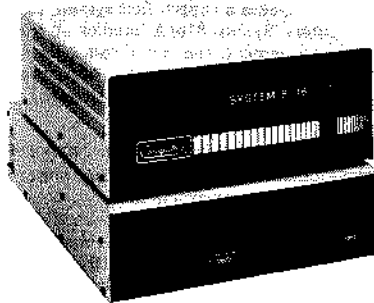Burnaby, British Columbia V5G 4K4
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CompuPro ®

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System Packages

The **CompuPro** family of system packages excel in high level business, industrial, and scientific computing environments. Simply add the terminal(s) and printer(s) of your choice, and you'll be up and running with one of the most advanced microcomputers available today.

Each package includes a unique combination of **CompuPro** system components, optimized for common single and multi-user applications; however, since all systems are modular and adhere to the IEEE 696/S-100 bus standard, they may also be expanded or upgraded at any time for increased computing power. All single-user systems may be easily upgraded to multi-user operation. The result is a computer which can grow as your computing requirements grow.

HARDWARE. CompuPro has been manufacturing high quality computer system components since 1974. During that time, we have developed one of the broadest, highest performance, and most cost-effective line of computer boards in the industry. Each system includes only genuine **CompuPro** system components—the same components specified by quality-conscious organizations such as IBM and NASA.

CompuPro hardware has earned an enviable reputation for performance, quality, reliability, and high throughput. Now, with the introduction of system packages, it has never been easier to add **CompuPro**'s exceptional computing power to your office, lab, or assembly line.

SOFTWARE. CompuPro systems run the comprehensive library of CP/M®-compatible business oriented software. Unlike other computers which may require an add-on to run CP/M software, or worse yet, run modified CP/M software which is not as powerful as the original version. **CompuPro** systems provide the sophisticated environment in which many popular programs (such as MicroPro's Wordstar™ for word processing, Sorcim's SuperCalc-86™ for business and financial planning, and Ashton-Tate's dBase II™ for data base management) were designed to run. Another **CompuPro** plus is that data stored on floppy diskette conforms to the IBM 3740 standard, meaning that data developed on a **CompuPro** machine can be transported to any other machine that follows IBM's disk storage protocol.

SUPPORT. CompuPro system packages are supported by a growing network of **CompuPro Full Service Systems Centers.** These centers specialize in business, industrial, and scientific microcomputing; they offer full hardware and software support, system installation, and training.

WARRANTY. CompuPro offers one of the best limited warranties in the business at no extra cost: 1 year (from date of purchase by end user) on the boards, mainframe enclosures, and floppy disk drives.

There has long been a need for microcomputer systems which outperform "personal" computers, yet cost substantially less than minicomputers. **CompuPro** system packages deliver high throughput, high speed, no compromise computing at a surprisingly affordable price—with the option for future upgrades. Whether 8 or 16 bit, single or multi-user, **CompuPro** makes a system package for your firm's computing needs.

CP/M is a registered trademark of Digital Research.

CompuPro ®

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System 816/A T.M.

System 816/A is an entry level, single user system which outperforms any "personal" computer on the market and also accommodates future expansion. It makes a superb first system, as well as an excellent upgrade for those already using personal or portable computers. System 816/A handles all popular peripherals (printers, terminals, modems, etc.) used in a typical business environment, and is well suited for word processing, business and financial planning, data base management, or other business-related tasks. Also note that unlike many other systems, with CompuPro's modular approach you can choose the printer and terminal that best fit your needs and budget.

HARDWARE. System 816/A includes the following system components:

● **Desktop Enclosure 2** with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.

● **Floppy Disk Enclosure** featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2,400,000 bytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM disk protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.

● **Disk 1 DMA Disk Controller** board for high speed operation.

● **CPU 8085/88,** the original, much-imitated dual processor board which runs both standard 8 bit and ultra-efficient 16 bit software. Most other systems can run 8 or 16 bit software, but not both.

● **Interfacer 4,** which includes three serial ports, a parallel port, and a Centronics/Epson style port. In a typical office application, this board could support a terminal, daisy wheel printer for letter quality output, draft quality printer (such as the Epson MX-80), and intelligent modem.

● **128K of memory.** CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. Note that other systems - which may not even be expandable - typically include 64K or less of RAM, which limits the ability to run complex programs. CompuPro machines, which start at 128K, are expandable to 1 Megabyte of RAM.

● **System Support 1** (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, more) to handle miscellaneous computer functions. The extra serial port allows addition of another intelligent modem or similar device for system expansion.

● **All internal cables.**

SOFTWARE. System 816/A includes the following software packages:

● **Digital Research's CP/M®** 2.2 (8 bit) and **CP/M-86**™ (16 bit) operating systems. As an added bonus, the implementation of CP/M includes **CompuPro's M-Drive**™ software. This program optionally lets you turn the system RAM into a pseudo-disk drive, thereby increasing operating speeds up to 3500% during disk-intensive operations.

● **Sorcim's SuperCalc-86**™ This powerful, 16 bit business and financial planning package outperforms 8 bit equivalents both in terms of speed and flexibility.

● A version of **Ashton-Tate's dBase**™ data base management system.

System 816/A gives superb computing today with an option for future expansion - all the way up to sophisticated multi-user operation. For additional information on software and peripherals, contact your **CompuPro Full Service Systems Center.**

SYSTEM 816/A Basic Specifications

8 bit processor: 6 MHz 8085
16 bit processor: 8 MHz 8088
Disk storage: Up to 2.4 Megabytes. Handles all popular 8"diskette formats-single or double sided, single or double density. Disk storage expandable to 4.8 Megabytes.
Main memory: 128K
Main memory expandable to: 1 Megabyte
Serial ports: 4
Parallel ports: 1
Centronics/Epson ports: 1
Software: CP/M 2.2, CP/M-86, M-Drive, SuperCalc-86, dBase
Convenience features: Clock/calendar, interrupt controllers, interval timers, and math processor option.

Specifications subject to change without notice

System 816/B ^{T.M.}

System 816/B is an ultra-high performance single user system, which is also designed for easy upgrading to a multi-user system. System 816/B handles all popular peripherals (printers, terminals, modems, etc.), and is well suited for word processing, business and financial planning, data base management, or other tasks associated with a sophisticated office or laboratory environment. Also, note that unlike many other systems, with CompuPro's modular approach you can choose the printer and terminal that best fit your needs and budget.

HARDWARE. System 816/B includes the following system components:

- **Desktop Enclosure 2** with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.
- **Floppy Disk Enclosure** featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2,400,000 bytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.
- **Disk 1 DMA Disk Controller** board for high speed operation.
- **CPU 8085/88**, the original, much-imitated dual processor board which runs both standard 8 bit and ultra-efficient 16 bit software. Most other systems can only run 8 or 16 bit software (but not both).
- **Interfacer 3-5**, which includes five RS-232C serial ports. In a typical application, System 816/B could easily support a couple of printers (high speed draft and/or letter quality), terminal, and intelligent modem - with two ports for future expansion.
- **256K of memory.** CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. Note that other systems - which may not even be expandable - typically include 64K or less of RAM, which limits the ability to run complex programs. CompuPro machines not only include more initial memory, but are also expandable to 1 Megabyte of RAM.
- **System Support 1** (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, more) to handle miscellaneous computer functions. The board's serial port allows addition of another intelligent modem or similar device for system expansion.
- **All internal cables.**

SOFTWARE. System 816/B includes the following software packages:

- **Digital Research's CP/M 2.2®** (8 bit) and **CP/M-86**^{tm} (16 bit) operating systems. As an added bonus, the implementation of CP/M includes **CompuPro's M-Drive**^{tm} software. This program optionally lets you turn the system RAM into a pseudo-disk drive, thereby increasing operating speeds up to 3500% during disk-intensive operations. Having 192K of M-Drive available lets you store programs and data in RAM - for example, you could store a word processing program (which would normally run slowly due to its disk-intensive nature) under M-Drive, along with several lengthy files, to experience the advantages of lightning fast word processing.
- **Sorcim's SuperCalc-86**^{tm}. This powerful, 16 bit business and financial planning package outperforms similar 8 bit programs in both speed and flexibility.
- **Ashton-Tate's dBase II**^{tm}. This is the industry's best selling data base management program. It simplifies everything from mailing lists, to accounting, to department staffing, to monitoring the results of scientific projects. For manipulating data, no other data base management program offers the same powerful operation as dBase II.

System 816/B delivers state-of-the-art single user computing today, with an option for future expansion to multi-user operation.

SYSTEM 816/B Basic Specifications

8 bit processor: 6 MHz 8085
16 bit processor: 8 MHz 8088
Disk storage: Up to 2.4 Megabytes. Handles all popular 8" diskette formats - single or double sided, single or double density. Disk storage expandable to 4.8 Megabytes.
Main memory: 256K
Main memory expandable to: 1 Megabyte
Serial ports: 6
Software: CP/M 2.2, CP/M-86, M-Drive, SuperCalc-86, dBase II
Convenience features: Clock/calendar, interrupt controllers, interval timers, and math processor option.

Note: CompuPro systems carry a 1 year limited warranty, from date of purchase by end user, on the boards, mainframe enclosures, and disk drives. Boards qualified under the Certified System Component (CSC) high-reliability program (200 hour burn-in and 2 year board exchange warranty) are optional at extra cost.

Specifications subject to change without notice

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System 816/C T.M.

System 816/C is the only high performance multi-user system which allows both 8 and 16 bit programs to run simultaneously; it is also an unparalleled single user system. The stock configuration supports up to three users, and is easily expandable. System 816/C is the preferred system for business, industrial, or scientific environments where multiple tasks need to be run by multiple operators; for example, one operator could be running an 8 bit word processor, another SuperCalc-86 (a 16 bit program), and yet another dBase II - with all work stations tied to the same central computer, and capable of sharing data. Also, note that unlike many other systems, with CompuPro's modular approach you can choose the printer and terminal that best fit your needs and budget.

As a single user system, 816/C has the power needed for involved applications such as software development. Additionally, System 816/C delivers flawless "spooling" (printing and editing simultaneously) to further increase productivity, and may easily shift between single and multi-user operation as the need arises.

HARDWARE. System 816/C includes the following system components:

• Desktop Enclosure 2 with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.

• Floppy Disk Enclosure featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2,400,000 bytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.

• Disk 1 DMA Disk Controller board for high speed operation.

• CPU 8085/88, the original, much-imitated dual processor board which runs both standard 8 bit and ultra-efficient 16 bit software. Most other systems can only run 8 or 16 bit software (but not both).

• Interfacer 3-8, which includes eight RS-232C serial ports. In a typical application, this board could easily support a couple of printers (high speed draft and/or letter quality), three terminals, and an intelligent modem - with more ports left over for additional users.

• 384K of memory. CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. During 8 bit operation, this large amount of memory gives each user in a multi-user system more CP/M® workspace than would be available in a 64K single user system. During 16 bit operation, space is automatically allocated according to program requirements. Also note that many other systems - which may not even be expandable - typically include 64K or less of RAM, which limits the ability to run complex programs. CompuPro machines not only include more initial memory, but may be expanded to 1 Megabyte of RAM.

• System Support 1 (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, more) to handle miscellaneous computer functions.

• All internal cables.

SOFTWARE. System 816/C includes the following software packages:

• CompuPro's MP/M 8-16™ operating system. This proprietary version of Digital Research's MP/M-86™ (V 2.X) allows 8 and 16 bit programs to run simultaneously in a multi-user environment. Even 8 bit programs run under a true 16 bit operating system for greater speed and power.

• Digital Research's CP/M 2.2® (8 bit) and CP/M-86™ (16 bit) operating systems. As an added bonus, the implementation of CP/M includes CompuPro's M-Drive™ software. This program optionally lets you turn the system RAM into a pseudo-disk drive, thereby increasing operating speeds up to 3500% during disk-intensive operations.

• Sorcim's SuperCalc-86™. This powerful, 16 bit business and financial planning package outperforms similar 8 bit programs in both speed and flexibility.

• Ashton-Tate's dBase II™. This is the industry's best selling data base management program. It simplifies everything from mailing lists, to accounting, to department staffing, to monitoring the results of scientific projects. For manipulating data, no other data base management program offers the same powerful operation as dBase II.

System 816/C delivers fast, reliable multi-user operation as well as unparalleled single user computing. System 816/C is the system of choice for firms which need superior computing power now, with the option to expand into an even more powerful system in the future. For additional information on software and peripherals, contact your CompuPro Full Service Systems Center.

SYSTEM 816/C Basic Specifications

8 bit processor: 6 MHz 8085
16 bit processor: 8 MHz 8088
Disk storage: Up to 2.4 Megabytes. Handles all popular 8" diskette formats - single or double sided, single or double density. Disk storage expandable to 4.8 Megabytes.
Main memory: 384K
Main memory expandable to: 1 Megabyte
Serial ports: 9
Software: CP/M 2.2, CP/M-86, M-Drive, SuperCalc-86, dBase II , MP/M 8-16.
Convenience features: Clock/calendar, interrupt controllers, interval timers, and math processor option.

System 816/D

CompuPro **System 816/D** is an extremely fast multi-user computer which provides business professionals and systems programmers with the fastest 8086-based system available. Not only does it have the fastest CPU on the market (the 10 Megahertz 8086), **System 816/D** also contains 1.5 Megabytes of "solid-state disk drive" for the most efficient performance of both business and development programs.

The **System 816/D** is the ideal system for up to 5 users to run MP/M-86, the industry-standard 16-bit multi-user operating system. The 1.5 Megabytes of M-Drive/H looks exactly like a standard disk to all applications software, but the information on it is accessed as much as 35 times faster than floppy disks. Thus, the already-fast 8086 CPU can run programs at lightning speed, saving time and money.

HARDWARE. System **816/D** includes the following system components:

• **Desktop Enclosure 2** with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.

• **Floppy Disk Enclosure** featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2.4 Megabytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.

• **Disk 1 DMA Disk Controller** board for high speed operation.

• **CPU 8086/8087** central processing board with the 10 MHz sixteen bit 8086 processor. The board can also accommodate the Intel 8087 math processor and 80130 Operating System Firmware components, and offers the fastest execution of CP/M-86 programs available today.

• **M-Drive/H™** boards for 1.5 Megabytes of ultra-fast RAM-based disk memory.

• **Interfacer 3-8**, which includes eight RS-232C serial ports. In a typical application, this board could easily support a couple of printers (high speed draft and/or letter quality), three terminals, and an intelligent modem—with more ports left over for future expansion.

• **Interfacer 4**, which includes three more serial ports, a parallel port, and a Centronics style port. In a typical application, this board could support terminals, a daisy wheel printer for letter quality output, a draft quality printer, and an intelligent modem.

• **512K bytes of 16-bit memory.** CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. Space is automatically allocated according to program requirements. **System 816/D** not only includes more initial memory than most machines, it can be expanded to 1 Megabyte of RAM.

• **System Support 1** (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, battery backed-up RAM and more) to handle miscellaneous computer functions.

• **All internal cables.**

SOFTWARE. System **816/D** includes the following software packages:

• **Digital Research's CP/M-86™** and **MP/M-86™** operating systems. The operating systems are configured to access all of the advanced features of the **System 816/D.**

• **Sorcim's SuperCalc-86™.** This powerful, 16 bit business and financial planning package outperforms similar 8 bit programs in both speed and flexibility.

• **Sorcim's SuperWriter-86™.** This advanced word processing system takes advantage of the inherent speed and power of the 8086 processor. It is one of the friendliest text editing and formatting packages available on any microcomputer system.

System **816/D** is the most powerful and easy-to-use multi-user system available for businesses and system developers. **System 816/D** is an effective gateway to the multitude of CP/M-86 software available, and delivers the fastest performance possible. Optional 8/16 bit slave processor(s) are available. For additional information on software and peripherals, contact your **CompuPro Full Service Systems Center.**

SYSTEM 816/D Basic Specifications

16 bit processor: 10 MHz 8086
Disk storage: Up to 2.4 Megabytes. Handles all popular 8" diskette formats—single or double sided, single IBM 3740 or double density. Disk storage expandable to 4.8 Megabytes.
M-Drive/H: 1.5 Megabytes of RAM-based disk storage.
Main memory: 512K bytes of 16-bit memory
Main memory expandable to: 1 Megabyte
Serial ports: 12
Centronics Printer port: 1
Parallel ports: 1
Software: CP/M-86, MP/M-86, SuperCalc-86, SuperWriter-86
Convenience features: Clock/calendar, interrupt controllers, interval timers, battery backed-up RAM and math processor option.

System 816/O8

System 816/O8 combines the speed and power of **CompuPro** hardware with the user-friendly OASIS operating system for a multi-user computer system that any business can afford. No other 8 bit OASIS multi-user system performs as efficiently or is as easy to learn as the **System 816/O8.**

System 816/O8 is flexible, so that you can add terminals and printers when your needs expand. The system also includes **CompuPro's** M-Drive/H™, a "solid-state disk drive", for ultra-fast access to your data. The operating system comes complete with all of the system utilities and friendly features that make OASIS the operating system of choice in the business world.

HARDWARE. System 816/O8 includes the following system components:

• **Desktop Enclosure 2** with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.

• **Floppy Disk Enclosure** featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2.4 Megabytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.

• **Disk 1 DMA Disk Controller** board for high speed operation.

• **CPU Z** The fastest Z80 CPU board available. It runs at 6 MHz (not 2 MHz, like 8080's), and has advanced interrupt handling and memory management.

• **M-Drive/H** board for 512K bytes of ultra-fast RAM-based disk memory.

• **Interfacer 4,** which includes three serial ports, a parallel port, and a Centronics style port. In a typical application, this board could support terminals, a daisy wheel printer for letter quality output, a draft quality printer and an intelligent modem.

• **208K bytes of memory.** CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. Space is automatically allocated according to program requirements. System 816/O8 not only includes more initial memory than most machines, it can be expanded to 1 Megabyte of RAM.

• **System Support 1** (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, battery backed-up RAM and more) to handle miscellaneous computer functions.

• **All internal cables.**

SOFTWARE. System 816/O8 includes the following software:

• **OASIS**™ operating system from Phase One Systems. The operating system comes with all system utilities, electronic mail, a print spooling program, a text editor and formatter, OASIS BASIC (the most advanced BASIC available for 8 bit computers), communications software, and assembly language linker and debugger. Other languages, such as COBOL, and hundreds of business applications are also available options.

System 816/O8 is an extremely easy-to-use multi-user system that is perfect for businesses. **System 816/O8** is the fasted computer running multi-user OASIS, and it is easily expandable to accommodate more users. For additional information on software and peripherals, contact your **CompuPro Full Service Systems Center.**

SYSTEM 816/O8 Basic Specifications

8 bit processor: 6 MHz Z80B
Disk storage: Up to 2.4 Megabytes. Handles all popular 8" diskette formats—single or double sided, single or double density. Disk storage expandable to 4.8 Megabytes.
M-Drive/H: 512K bytes of RAM-based disk storage.
Main memory: 208K bytes
Main memory expandable to: 1 Megabyte
Serial ports: 4
Centronics Printer port: 1
Parallel ports: 1
Software: OASIS operating system and all support programs
Convenience features: Clock/calendar, interrupt controllers, interval timers, and math processor option.

System 816/O16

CompuPro System 816/O16 combines the speed and power of advanced 16 bit CompuPro hardware with the OASIS-16 operating system for the most powerful multi-user OASIS computer system available. No other 16 bit multi-user system is as friendly and easy to use as the System 816/O16.

System 816/O16 is flexible, so that you can add terminals and printers when your needs expand. The system also includes CompuPro's 1.5 Megabytes of M-Drive/H, a "solid-state disk drive," for ultra-fast access to your data. The operating system comes complete with all of the system utilities and friendly features that make OASIS-16 a fine choice in the business world.

HARDWARE. System 816/O16 includes the following system components:

• **Desktop Enclosure 2** with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.

• **Floppy Disk Enclosure** featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2.4 Megabytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.

• **Disk 1 DMA Disk Controller** board for high speed operation.

• **CPU 8086/8087** central processing board with the 10 MHz sixteen bit 8086 processor. The board can also accommodate the Intel 8087 math processor and the 80130 Operating System Firmware Components, and offers the fastest execution of OASIS-16 programs available today.

• **M-Drive/H**™ for 1.5 Megabytes of ultra-fast RAM-based disk memory.

• **Interfacer 3-8,** which includes eight RS-232C serial ports. In a typical application, this board could easily support a couple of printers (high speed draft and/or letter quality), three terminals, and an intelligent modem—with more ports left over for future expansion.

• **Interfacer 4,** which includes three more serial ports, a parallel port, and a Centronics style port. In a typical application, this board could support terminals, a daisy wheel printer for letter quality output, a draft quality printer, and an intelligent modem.

• **512K bytes of 16-bit memory.** CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. Space is automatically allocated according to program requirements. System 816/O16 not only includes more initial memory than most machines, it can be expanded to 1 Megabyte of RAM.

• **System Support 1** (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, more) to handle miscellaneous computer functions.

• **All internal cables.**

SOFTWARE. System 816/O16 includes the following software:

• **OASIS-16**™ operating system from Phase One Systems. This sophisticated 16 bit operating system comes with all system utilities, electronic mail, a print spooling program, a text editor and formatter, OASIS BASIC (the most advanced BASIC available for 16 bit computers), communications software, and assembly language linker and debugger. Other languages, such as COBOL, and hundreds of business applications are also available.

System 816/O16 is an extremely easy-to-use multi-user system that is perfect for businesses. System 816/O16 is the fastest computer running multi-user OASIS-16, and is easily expandable to accommodate more users. For additional information on software and peripherals, contact your CompuPro Full Service Systems Center.

SYSTEM 816/O16 Basic Specifications

16 bit processor: 10 MHz 8086
Disk storage: Up to 2.4 Megabytes. Handles all popular 8" diskette formats—single or double sided, single or double density. Disk storage expandable to 4.8 Megabytes.
M-Drive/H: 1.5 Megabytes of RAM-based disk storage.
Main memory: 512K bytes of 16-bit memory
Main memory expandable to: 1 Megabyte
Serial ports: 12
Centronics Printer port: 1
Parallel port: 1
Software: OASIS-16 operating system and all support programs
Convenience features: Clock/calendar, interrupt controllers, interval timers, and math processor option.

Scheduled 1983 consult factory.

OASIS 16 is a trademark of Phase 1.

Note: CompuPro systems carry a 1 year limited warranty, from date of purchase by end user, on the boards, mainframe enclosures, and disk drives. Boards qualified under the Certified System Component (CSC) high-reliability program (200 hour burn-in and 2 year board exchange warranty) are optional at extra cost.

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System 68K™

CompuPro System 68K is the ideal system for business people and systems integrators wanting to take advantage of the new CP/M 68K™ operating system. With the powerful 8 Megahertz 68000 CPU, 1.5 Megabytes of "solid-state disk drive" for exceptionally fast data access, and full support for popular peripherals (printers, terminals, modems, etc.), there is no 68000 based computer better suited to today's market than the System 68K.

As more software becomes available for CP/M 68K, System 68K becomes more valuable due to its speed, expandability, and CompuPro's reputation for high reliability. The CPU 68K, which conforms to the IEEE 696/S-100 industry standard, has powerful memory addressing, as well as the ability to access on-board EPROMs.

HARDWARE. CompuPro System 68K includes the following system components:
 • Desktop Enclosure 2 with 20 slot motherboard, constant voltage power supply, line filter, positive pressurized filtered ventilation system, and rugged all-metal construction.
 • Floppy Disk Enclosure featuring all-metal construction, regulated power supply, two Qume Trak 842 drives capable of storing 2.4 Megabytes of information, and the ability to handle single or double sided, single or double density diskettes. All information is stored under the standard IBM protocol for transportability to other machines. Operation can be expanded to four disk drives simply by adding another Floppy Disk Enclosure.
 • Disk 1 DMA Disk Controller board for high speed operation.
 • CPU 68K 8 MHz central processing board with the 16 bit 68000 processor. The board can accommodate EPROMs, and has advanced interrupt handling and memory addressing.
 • M-Drive/H™ for 1.5 Megabytes of ultra-fast RAM-based disk memory.
 • Interfacer 4, which includes three serial ports, a parallel port, and a Centronics style port. In a typical application, this board could support a terminal, a daisy wheel printer for letter quality output, a draft quality printer, and an intelligent modem.
 • 256K bytes of 16-bit memory. CompuPro systems use only high speed, energy efficient static RAM for maximum reliability. Space is automatically allocated according to program requirements. System 68K not only includes more initial memory than most machines, it can be expanded to 16 Megabyte of RAM.
 • System Support 1 (with clock/calendar, RAM/ROM/math processor options, RS-232C serial port, dual interrupt controllers, triple interval timers, battery backed-up RAM and more) to handle miscellaneous computer functions.
 • All internal cables.

SOFTWARE. CompuPro System 68K includes the following software packages:
 • Digital Research's CP/M 68K operating system. The operating system is configured to access all of the advanced features of the System 68K.
 • mapFORTH language. This implementation of the popular FORTH language is based on the book Starting FORTH by Leo Brodie.

System 68K is the most powerful CP/M 68K system available for businesses and developers. System 68K is easily expandable, and its 68000 processor offers the most 68000 computing power on the market. For additional information on software and peripherals, contact your CompuPro Full Service Systems Center.

SYSTEM 68K Basic Specifications

16 bit processor: 8 MHz 68000, 10 MHz CSC
Disk storage: Up to 2.4 Megabytes. Handles all popular 8" diskette formats—single or double sided, single or double density. Disk storage expandable to 4.8 Megabytes.
M-Drive/H: 1.5 Megabytes of high speed RAM-based disk storage.
Main memory: 256K bytes of 16-bit memory
Main memory expandable to: 16 Megabyte
Serial ports: 4
Centronics Printer port: 1
Parallel ports: 1
Software: CP/M 68K, mapFORTH with macro assembler
Convenience features: Clock/calendar, interrupt controllers, interval timers, battery backed-up RAM, and math processor option.

CP/M 68K is a trademark of Digital Research.

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Floppy Disk Sub-System
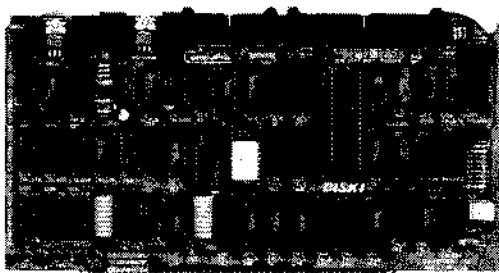
The **COMPUPRO FLOPPY DISK SUB-SYSTEM** provides a mass storage system designed to perfectly complement **CompuPro** (and other) microcomputer systems. Two Qume double-sided, double-density Trak 842 drives form the heart of the system, thus giving reliable mass storage with up to 2.4M bytes of formatted data on-line at one time. The **COMPUPRO FLOPPY DISK SUB-SYSTEM** includes the following features:

- **CompuPro DISK 1** DMA floppy disk controller.
- Digital Research's CP/M®-80 and CP/M-86 operating systems.
- Sorcim's **SuperCalc-86** and Ashton-Tate's **dBase II** high-powered applications software.
- Quiet fan for cool system operation.
- Removable filter to keep drives and diskettes clean.
- AC line filter for electrical noise suppression.
- Circuit breaker to promote safe operation.
- Positive pressurization for ease of filtration.
- Physical dimensions: 22" deep, 5.5" high, and 18" wide.

Disk systems must be fast, reliable, and accurate in order to best utilize a computer's capabilities. The **COMPUPRO FLOPPY DISK SUB-SYSTEM** takes advantage of **CompuPro's** IEEE 696/S-100 design excellence to deliver the performance, quality, and reliability needed in all high-level computing systems.

SPECIFICATIONS

Enclosure Dimensions	Approximately 22" deep, 5.5" tall, and 18" wide.
Ventilation System	Provided by low noise fan, with positive pressurization and integral finger guard. Easily cleanable filter promotes a dust-free interior.
Disk Drives	Double-sided, double-density Qume Trak 842 drives. These drives accept single- or double-density, single- or double-sided media.
Drive Storage	2.4 Megabytes (with double-density/double-sided media, 1024 bytes per sector).
Disk Controller	CompuPro DISK 1 DMA disk controller (for more information, see the DISK 1 data sheet).
Power Requirements	117 VAC, 60 Hz operation only.
Line Transient Suppression	Provided by line filter.
Other protection	Provided by 5 Amp circuit breaker.

CP/M is a Registered trademark of Digital Research.

Note: The **CompuPro Floppy Disk Sub-System** is completely assembled and ready to run. The Qume disk drives have a 6 month limited warranty, while the rest of the system has a 1 year limited warranty.

Specifications subject to change without notice.

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MP/M 8-16 ™

MP/M 8-16, CompuPro's multi-user operating system based on Digital Research's MP/M 86 Version 2.X, allows both 8 and 16 bit programs to run simultaneously in a multi-user environment. Offering the power of a true 16 bit operating system while maintaining complete downward compatibility with existing CP/M 80 software, each CP/M 80 user has over 60K bytes of work space (not just the usual 48K). And, eight bit tasks do not run in an emulation mode - CompuPro's dual processor architecture runs the eight bit task directly on a high speed 8 bit processor.

Of course, MP/M 8-16 also lets you run the growing library of powerful 16 bit (CP/M 86) software available from third party vendors, including a variety of word processors, an extended version of Sorcim's SuperCalc which allows almost unlimited size spreadsheets, ANSI standard FORTRAN and COBOL compilers, and a host of other offerings.

MP/M 8-16 optionally uses CompuPro's sophisticated MPX-1 Front End Processor to provide an extremely efficient interrupt-driven environment. Providing extras such as time and date stamping of files, dynamic memory allocation, hierarchal file protection, and the other features listed below, MP/M 8-16 is the multi-user system of choice for business, scientific, and industrial installations.

- High performance, high speed operation.
- Runs 16 bit CP/M 86 software.
- Runs 8 bit CP/M 80 software (with a greater than 60K temporary program area!).
- Full support for CompuPro's hard disk controller series.
- Password as well as hierarchal file protection.
- Dynamic memory allocation in 4K increments.
- Time and date stamping of files.
- Can use MPX-1 Front End Processor for efficient interrupt structure.

(Please note that MP/M 8-16 requires the following minimum hardware configuration: CPU 8085/88, 256K of extended address RAM, DISK 1, System Support 1, Interfacer 3 or 4, and optionally an MPX-1. This minimum configuration will support at least three users; additional users can be supported by adding more RAM and appropriate I/O.)

CP/M 8-16 ™

CP/M 8-16, CompuPro's single user operating system based on Digital Research's CP/M 86™ 1.X, allows either 8 or 16 bit programs to run in the same environment. Offering the power of a true 16 bit operating system, while maintaining complete downward compatibility with existing CP/M 80™ software. A CP/M 80 program gets over 60K bytes of work space (not just the usual 48K or 56K). And, eight bit programs do not run in an emulation mode—CompuPro's dual processor architecture runs the eight bit program directly on a high speed 8 bit processor.

Of course, CP/M 8-16 also lets you run the growing library of powerful 16 bit (CP/M 86) software available from third party vendors, including a variety of word processors, and extended version of Sorcim's SuperCalc which allows almost unlimited size spreadsheets. C. PASCAL and COBOL compilers and a host of other offerings.

- High performance, high speed operation.
- Runs 16 bit CP/M 86 software.
- Runs 8 bit CP/M 80 software (with a greater than 60K temporary program area!).
- Full support for CompuPro's hard disk controller series.
- Supports CompuPro's M-DRIVE/H ram memory disk.

CP/M 86 and CP/M 80 are trademarks of Digital Research.

(Please note that CP/M 8-16 requires the following hardware configuration: CPU 8085/88, 192K of extended address RAM, DISK 1, System Support 1.)

Specifications subject to change without notice.

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Price List

COMPUPRO SYSTEMS PRICE LIST

SYSTEM	ASM	CSC
SYSTEM 816A	$ 5,495.00	$ 6,095.00
SYSTEM 816B	6,995.00	7,795.00
SYSTEM 816C	8,995.00	9,995.00
SYSTEM 816D	13,995.00	15,595.00
SYSTEM 816-O8	8,995.00	9,995.00
SYSTEM 816-O16	13,995.00	15,595.00
SYSTEM 816-68K	8,995.00	9,995.00
FLOPPY DISK SUB SYSTEM	3,295.00	N/A

SOFTWARE AND SOFTWARE DOCUMENTATION PRICE LIST

PROGRAM NAME	SOFTWARE W/ DOCUMENTATION	DOCUMENTATION ONLY
CP/M 80	$ 175.00	*
CP/M 86	300.00	*
MP/M 816	1,000.00	*
CP/M 816 (CPU 8085/88 only)	**	*
CP/M 68K (CPU 68K only)	200.00	*
OASIS 8 (System 816/O8 only)	**	*
OASIS 16 (System 816/O16 only)	**	*

*This documentation is not available from us separately.   **Call for prices on this software.

COMPUPRO NOW BRINGS YOU THESE DIGITAL RESEARCH LANGUAGES AND PRODUCTIVITY TOOLS

8 BIT LANGUAGES (CP/M-80 OR MP/M 816)

CBASIC	$ 150.00	$ 30.00
PASCAL MT +	350.00	30.00
PASCAL MT + WITH SPP	500.00	35.00
CB80	500.00	30.00
PL/1-80	500.00	35.00
CIS COBOL	850.00	50.00
LEVEL II COBOL	1600.00	60.00

8 BIT PRODUCTIVITY TOOLS (CP/M-80 OR MP/M 816)

SID	75.00	10.00
MAC	90.00	15.00
ZSID	100.00	10.00
XLT86	150.00	10.00
RMAC, LINKLIB, XREF	200.00	25.00
BT-80	200.00	25.00
SPEED PROGRAMMING PACKAGE	200.00	10.00
ACCESS MANAGER	300.00	30.00
DISPLAY MANAGER	400.00	30.00

16 BIT LANGUAGES (CP/M-86 OR MP/M-816)

CBASIC 86	325.00	35.00
CB86	600.00	30.00
PL/1-86	*	*
PASCAL MT + 86	600.00	30.00
PASCAL MT + 86 WITH SPP	800.00	35.00
CIS COBOL 8086	850.00	50.00
LEVEL II COBOL 8086	1600.00	60.00

16 BIT PRODUCTIVITY TOOLS (CP/M-86 OR MP/M-816)

SID-86	150.00	10.00
SPEED PROGRAMMING PACKAGE 8086	250.00	10.00
BT-86	*	*
ACCESS MANAGER-86	*	*
DISPLAY MANAGER-86	*	*

NOTE: These prices are subject to change without notice. Please contact your local dealer or the **CompuPro** factory for pricing and availability. The following products are soon to be released for CP/M 86 and MP/M 816,   CB-86, PL/1-86, Access Manager-86, Display Manager-86 and BT-86.
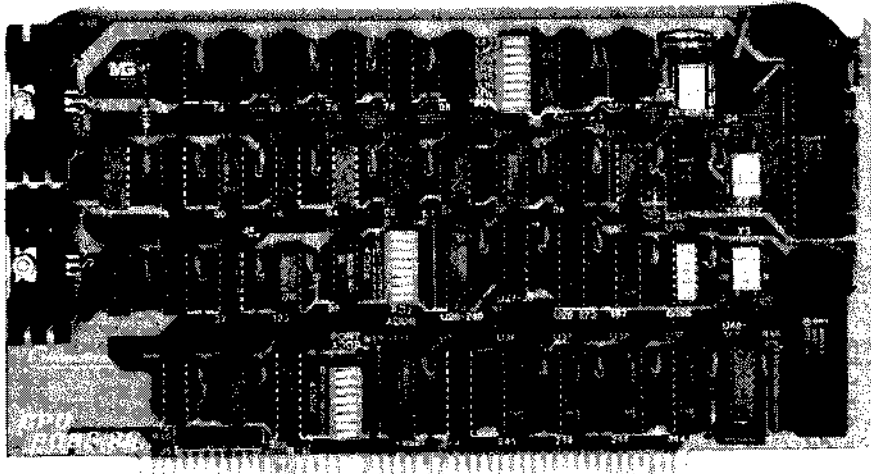
To achieve an unprecedented level of performance in a CPU board, **CPU 8085/88** includes two processors that exchange tasks to best utilize existing system capabilities. One CPU, the 8088, is an 8 bit bus version of the 8086 16 bit CPU; it has full 16 bit internal architecture, but interfaces with memory and I/O over an 8 bit bus. This approach ensures compatibility with present day machines while providing the speed and power of a true 16 bit computer. The second CPU (an 8085) is a sophisticated 8 bit processor that can run existing software such as CP/M®, and may optionally run at 2 MHz for compatibility with timing dependent software.

One look at the features listed below will show you why the **CPU 8085/88** board excels in high performance industrial, scientific and commercial applications:

- 8085 CPU is downward compatible with the vast library of 8080 software; 8088 CPU is upward compatible with 8086/8088 software, Intel's coming P-series, and other hardware and software not yet developed.
- Provides true 16 bit power with a standard 8 bit S-100 bus.
- Accesses 16M bytes of memory.
- Fully conforms to all IEEE 696/S-100 bus specifications.
- Switches between CPUs upon receipt of a single input instruction; on-board hardware handles all pertinent switching (DMA can even occur during CPU changeover with no glitches).
- Runs both 8085 and 8088 code in existing S-100 mainframes.
- High speed operation.
- Designed to accept clock speeds up to 8 MHz, thereby preventing obsolescence when higher speed processors become available.
- Ideal for multi-user installations.

CPU 8085/88 bridges the 8 and 16 bit worlds to give you the advantages of both modes of operation - without any of the drawbacks. For 8/16 bit software development, advanced computing systems, or multi-user setups, **CPU 8085/88** is an efficient and cost-effective gateway to the future of computing.

CompuPro ®

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SPECIFICATIONS

Timing..Meets all IEEE specifications*
Clock Rate (8085)...2 or 6 MHz, switch selectable.
Clock Rate (8088)...8 MHz standard.
Address Bits...24 bits; conforms to IEEE 696/S-100 24 bit extended addressing (16 M byte) specifications.

Memory Manager (implements extended addressing)/CPU Swap
Port Address...Address selectable by DIP switch.
Data Bus..8 bits.
Power-On-Jump..DIP switch selectable to any 256 byte boundary.
Jump-On-Reset capability..............................Switch selectable.
I/O Wait States...One wait state (switch selectable option).
MWRITE Generator.......................................On-board, may be switch disabled.
Front Panel Compatibility..............................Provided.
Method of CPU Swapping..............................Input instruction to swap port.
Swap Time..4 clock cycles maximum.
CLOCK (pin 49)..Always 2 MHz.
Reset, Slaveclr...Generated at power-on.
Technical Manual..Comprehensive, with complete circuit description, theory of operation, and schematic.
Speed Upgrade...Simply change crystals when faster CPUs become available.
PC Board...High quality epoxy, solder masked both sides, component legend, plated through holes, gold plated edge connector fingers.
Sockets...Provided for all ICs.
Power Consumption.......................................950 mA typical, 1.5A maximum.

*Except 8088 clock, which exceeds the duty cycle requirements.

Note: **CompuPro** products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for boards in the event of malfunction).
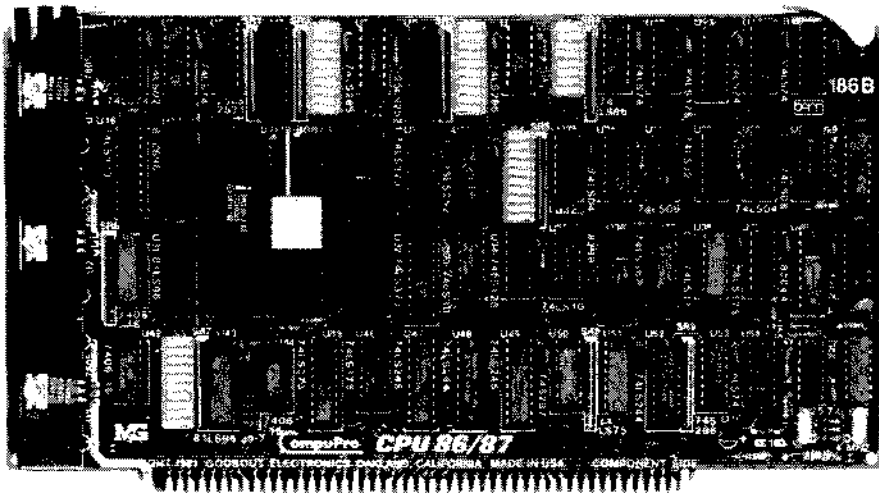
CPU 8086/87

CPU 8086/87, based around Intel's high performance 8086 sixteen bit processor, also includes sockets for their 8087 math co-processor and 80130 Operating System Firmware component. This combination creates a board with unusually high power and performance, whether for number-crunching, development systems, or high-speed business applications.

CPU 8086/87 also accomodates existing computing systems with ease. To protect previous memory investments, **CPU 8086/87** is compatible with 8 bit and 16 bit memory (both types of memory may even be mixed in the same system). **CPU 8086/87** is also fully compatible with all IEEE 696/S-100 standard DMA devices, and includes a unique clock switching circuit that allows specially designed slave processor boards to share the bus with **CPU 8086/87**. This allows you to run special 8 bit processor boards in the same machine, thus providing a simple way to execute libraries of existing 8 bit software. **CPU 8086/87** includes these other state-of-the-art features:

- 24 bit address lines access 16 megabytes of memory.
- Power-on-jump capability allows jump to any 4K boundary in the lower 1 megabyte address space.
- 8087 math co-processor adds extremely high speed number-crunching capability that rivals minicomputer performance.
- 80130 Operating System Firmware includes 8 level vectored interrupt controller, three interval timers, and optionally, iRMX ™ operating system kernel or CP/M-86®.
- In the presence of 8 bit memory or I/O, on-board logic reads or writes two bytes serially to simulate 16 bit operation.
- Clock switching circuit allows slave processors to run at different clock rates on the same bus without timing problems.
- Compatible with all DMA devices conforming to the IEEE 696/S-100 standard, such as **DISK 1**, **DISK 2**, all **INTERFACER** boards, **RAM 16**, **RAM 17**, etc.
- Designed to work with clock speeds in excess of 10 MHz as higher-speed 8086s become available.

When you add all these special features to high speed operation (8 MHz standard, 10 MHz CSC) and powerful memory addressing capabilities, it's clear that **CPU 8086/87** is the processor board of choice for advanced S-100 computing systems of the eighties.

iRMX is a trademark of Intel Corporation.
CP/M is a registered trademark of Digital Research.

CPU 8086/87

SPECIFICATIONS

Timing	Meets all IEEE specifications*.
Clock Rate	8 MHz standard, 10 MHz CSC**.
Address Bits	24 bits; addresses 16 megabytes.
Data Bus Width	16 bits; also compatible with 8 bit memory.
Number of Vectored Interrupts	8 with 80130 installed.
Number of Interval Timers	3 with 80130 installed.
Master Status	Implemented as a permanent bus master.
Power-On-Jump	Switch selectable; jumps to any 4K boundary in the lower 1 megabyte address space.
Software Available	CP/M-86, MP/M-86, MS-DOS, and others.
Technical Manual	Comprehensive, with complete circuit description, theory of operation, and schematic.
PC Board	High quality multi-layer epoxy, solder masked both sides, component legend, plated through holes, gold plated edge connector fingers, standard size (5 x 10 inches).
Sockets	Provided for all ICs.
Power Consumption	2000 mA typical, 2500 mA maximum.

*Except ϕ, which exceeds duty cycle requirements.
**8087 requires slower clock speeds.

Note: **CompuPro** products are available **Assembled/Tested** or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program in event of board malfunction).
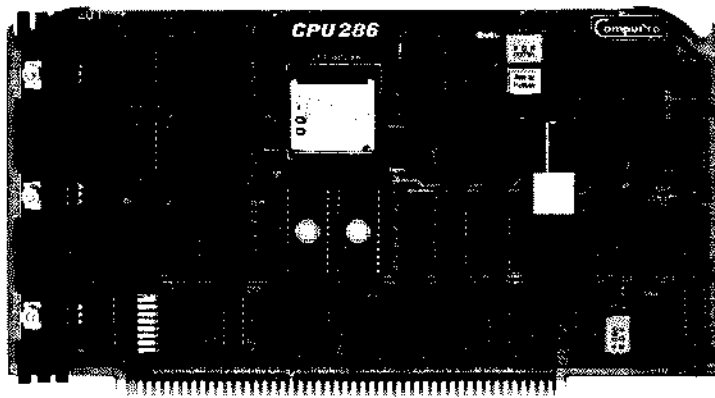
CPU 286™

CPU 286, based around Intel's ultra high performance iAPX 286/10 sixteen bit processor, also includes sockets for their 80287 math co-processor and up to 16 Kbytes of EPROM on-board. This combination creates a board with extremely high speed and performance, whether for number-crunching, development systems, or high-speed multi-user business applications.

CPU 286 also accommodates existing computing systems with ease. To protect both previous memory and software investments, CPU 286 is compatible with 8 bit and 16 bit memory (both types of memory may even be mixed in the same system), and is 100% software compatible with code written for Intel's 8086 and 8088 processors. CPU 286 is also fully compatible with all IEEE 696/S-100 standard DMA devices, and includes a unique clock switching circuit that allows specially designed slave processor boards to share the bus with CPU 286. This allows you to run special 8 bit or 16 bit slave processors boards in the same machine, thus providing a simple way to execute alternate software libraries. CPU 286 includes these other state-of-the-art features:

- Ultra high performance iAPX 286/10 processor with integrated memory management unit.
- Full virtual memory support with an instruction set optimized for multi-user operation.
- 24 address lines allow access 16 megabytes of memory.
- 80287 math co-processor adds extremely high speed number-crunching capability that rivals minicomputer performance.
- In the presence of 8 bit memory or I/O, on-board logic reads or writes two bytes serially to simulate 16 bit operation.
- Clock switching circuit allows slave processors to run at different clock rates on the same bus without timing conflicts.
- Compatible with all DMA devices conforming to the IEEE 696-S-100 standard, such as DISK 1-3, as well as all INTERFACER boards, RAM boards, and the rest of the CompuPro product line.
- Designed to work with clock speeds in excess of 10 MHz as faster processor chips become available.

When you add all these features to high speed operation (8 MHz standard, 10 MHz CSC) and powerful virtual memory addressing capabilities, it's clear that the **CPU 286** is the choice for advanced IEEE 696/S-100 computing systems of the eighties.

CPU 286

SPECIFICATIONS

Timing .... Meets all IEEE 696/S-100 bus specifications.

Clock Rate .... 8 MHz standard, 10 MHz CSC.

Address Bits .... 24 bits; addresses 16 megabytes.

Data Bus Width .... 16 bits; also compatible with 8 bit memory or I/O.

Master Status .... Implemented as a permanent bus master.

EPROM .... Up to 16 Kbytes of EPROM may be installed.

Math Co-processor .... Optional 80287 socket on-board running at a speed independent of the 80286.

Software Available .... CP/M-86*, MP/M-86*, OASIS 16™, and others.

Technical Manual .... Comprehensive, with complete circuit description and schematic.

PC Board .... High quality double sided, with solder mask, legend, and gold plated fingers. Standard single height board. (5 × 10 inch)

Sockets .... Provided for all ICs.

Power Consumption .... 2500 mA. max. at 8VDC.

NOTE. **CompuPro** products are available ASSEMBLED TESTED with a 1 year limited warranty, or qualified under the CERTIFIED SYSTEMS COMPONENT (CSC) high reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program in event of board malfunction).

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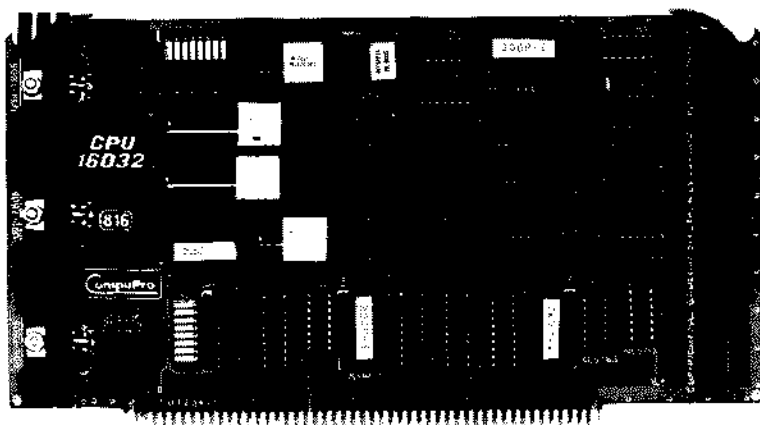
CPU 16032™

The CompuPro CPU 16032 board, based around the NS16032 16 bit microprocessor from National Semiconductor Corp., is one of the most powerful members of the CompuPro CPU family. The CPU 16032 has provisions for an on-board memory management unit, a floating point unit, and up to 32K bytes of ROM for initial system boot or monitor. This combination creates a processor board with exceptionally high performance for number-crunching, development systems, or high-speed multi-user business systems.

CPU 16032 accommodates existing computing systems. To protect previous investments CPU 16032 is compatible with 8 bit and 16 bit memory (both types of memory may even be mixed in the same system) and 8 or 16 bit Input Output devices. CPU 16032 is also fully compatible with all IEEE 696 S-100 standard DMA devices. CPU 16032 includes these other state-of-the-art features:

- Full 32 bit internal architecture
- 24 bit addressing accesses 16 Megabytes of memory.
- 16 Megabytes of non-segmented addressing space.
- Power-On-Jump capability using the On-Board ROM.
- Socket for optional NS16082 Memory Management Unit (MMU).
- Supports virtual memory and page protection.
- Socket for optional NS16081 Floating Point Unit (FPU).
- FPU can handle 32 bit and 64 bit floating point numbers.
- Sockets for up to 32K bytes (16K × 16) of optional ROM.
- Byte swap circuitry for operation with 8 bit or 16 bit memory.
- Flexible wait state circuitry for slower peripheral devices.
- Complies fully to the IEEE 696 S-100 bus specifications.
- 16 bit I O address capable of accessing 64K I O devices.
- Requires unregulated +8 volt supply only.

The CompuPro CPU 16032 has the capability of bringing mainframe power to a desktop microcomputer! CompuPro will support the CPU 16032 with single-user and multi-user operating systems and the whole family of CompuPro products. Whether the CPU 16032 is replacing the processor in an existing system or the heart of a new system, the result will be a system that is one of the most powerful microcomputer system available today.

CPU 16032

SPECIFICATIONS

Timing .... Meets all IEEE 696 specifications.
Clock Rate .... Up to 10 MHz.
Address Bits .... 24 bits; addresses 16 Megabytes.
Data Bus .... 16 bits; also compatible with 8 bit memory and Input/Output devices.
Input/Output .... Memory mapped in 64K bytes at FE000 (hex).
Wait States .... Provisions for up to 7 jumper selectable wait states.
Master Status .... Board is implemented as a permanent master.
pRESET*. SLAVECLR* .... Generated at power-on.
MWRITE Generator .... Provided through a switch option.
CLOCK (bus pin 49) .... 2 MHz square wave.
Power-On-Jump .... Implemented with first few bytes in ROM.
Virtual Memory .... Optional with the NS16082 MMU.
Memory Protection .... Optional with the NS16082 MMU.
Math Functions .... Optional with the NS16081 FPU.
Sockets .... Provided for all IC's.
P.C. Board .... High Quality double-sided epoxy, solder masked both sides, component legend. plated through holes, gold plated edge connector fingers, standard size (5 × 10 inches).

Note: **CompuPro** products are available **Assembled/Tested** and with a 1 year limited warranty. or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in. 2-year limited warranty. and direct exchange program for the boards in the event of malfunction).

Available First Quarter 1983
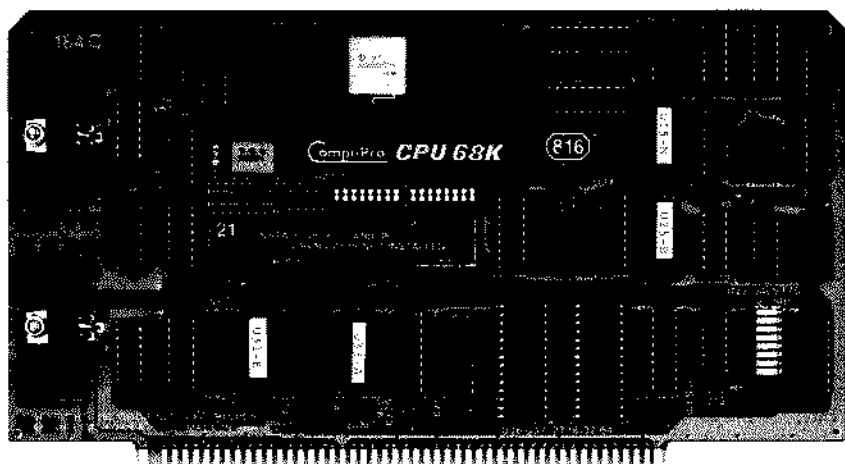
CPU 68K™

CPU 68K, based on the 68000 sixteen bit processor, includes features which take advantage of this chip's exceptional capabilities. This powerful board comprises not just the CPU, but also a socket for the 68451 Memory Management Unit, and sockets for up to 16K bytes of EPROM (organized as 8K × 16).

CPU 68K is not only suited for starting powerful new systems, but is also completely compatible with existing IEEE 696/S-100 systems (including DMA devices). For example, to protect existing memory investments, CPU 68K works with both 8 and 16 bit memory—both types of memory may even be mixed in the same system. For use with lower speed systems, the board can change from full speed to half speed operation with a simple jumper change.

Here are some of the other state-of-the-art features offered by CPU 68K:

- Non-segmented memory directly accesses all 16 Megabytes available on the IEEE 696/S-100 bus.
- Runs at 8 MHz standard; boards qualified under the CSC high-reliability program run at 10 MHz.
- On-board sockets accept 2716, 2732, or 2764 type EPROMs for up to 8K × 16 of memory.
- Provision for on-board Power-on-Jump using EPROMs.
- On-board wait state generator accommodates all types of machine operations. Up to five waits can be added to any cycle.
- Fully compatible with the entire CompuPro product line, and may even share the bus with CompuPro slave processors to run 8 or 16 bit software.
- Flexible on-board interrupt structure works with either the internal vector generation circuitry, or an external source.
- Jumper option for generating the MWRITE signal.
- Conforms to all IEEE 696/S-100 specifications.

These features, coupled with high speed operation and powerful memory addressing capabilities, make CPU 68K the ideal 68000-based CPU board for business, scientific, and industrial microcomputing applications.

CPU 68K

SPECIFICATIONS

Timing	Meets all IEEE 696/S-100 specifications.
Clock Rate	8 MHz standard, 10 MHz CSC. On-board provision for running at half speed.
Other Clock Signals	2 MHz clock generated on bus pin 49.
Address Bits	24 bits; addresses 16 Megabytes (less 64K for I/O mapping).
Data Bus Width	16 bits; also compatible with 8 bit memory and I/O.
Processor Used	68000.
I/O Mapping	I/O memory mapped at extended memory page FF0000-FFFFFF hex (standard); may be moved to any other 64K boundary (optional at extra cost).
Interrupt Structure	Flexible interrupt structure works with either internal vector generation circuitry, or an external source such as CompuPro's System Support 1 board.
MWRITE Generation	Available via jumper.
EPROM Option	On-board sockets accept up to 8K × 16 of memory (2716, 2732, or 2764 type EPROMs). Addressable on 2K, 4K, or 8K boundaries in extended page FD (hex) program space.
Power-On-Jump	First eight bytes of on-board optional EPROM provide jump vector for power-on-jump.
Software Available	Supported by CP/M 68K™ and an advanced FORTH operating system.
Slave Processor Option	Compatible with CompuPro 8 or 16 bit slave processors.
Technical Manual	Comprehensive, with complete circuit description, theory of operation, and schematic.
PC Board	High quality multi-layer epoxy, solder masked both sides, component legend, plated through holes, gold-plated edge connector fingers, standard size board (5 × 10 inches).
Sockets	Provided for all ICs.
Power Consumption	1250 mA typical, 1750 mA maximum.

Note: **CompuPro** products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component (CSC)** high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program in event of board malfunction).

CP/M 68K is a trademark of Digital Research.
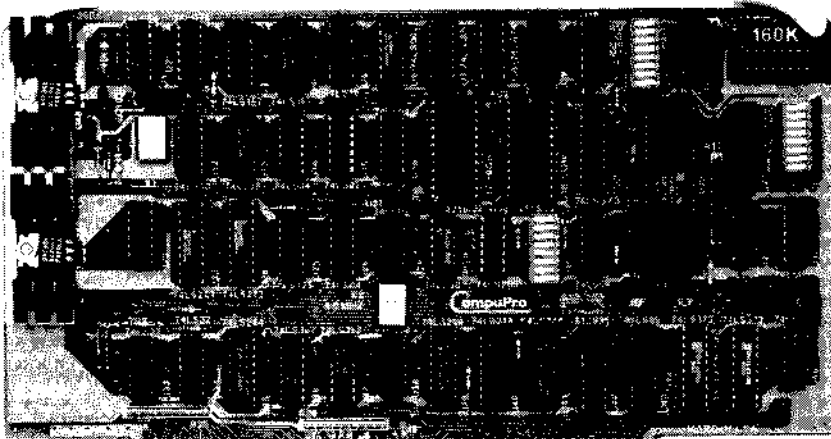
CPU Z

CPU Z is an 8 bit workhorse which not only includes all standard Z80B features, but also has the necessary options to ensure backward compatibility with most older S-100 mainframes. CPU Z optionally runs at slower clock speeds if needed, generates MWRITE for systems requiring this signal, and even includes a plug which accepts the connector from an IMSAI type front panel. Other features include:

- 6 MHz Z80B.
- Full compliance with all IEEE 696/S-100 specifications (including timing specifications).
- Downward compatible with the vast library of 8080 software.
- 24 bit addressing allows access to 16 MBytes of memory.
- Ideal for multi-user installations.
- Designed for high speed operation that greatly increases system throughput.
- Provision for adding up to 8 KBytes of on-board memory (2716/2732 EPROMs or 6116 RAMs - not included with board).
- On-board Memory sockets may be disabled under software control to allow overlapping RAM.
- On-board fully maskable vectored interrupts for interrupt driven systems.
- Power-on clear (POC) generates SLAVE CLR* and pRESET*.
- Selectable automatic wait state insertion for servicing M1* instructions - MRQ* - I/O RQ* - or the on-board memory (may be inserted in any or all of the above).
- Automatic jump upon Reset or power-on to any 256 byte boundary.
- Non-maskable interrupt on bus pin 12, as per IEEE 696 specs.

This powerful and flexible CPU board provides the sophisticated operation required by today's S-100 computers, while allowing for complete compatibility with older systems as well. But perhaps best of all, CPU Z is cost-competitive with boards that do considerably less. When you need a powerful 8 bit CPU board that is at home with the latest (as well as some of the earliest) S-100 systems, CPU Z is the answer.

CompuPro ®

CPU Z

SPECIFICATIONS

Timing...Meets all IEEE specifications.
Clock Rate ....3 or 6 MHz, switch selectable.
Address Bits...24 bits; conforms to IEEE 696/S-100 extended addressing (16 megabyte) specifications.
Memory Manager (implements extended addressing).......................................Port FD (Hex).
Vectored Interrupt Mask..................................Port FE (Hex).
Data Bus...8 bits.
Power-On-Jump...DIP switch selectable to any 256 byte boundary.
Jump-On-Reset Capability..................................Switch selectable.
I/O Wait State..One wait state, switch selectable.
MRQ Wait State..One wait state, switch selectable.
M1 Wait State...One wait state, switch selectable.
On-board Memory Wait State............................One wait state, switch selectable.
MWRITE Generator..On-board, can be disabled.
Front Panel Compatibility.................................Provided on-board.
CLOCK (pin 49)..Always 2 MHz.
pRESET*, SLAVE CLR*...................................Generated by POC* (power-on-clear).
Technical Manual...Comprehensive, with complete circuit description, theory of operation, and schematic.
Speed Upgrade..Simply change crystals when faster CPUs become available.
PC Board...High quality epoxy, solder masked both sides, screened component legend, plated through holes, gold plated edge connector fingers.
Sockets..Provided for all ICs.
Power Consumption...950 mA typical, 1.5A maximum.

Note: CompuPro products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for defective boards).

Specifications subject to change without notice

RAM 16

64K X 8 / 32K X 16
LOW POWER STATIC RAM BOARD
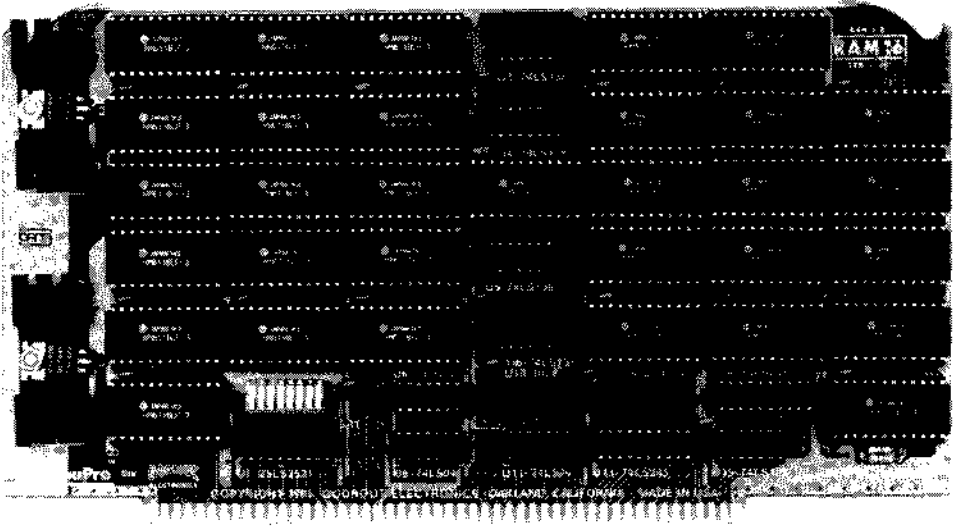
CompuPro's exceptional **RAM 16** performs byte (8 bit) and word (16 bit) transfers in full accordance with the IEEE 696/S-100 bus standard, thus insuring compatibility in both 8 and 16 bit computing systems. This low power, high speed, high density (64K byte) RAM board not only draws approximately half the power of dynamic equivalents, but also provides all the speed advantages and system reliability associated with fully static operation (such as flawless handling of DMA transfers). Additional features include:

- Operates at 10 MHz with 8085/86/88 and 68000 type CPUs.
- Extremely low power consumption (2 watts typical).
- Meets or exceeds all IEEE 696/S-100 specifications, including timing.
- Performs byte (8 bit) or word (16 bit) transfers as per IEEE 696 specifications.
- Fully static design eliminates timing problems associated with dynamic memories.
- Guaranteed to perform flawlessly with any IEEE 696/S-100 DMA device.
- DIP switch settable 24 bit addressing.
- Board addressable as one 64K X 8 or 32K X 16 block.
- Single +5 Volt operation (requires no other supply voltages).
- High quality double sided circuit board with solder mask, legend, and gold plated contact fingers.

There **is** an alternative to quirk-prone dynamic memories: thanks to low power consumption, high speed operation, fully static technology, and suitability for 8 or 16 bit systems, **RAM 16** represents a new high in performance for sophisticated S-100 computer systems.

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RAM 16

SPECIFICATIONS

Timing... Meets all IEEE 696/S-100 specifications.

Speed.. Runs with 8085/86/88 and 68000 type CPUs up to 10 MHz.

Address Bits.. 24 bits; conforms to IEEE 696/S-100 address specifications.

Addressing... DIP switch selectable on any 64K byte boundary.

Data Transfer... 8 or 16 bit transfer dependent on SXTRQ*. Conforms with IEEE 696/S-100 timing requirements for SXTRQ* and SIXTN*.

Sockets... High quality sockets provided for all ICs.

Technical Manual... Comprehensive, with complete circuit description, schematics, and theory of operation.

PC Board.. FR4 epoxy glass with full solder mask, screened component legend, and gold plated edge connector fingers.

Power Consumption.. Less than 2 Watts typically, 4 Watts maximum at nominal +8V bus voltage.

Note: **CompuPro** products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for boards in the event of malfunction).

RAM 17

64K x 8 LOW POWER STATIC RAM BOARD
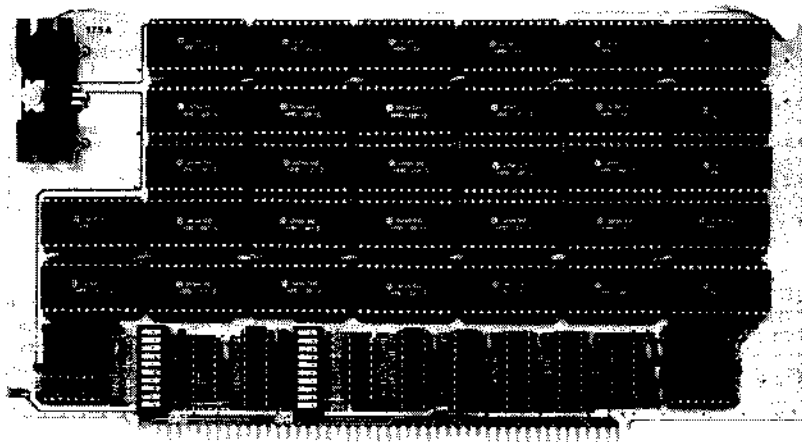
Where density and miserly power consumption is crucial, **RAM 17** is the answer. This exceptional 64K memory draws approximately half the power of dynamic equivalents, while providing all the advantages and system reliability associated with fully static operation. Available in 48K and 64K configurations, **RAM 17**'s many features don't stop with low power and high speed:

- Meets or exceeds all IEEE 696/S-100 specifications (including timing - works up to and including 10 MHz with 8088/86 CPUs).
- Fully static design eliminates the timing problems associated with dynamic memories, and allows for accurate data retention during DMA operations or during long wait and halt situations.
- Guaranteed to perform flawlessly with any IEEE 696/S-100 extended addressing (16 megabyte) specification, or 16 address lines as used in older S-100 systems.
- Ideal for multi-user installations.
- CSC and **Assembled/Tested** boards are designed for CPU speeds up to 10 MHz.
- Board is addressable as one 64K x 8 block.
- 2K windows, individually selectable at E000, E800, F000, and F800 permits use with older memory-mapped disk controllers or ROM (i.e. Morrow, North Star).
- Switch selectable PHANTOM disable.
- +5 Volt operation (requires no other supply voltages).
- Thorough bypassing of all supply lines.
- Extremely low power consumption: 2 Watts typical, less than 4 Watts guaranteed maximum for full 64K.
- Switch-selectable choice of 24 address lines conforming to the IEEE 696/S-100 extended addressing (16 megabyte) specification, or 16 address lines as used in older S-100 systems.

RAM 17 delivers the high-density memory needed by sophisticated S-100 computer systems in an exceptionally well-designed package. You don't have to put up with the quirks of dynamic memory in order to achieve low power with high density: **RAM 17** is here.

CompuPro ®

RAM 17

SPECIFICATIONS

Timing..Meets all IEEE 696/S-100 specifications; works up to and including 10 MHz with 8088/86 CPUs.

Address Bits...24 bits; conforms to IEEE 696/S-100 address specifications.

Board Addressing..................................DIP switch selectable on any 64K boundary.

Address Configuration.........................Any 16K block may be disabled; dip switch selectable 2K disable from XXE000 - FFFF in 2K increments.

Sockets..High quality sockets provided for all ICs.

Technical Manual ....Comprehensive, with complete circuit description, theory of operation, and schematic.

PC Board..Epoxy glass, masked both sides, component legend, plated through holes, gold plated edge connector fingers.

Power Consumption...............................Less than 2 Watts typical, 4 Watts guaranteed maximum.

Note: **CompuPro** products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for boards in the event of malfunction).

RAM 21

128K X 8 / 64K word X 16
LOW POWER STATIC RAM BOARD
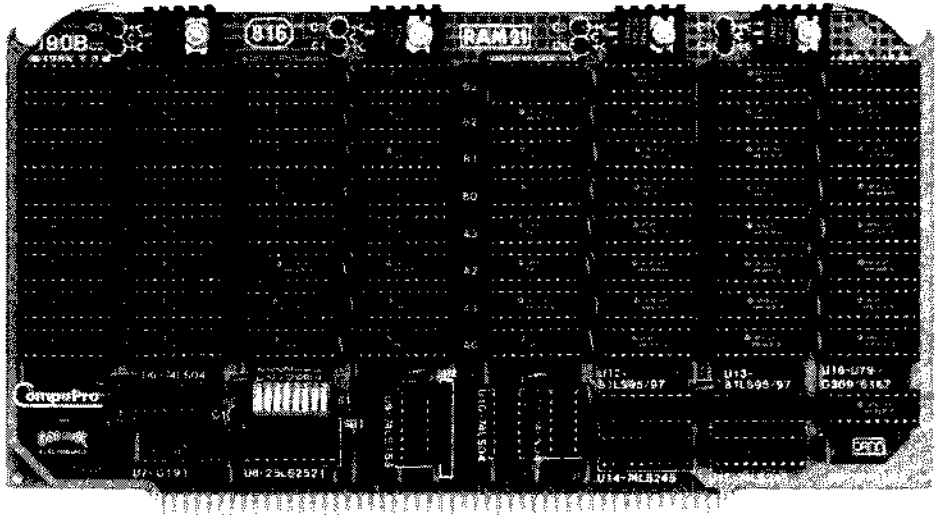
CompuPro's exceptional **RAM 21** performs byte (8 bit) and word (16 bit) transfers in full accordance with the IEEE 696/S-100 bus standard, thus insuring compatibility in both 8 and 16 bit computing systems. This low power, high speed, high density (128K byte) RAM board not only draws approximately half the power of dynamic equivalents, but also provides all the speed advantages and system reliability associated with fully static operation (such as flawless handling of DMA transfers). Additional features include:

- Operates at 12 MHz with 8088, 8086, 68000, 80286, and 16032 type CPUs.
- Extremely low power consumption.
- Meets or exceeds all IEEE 696/S-100 specifications, including timing.
- Performs byte (8 bit) or word (16 bit) transfers as per IEEE 696 specifications.
- Fully static design eliminates timing problems associated with dynamic memories.
- Guaranteed to perform flawlessly with any IEEE 696/S-100 DMA device.
- DIP switch settable 24 bit addressing.
- Board addressable as one 128K X 8 or 64K word X 16 block.
- Single + 5 Volt operation (requires no other supply voltages).
- High quality double sided circuit board with solder mask, legend, and gold plated contact fingers.

There is an alternative to quirk-prone dynamic memories: thanks to low power consumption, high speed operation, fully static technology, and suitability for 8 or 16 bit systems, **RAM 21** represents a new high in performance for sophisticated S-100 computer systems.

SPECIFICATIONS

Timing... Meets all IEEE 696/S-100 specifications.

Speed.. Runs with 8088, 8086, 80286, 68000, and 16032 type CPUs up to 12 MHz.

Address Bits.. 24 bits; conforms to IEEE 696/S-100 address specifications.

Addressing.. DIP switch selectable on any 128K byte boundary.

Data Transfer.. 8 or 16 bit transfer dependent on SXTRQ*. Conforms with IEEE 696/S-100 timing requirements for SXTRQ* and SIXTN*.

Sockets... High quality sockets provided for all ICs.

Technical Manual.................................... Comprehensive, with complete circuit description, schematics, and theory of operation.

PC Board .... FR4 epoxy glass with full solder mask, component legend, and three layer plated edge connector fingers (heavy gold over nickel over copper).

Power Consumption................................. Less than 4 Watts typical at nominal +8V bus voltage.

Note: **CompuPro** products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for boards in the event of malfunction).

M-DRIVE/H

SPECIFICATIONS

Timing ....Meets all IEEE 696 Specifications.
Number of I/O Ports Used ....2, switch selectable to any 2 port boundary.
Standard Port Addresses ....C6 and C7 hex. *
Storage Capacity ....512K bytes per board (un-formatted).
Number of boards supported ....8 boards, 4 megabytes total.
Bus memory space required ....None.
PC Board ....High quality FR4 epoxy glass.
Sockets ....Provided for all ICs.
Power Consumption ....900 mA typical, 1200 mA maximum.
Technical Manual ....Comprehensive, includes sample BIOS drivers.
Software Support ....All of CompuPro's standard operating systems include M-Drive/H support. Install procedure provided for other standard CP/M 2.2 implementations.

*Up to eight M-Drive/H boards exist at the same two port addresses.

Note: CompuPro products are available Assembled/Tested with a 1 year limited warranty, or qualified under the Certified System Component (CSC) high-reliability program (200 hour burn-in, 2-year limited warranty, and direct exchange program for boards in the event of malfunction).

DISK 1

HIGH PERFORMANCE
FLOPPY DISK CONTROLLER
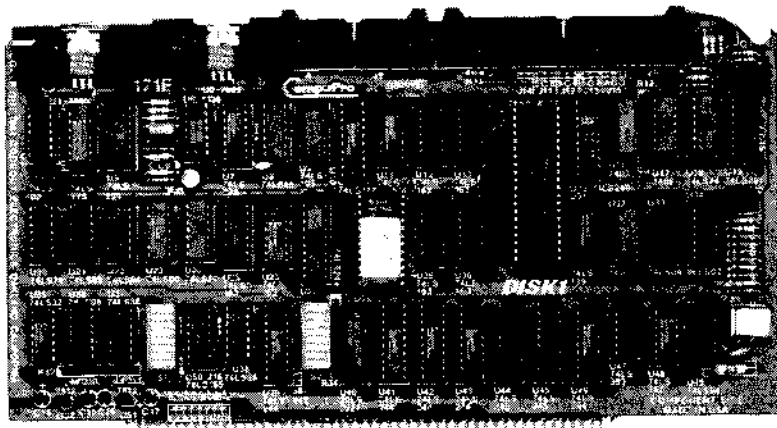
Conforming fully to all IEEE 696/S-100 specifications, including DMA arbitration, **DISK** 1 delivers exceptional performance which is suitable for the highest level industrial, commercial, and scientific microcomputer systems. Based on the most advanced LSI floppy disk controller available today, and taking advantage of the **CompuPro** design team's extensive experience in designing computer peripherals, **DISK** 1 offers the following state-of-the-art features:

- Uses third generation INTEL 8272 / NEC 765A LSI floppy disk controller IC.
- High speed, "cycle stealing" DMA interface gives processor independent data transfer between system memory and floppy disk for high speed operation (up to 10 MHz with new, high-speed 8086/88 CPUs).
- Handles up to four 8" or 5.25" floppy disk drives, single or double density, single or double sided.
- Supports IBM 3740 single density (FM), or system 34 double density (MFM), soft sectored formats.
- 24 bit DMA addressing, with data transfer across 64K boundaries, allows data transfer throughout the 16 megabyte memory map.
- I/O mapped interface allows contiguous system memory **DISK** 1 occupies no memory space).
- On-board 3 wire serial interface for system initialization.
- Board compatible with MP/M®*, OASIS*, CP/M®-80, and CP/M-86; supplied with BIOS for CP/M-80.
- CP/M-80 and CP/M-86 available for **DISK** 1.
- Fully arbitrated DMA interface (that meets all IEEE 696/S-100 specifications) allows for multiple DMA devices without conflict.
- May be interrupt-driven in multi-user environments.
- Up to 600K bytes per disk side (8' drive) for an on-line total of up to 4.8 megaytes (four drives, double sided, double density).

DISK 1 provides the advanced capabilities required by today's - and tomorrow's - single or multi-user microcomputer systems. Whether specifying a new disk system or upgrading an older one, **DISK** 1's high speed, reliability, and flexibility yield the best cost/performance ratio available today.

*MP/M and CP/M are registered trademarks of Digital Research; OASIS is a trademark of Phase 1.

CompuPro ®

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DISK 1

SPECIFICATIONS

GENERAL SPECIFICATIONS

Timing...Meets all IEEE 696/S-100 timing specifications.

Floppy Disk Controller............................3rd generation NEC 765A or INTEL 8272.

DMA Type..Cycle stealing (releases CPU after transfer). 24 bit address, crosses 64K boundaries.

DMA Arbitration....................................Meets all IEEE 696/S-100 timing specifications.

Arbitration Priority................................16 switch selectable priority levels.

Port Addressing.....................................Four port locations required, switch selectable to any four port boundary in the 256 port space.

CP/M Port Requirement...........................Ports C0 - C3H for CP/M-80 and CP/M-86.

BOOT EPROM.......................................Asserts PHANTOM* line for operation, may contain up to four switch selectable boot routines of up to 256 bytes each.

Memory Requirement..............................Requires a 256 byte page of RAM (on page boundary at host CPU reset address) that responds to PHANTOM* for boot EPROM overlay.

Power-On-Jump....................................Not required.

Serial Channel......................................Software controlled with standard RS-232C DCE interface pinout for startup operations.

Interrupts...Supports any of eight vectored interrupt lines (VI0 - VI7) or pINT*.

DISK FORMAT AND INTERFACE

Drive Interface......................................Direct connection to drives with interfaces compatible with Shugart 400, 450, 800, and 850 series drives.

Drive Requirements................................Supports up to four 5.25" or 8" drives, single or double sided, single or double density.

Media Format.......................................Supports IBM 3740 System 34 soft sectored format.

Encoding...FM or MFM - precompensated.

Sector Size...Single density: 128 byte. Double density: 256, 512, and 1024 byte.

Tracks...Supports drives with up to 256 tracks.

System Capacity....................................Up to 600K bytes per side, 1.2 megabytes per drive, 4.8 megabytes per system (four 8" drives).

MISCELLANEOUS SPECIFICATIONS

BIOS for CP/M®....................................Provided with documentation.

Wait States..0 or 1 wait state available (switch selectable).

Board..High quality epoxy glass, solder masked on both sides with component legend.

Sockets...Provided for all ICs and cables.

Power Consumption...............................+8V at 950 mA typical, 1200 mA maximum; +16V at 20 mA typical, 50 mA maximum; -16V at 20 mA typical, 50 mA maximum.

Technical Manual...................................Comprehensive, with theory of operation, schematic, and startup instructions.

DISK 1-8...Handles 8" diskettes.

DISK 1-5...Handles 5.25" diskettes.

Cables Required....................................One 50 pin female transition to 50 pin male bulkhead; and optionally, one 50 pin female transition to 50 pin female transition (cables not provided with board).

Disk 2/Selector Channel

HIGH PERFORMANCE
WINCHESTER DISK CONTROLLER
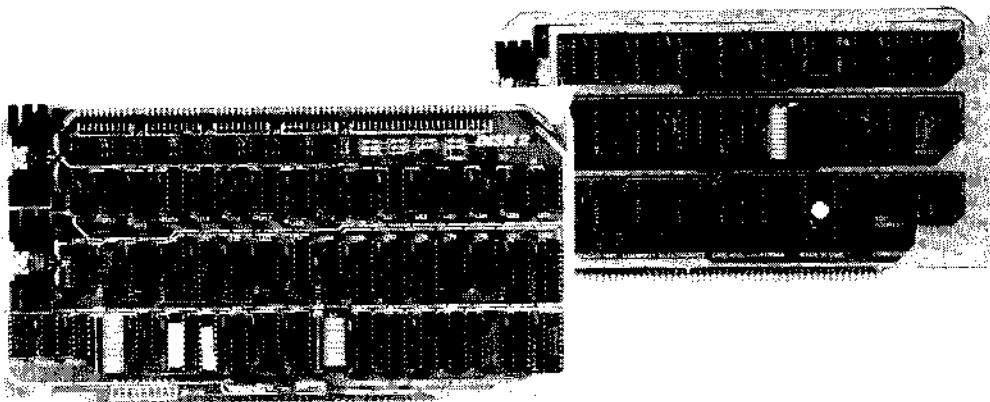
CompuPro's DISK 1 has already set new standards for floppy disk controllers. and now the **DISK 2** board set is leading the way to ultra-high performance S-100 Winchester disk systems as well. The **DISK 2/SELECTOR CHANNEL** combination conforms fully to all IEEE 696/S-100 specifications (including DMA arbitration), and delivers the extremely high speed performance required by the highest level industrial, commercial, and scientific microcomputer applications. Capable of directly accessing the full 16 MByte address space on the IEEE 696/S-100 bus (thanks to high speed DMA protocol), **DISK 2** makes processor dependent data transfer a thing of the past. The following state-of-the-art features attest to the performance built into every **CompuPro** hard disk controller system:

- High speed, "burst mode" DMA interface gives processor independent data transfer between system memory and Winchester disk for high speed operation.
- Handles up to four Winchester disk drives, up to sixteen heads per drive.
- Interfaces to Shugart SA-4000 series 14 inch drives, Fujitsu 2301 and 2302 8 inch drives, and Memorex 101 series 8 inch drives.
- 24 bit DMA addressing. with data transfer across 64K boundaries. allows data transfer throughout the 16 Megabyte memory map.
- I/O mapped interface allows contiguous system memory (**DISK 2** occupies no memory space).
- For automatic startup. **SELECTOR CHANNEL** board has socket for on-board PHANTOM boot EPROM.
- Accommodates the following sector sizes: 128, 256, 512, 1024, and 2048 bytes per sector.
- Requires only a total of three I/O ports for both the **SELECTOR CHANNEL** and **DISK 2** boards.
- Compatible with MP/M®, OASIS®, CP/M®-80, and CP/M-86.
- CP/M-80 and CP/M-86 available for **DISK 2**.
- Fully arbitrated DMA interface conforms to all IEEE 696/S-100 specifications. thus allowing multiple DMA devices on the same bus without conflict.
- May be interrupt-driven in multi-user environments.

The reason for selecting a hard disk in the first place is speed and efficiency. **DISK 2** lets a hard disk system work at its peak potential by providing the high operating speeds. flawless DMA. and advanced features required by sophisticated single or multi-user microcomputer systems.

Disk 2/Selector Channel

SPECIFICATIONS

GENERAL SPECIFICATIONS

Timing...Meets all IEEE 696/S-100 timing specifications.

DMA Type...Burst mode - transfers entire sector, 24 bit address, crosses 64K boundaries.

DMA Arbitration..Meets all IEEE 696/S-100 timing specifications.

Arbitration Priority..16 switch selectable priority levels.

Port Addressing...Two ports for the **DISK 2** and one port for the **SELECTOR CHANNEL**, switch selectable anywhere in the port may.

CP/M Port Requirement..Ports C8 - C9 for the **DISK 2** and Port FO for the **SELECTOR CHANNEL**.

BOOT EPROM...Resides on **SELECTOR CHANNEL**. Asserts PHANTOM* line for operation, and may contain up to eight jumper selectable boot routines of up to 256 bytes each (or a fewer number of longer routines). BOOT EPROM may be disabled.

Memory Requirement...Requires a minimum of 2K bytes of RAM (at host CPU reset address) that responds to PHANTOM* for BOOT EPROM overlay.

Interrupts...Supports any of eight vectored interrupt lines (VIO* - V17*) or INT*.

DISK FORMAT AND INTERFACE

Drive Interface..Direct connection to drives with the following type interfaces: Shugart 4000 series 14 inch, Fujitsu 2301 and 2302 8 inch.

Drive Requirements...Supports up to four of the above drives.

Sector Formats..Supports the following sector sizes: 128 bytes/sector, 512 bytes/sector, 256 bytes/sector, 1024 bytes/sector, and 2048 bytes/sector.

Tracks..Supports drives with up to 256 tracks.

Heads...Supports drives with up to 16 heads.

SA-1000, SEAGATE interface................................See **DISK 3** specifications.

ANSI Rigid Disk interface.....................................See **DISK 4** specifications.

MISCELLANEOUS SPECIFICATIONS

Wait States...0 or 1 wait state available (switch selectable on **SELECTOR CHANNEL**).

Board...High quality epoxy glass, solder masked on both sides with component legend.

Sockets...Provided for all ICs and cables.

Power Consumption..**DISK 2:**
+8V at 1500 mA typical, 2000 mA maximum.
SELECTOR CHANNEL:
+8V at 550 mA typical, 750 mA maximum.

Technical Manual...Comprehensive, with theory of operation, schematic, and startup instructions.

Cables required..One 50 pin female transition to 50 pin female transition; one 20 pin female transition to 20 pin female transition (cables not provided with board).

CP/M and MP/M are registered trademarks of Digital Research; OASIS is a trademark of Phase I.

Note: **CompuPro** products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component** (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for boards in the event of malfunction).

DISK 3™

HIGH PERFORMANCE INTELLIGENT
WINCHESTER DISK CONTROLLER

Photo not available at press time

Intelligence is the key to a new level of performance for IEEE 696/S-100 multi-tasking systems. The host processor may now request the transfer of a large block between disk and memory with a single command by specifying only a source, destination and length. The **DISK 3**'s channel processor performs all required seeking, reading, and writing without external intervention. Each sector of data is transferred using high speed "burst mode" DMA. This approach minimizes the host processor overhead associated with disk operations while providing a simple table oriented command structure which may be easily implemented for a variety of processors. The features of this system include:

- Local processor relieves host CPU of disk overhead enhancing multi-tasking performance.
- Simple processor independent command structure.
- Single board includes complete controller and intelligent channel.
- High speed "burst mode" data transfers using a fully arbitrated IEEE 696/S-100 temporary master interface with a 16 Megabyte addressing range.
- Accepts up to four Seagate 500 series compatible drives or four Shugart SA1100 series compatible drives.
- Connected drives may have differing capacities, formats and seeking characteristics.
- May be interrupt-driven for multi-tasking environments.

The **DISK 3** will be the standard by which other Winchester disk controllers will be measured. So when specifying a Winchester controller for a new installation, or as an add-on to an existing system, consider the CompuPro **DISK 3** first.

CompuPro ®

DISK 3

SPECIFICATIONS

Timing .... Meets all IEEE 696/S-100 timing specifications.
DMA .... Fully arbitrated, 24 bit extended addressing temporary master per
IEEE 696/S-100 specifications. No restrictions at 64k bounderies.
Priority Level .... Switch selectable.
Memory requirements .... None.
Port requirements .... Two ports, switch selectable address.
Interrupts .... Completion interrupt enabled by software. Priority level jumperable
to VI0-VI7 or INT.

DRIVE INTERFACE—the DISK 3 is available in two configurations:

   A. Seagate compatible version which is characterized by:

         Disk Data Rate .... 5.0 MBPS
         Control Cable .... 34 Conductor
         Data Drivers RS422

   B. Optional Shugart SA1100 compatible version characterized by: (consult factory)

         Disk Data Rate .... 4.34 MBPS
         Control Cable .... 50 Conductor
         Data Drivers .... Current Sinking

   Either configuration will accept up to four drives of the appropriate type. Other parameters are software
configurable.

DRIVE CHARACTERISTICS AND FORMAT

   The **DISK 3** maintains a separate table of characteristics for each of the connected drives. Tables are loaded
through channel commands making each of the drives independently software configurable. The configurable
parameters include:

         Step Rate .... Software
         Head Settle Time .... Software
         Number of heads .... Software (Up to 16)
         Number of tracks .... Software (Up to 64K)
         Precomp .... Software (Any track)
         Low Current .... Software (Any track)
         Sector Size .... Software (128, 256, 512, 1024 or 2048 bytes)
         Sectors Per Track .... Software (Up to 256)
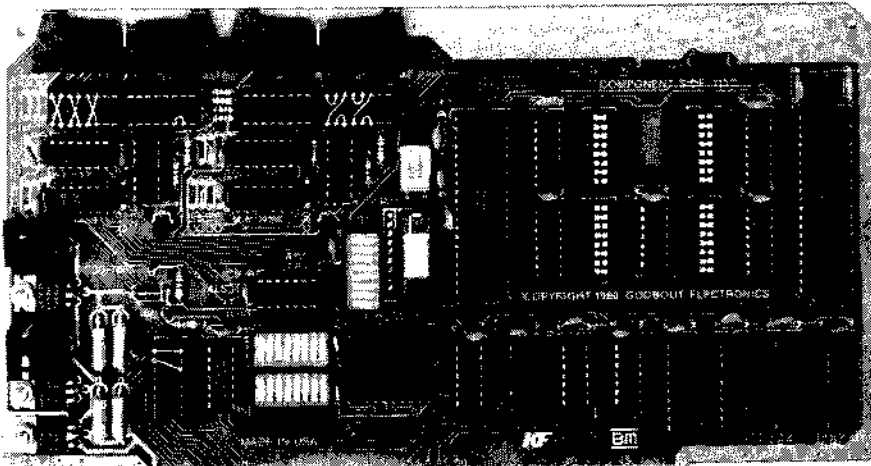
Interfacer 1

INTERFACER 1 is a dual channel, RS-232 serial I/O port which conforms to all IEEE 696/S-100 standards. To increase speed and reliability, hardware (rather than software) UARTs perform all basic I/O operations, thus freeing the CPU from having to handle these repetitive procedures. Other important features include:

- Two independently addressable serial channels.
- Independently selectable Baud rates for each channel, from 50 to 19200 Baud, allow for simultaneous driving of fast and slow devices (such as terminal/teletype combinations).
- Industry standard RS-232 drivers and receivers include five handshaking lines per channel.
- RS-232 channels conform to DTE or DCE configurations.
- Conversion to current loop (20 mA), RS-232, and TTL levels for simplified interfacing to almost any type of serial device.
- Optically isolated current loop for each channel, with selectable internal or external current sources for each channel.
- Hardware/software programmable UART parameters, interrupt enables, and handshaking levels default on power-up or reset to user specified parameters, thereby allowing operation under full software control without time consuming initialization procedures.
- Provision for custom frequency compensation and slew rate limiting to accommodate varying speed/noise situations or unusual cable lengths.
- Compatible with interrupt driven I/O systems.

High speed, high-throughput computers require sophisticated interface boards. INTERFACER 1 not only provides efficient and reliable data transfer in today's enhanced S-100 systems, but also offers the flexibility needed to interface with older or slower peripherals as well.

CompuPro ®

Interfacer 1

SPECIFICATIONS

Channel Addressing.............................. Each channel independently DIP switch addressable as a 2 port block anywhere in the 256 I/O port space.

Port Positions.................................... Data port at switch address and status/control port at switch address + 1 as shipped - user alterable to opposite configuration.

Baud Rates.. 16 switch selectable standard rates, from 50 to 19200 Baud (including 134.5 Baud for Selectric interface).

RS-232 Signals................................... Industry standard RS-232 drivers and receivers with five handshaking lines per channel.

RS-232 Configurations........................ Conforms to both Data Communication Equipment (DCE) or Data Terminal Equipment (DTE) pin configurations (MODEM or terminal mode).

Current Loop..................................... Optically isolated transmit and receive 20 mA loop on both channels, with selectable internal or external current sources.

I/O Mode Selection............................ Mode selected by user with provided DIP header.

Parameter Programming..................... Power-up or reset parameters set by user with programmable DIP shunt; parameters may be altered by software through the Status/Control port.

Interrupts.. Independent enable for both transmit and receive interrupts on each channel - independently jumperable to any vectored interrupt line (interrupt cleared from bus when serviced).

Noise Cancellation.............................. Provisions for on-board compensation and slew rate limiting capacitors.

Technical Manual............................... Comprehensive, with complete circuit description, theory of operation, and schematic.

PC Board... High quality epoxy, solder masked on both sides, component legend, and gold plated fingers.

Sockets... High quality sockets provided for all ICs.

Cabling.. 26 pin male transition connector for each channel mates directly to standard crimp-on transition connector, flat cable, or female DB-25 connector.

Power Consumption............................ +8V at 300 mA typical, 500 mA maximum;
+16V at 50 mA typical, 150 mA maximum;
-16V at 50 mA typical, 150 mA maximum.

Cable required................................... One 26 pin female transition to DB-25S for each channel (cable not provided with board).

STATUS/CONTROL PORT BIT ASSIGNMENT

STATUS			CONTROL		
Bit	Name	Function	Bit	Name	Function
DO	TBMT	Trans. Buffer Empty	DO	RxINTE	Receiver Interrupt Enable
D1	DAV	Data Available	D1	TxINTE	Transmitter Interrupt En.
D2	OPT	Selectable Status	D2	CD	Data Terminal Ready
D3	PE	Parity Error	D3	CA	Request To Send
D4	OR	Over Run Error	D4	TSB	Stop Bit Select
D5	FE	Framing Error	D5	NP	Parity Enable
D6	CC	Data Set Ready	D6	EPS	Even/Odd Parity Select
D7	CB	Clear To Send	D7	NBI	Bits per Character

Interfacer 2

TRIPLE PARALLEL/SINGLE SERIAL
I/O BOARD WITH TIMER
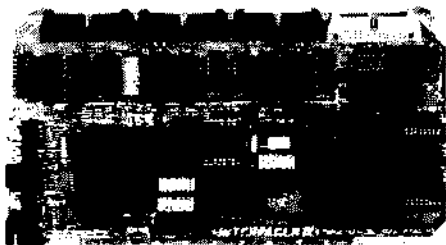
The multi-function **INTERFACER 2** includes three full duplex parallel ports for handling I/O data, one full channel of serial I/O (identical to an **INTERFACER 1** serial port), and a selectable rate interrupt timer. Designed for IEEE 696/S-100 compatibility, a single **INTERFACER 2** board will handle all the interfacing requirements of most small computer systems. Easy to set up and operate, this cost-effective board offers advanced features such as:

PARALLEL CHANNELS

* Latched input and output data with 24 mA drive capability.
* All three full channels contain 16 data lines along with strobe, enable, and attention lines.
* No mode selection or initialization required for operation.
* Separate 25 pin I/O connector (with power) for each channel.
* Interrupt capability on all three channels.
* Status/Control port for interrupt mask and channel status.
* Provides interfacing for any general purpose parallel application - A/D converters, keyboards, printers, and more.

SERIAL CHANNEL

* Works with all software drivers written for the **INTERFACER 1**.
* On-board hardware UART.
* Industry standard RS-232 drivers and receivers with five handshaking lines.
* Conversion to current loop (20mA), RS-232, and TTL for simplified interfacing to almost any kind of serial device.
* Optically isolated current loop with selectable internal or external current source.
* Crystal controlled Baud rate generator with rates up to 19200 Baud.
* Hardware/software programmability, with power-up/reset default to user specified parameters, allows operation under full software control without time-consuming initialization procedures.
* DIP switch selectable channel address and Baud rate.
* Full transmit and receive interrupt capability.

TIMER

* Provides 16 DIP switch selectable rates (from 50 to 19200 interrupts per second) on any vectored interrupt line.
* Optional user-jumperable divider reduces the above rates by a factor of two, four, or eight.
* Timer enable/disable is under software control.

INTERFACER 2 delivers cost-effective (and easy to use) serial/parallel interfacing, as well as providing additional timing capabilities. When your computer needs multi-function interfacing with the outside world, **INTERFACER 2** is the answer.

Interfacer 2

SPECIFICATIONS

PARALLEL SECTION

Channel Addressing.............................. DIP switch addressable as a 4 port block; Channels at switch address + 0, 1, or 2. Status/Control port at switch address + 3.

Parallel Data Lines.............................. 8 latched input lines (TTL levels).
8 latched Tri-State* output lines with 24 mA drive.

Parallel Control Lines........................... Strobe, enable, and attention lines with selectable polarity.

Parallel Power Lines............................. Available power at connector (3 channel total): +5V at 200 mA, +12V at 50 mA, -12V at 50 mA.

SERIAL CHANNEL

Channel Addressing.............................. DIP switch addressable as a 2 port block; Data port at the switch address, Status/Control port at switch address + 1.

Baud Rates... DIP switch selectable from 50 to 19200 Baud.

RS-232 Signals.................................... Industry standard RS-232 drivers and receivers with 5 handshaking lines per channel - conforms to both DCE and DTE pin configurations.

Current Loop...................................... Optically isolated 20 mA loop with selectable internal or external current source.

Parameter Programming....................... Default to user setting on power-up or reset - may be altered by software via control port.

Interrupts.. Independent transmit and receive interrupts with enables (jumperable to any vectored interrupt line).

Noise Cancellation.............................. Provision for on-board compensation and slew rate limiting capacitors.

TIMER

Interrupt Rates................................... 16 DIP switch selectable rates (from 50 INT/Sec. to 19200 INT/Sec, with user selectable divider for reduction of basic rates by factor of 2, 4, or 8).

Control... Interrupts enabled and disabled under software control.

Interrupt Line.................................... Jumperable to any vectored interrupt line.

GENERAL

Power Consumption............................. +8V at 400 mA typical, 800 mA maximum;
+16V at 50 mA typical, 200 mA maximum;
-16V at 50 mA typical, 200 mA maximum.

Technical Manual............................... Comprehensive, with complete circuit description, theory of operation, and schematic.

PC board.. High quality epoxy, solder masked on both sides, component legend, and gold plated fingers.

Cabling... 26 pin male transition connector for all channels mates directly to standard crimp-on transition connector/flat cable/female DB-25 connector combination.

Cables Required................................. One 26 pin female transition to DB-25S for each channel (cable not provided with board).

Note: CompuPro products are available Assembled/Tested with a 1 year limited warranty, or qualified under the Certified System Component (CSC) high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for defective boards).

*trademark of National Semiconductor.

Interfacer 3

EIGHT CHANNEL MULTI-USER SERIAL I/O BOARD

INTERFACER 3, an eight channel serial I/O board that conforms to all IEEE 696/S-100 timing specifications, is optimized for multi-user and interrupt-driven environments. Incorporating several innovative features previously unavailable on multi-channel I/O boards, **INTERFACER 3** handles all the serial interface requirements of today's - and tomorrow's - sophisticated microcomputer systesm. Six asynchronous DCE Interfaces (with full RS-232 handshaking), along with two synchronous/asynchronous DTE/DCE high speed channels (with full RS-232 handshaking and bi-directional clock drivers), connect to CRTs, printers, modems, or other computers with a minimum of effort and a maximum of flexibility. A unique user selection port allows cascading of up to four **INTERFACER 3** boards, providing for 32 contiguous users at only 8 physical port locations. **INTERFACER 3** also incorporates an elegant interrupt structure, with full maskability and flexible strapping, for unequalled ease of operation in multi-user applications.

For high performance industrial, scientific, and commercial applications, **INTERFACER 3's** many practical features insure fast - and exceptionally reliable - data transfer between computers and the computer peripherals of your choice.

ASYNCHRONOUS DCE CHANNELS

- Six asynchronous RS-232 channels with five full RS-232 handshaking lines per channel.
- Sophisticated LSI USARTs with full software programmability of all features, including Baud rate and RS-232 handshaking.
- Independently selectable Baud rates from 50 to 19200 Baud on each channel.
- Standard DCE interface with ribbon cable connectors allow direct connection to CRT terminals and printers without soldering or unusual cables.

ASYNCHRONOUS/SYNCHRONOUS DTE/DCE CHANNELS

- Two asynchronous/synchronous channels, with five full RS-232 handshaking lines and DTE or DCE capability, include all the features of the Asynchronous DCE Channels listed above along with the additional features listed below.
- High speed synchronous communication with Baud rates up to 250K Baud with external clocks.
- Bi-directional synchronous clock drivers allow each channel to either transmit or receive sync clocks.
- Standard interface to ribbon cable connectors allow direct connection to DCE or DTE devices such as modems, CRT terminals, printers, and other computers.
- Accepts interrupt on RS-232 status changes, as well as standard transmit and receive interrupts.

GENERAL BOARD FEATURES

- Available in either 5 or 8 channel configurations (5 channel version may be upgraded to 8 channels at a later date).
- Transmit and receive interrupts on each channel may be independently tied to any vectored interrupt line.
- Selectable 0, 1, or 2 wait states allow operation with systems running at up to 10 MHz.
- Switch selectable port addressing to any 8 port block.
- Switch selectable user block select for up to 32 users at the same 8 port addresses, with a common select port.
- Transmit and receive interrupt status ports allow determination of status without polling individual users.
- Transmit and receive interrupt control ports for masking each interrupt from each user.

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Interfacer 3

SPECIFICATIONS

Board Addressing........................ DIP switch addressable as an 8 port block on any 8 port boundary.

User Selection............................ DIP switch selectable user block (users 0-7, 8-15, 16-23, or 24-31) with a 5 bit user select number. Accepts maximum of 4 boards (32 users) at same port address.

USART Type............................... LSI, 2651/2661 type.

Baud Rates................................. 16 software selectable, crystal controlled Baud rates, from 50 to 19200 Baud in asynchronous mode. Up to 250K Baud with external clock in synchronous mode.

RS-232 Signals............................ Industry standard RS-232 drivers and receivers with five handshaking lines per channel (software controlled).

RS-232 Modes............................. Six channels standard DCE interface, two channels either DCE or DTE mode (selectable on header socket).

USART Parameters...................... Software controllable for all aspects of operation, including synchronous parameters. Compatible with Interfacer 4 sync channel.

Interrupt Control........................ 2 ports for independent masking of both transmit and receive interrupts.

Interrupt Status........................... 2 ports for independent checking of pending transmit and receive interrupts.

Interrupt Jumpering..................... Each interrupt may be independently tied to any vectored interrupt line.

Wait States................................. Push pin selectable 0, 1, or 2 wait states on USART registers only.

Cabling...................................... All connections accept ribbon cable and DB-25S connectors (no soldering required).

Technical Manual .... Comprehensive user manual with software programming examples.

PC board................................... High quality glass epoxy, with solder mask on both sides, component legend, and gold plated edge connector.

Sockets...................................... High quality, low profile sockets provided for all DIP integrated circuits.

Recommended Operating
Environment............................... 0 to 55 degrees Centigrade, 0 to 80% relative humidity (non-condensing).

Power Consumption..................... +8V at 900 mA typical, 1100 mA maximum;
+16V at 100 mA typical, 250 mA maximum;
-16V at 100 mA typical, 250 mA maximum.

Cables required........................... Two 26 pin female transition to DB-25S; one 50 pin female transition to triple DB25S (5 channel board), two 50 pin female transition to triple DB-25S (8 channel board). Cables not provided with board.

Interfacer 4

ADVANCED SERIAL / PARALLEL I/O BOARD
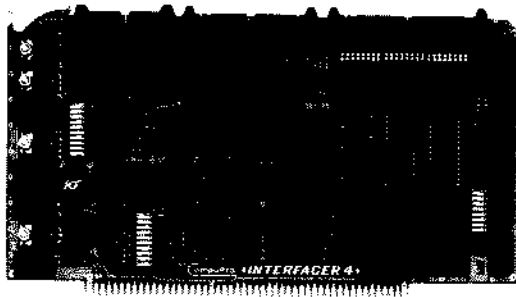
INTERFACER 4 is the only interface board needed for the majority of computer systems. The asynchronous serial interface (with full RS-232 handshaking and current loop capability) and two synchronous/asynchronous high speed channels (with full RS-232 handshaking and bi-directional clock drivers) connect to CRTs, printers, modems, and other computers easily and flexibly: the Centronics/Epson-style parallel interface provides all required signals for effortless printer connection; and a universal parallel interface allows custom interfacing.

A unique user selection port allows cascading of up to 8 INTERFACER 4 boards, allowing up to 32 contiguous users (with software compatibility with the INTERFACER 3) at only 8 physical port locations. And, an elegant interrupt structure with full maskability and flexible strapping gives ease of operation.

Conforming to all S-100/IEEE 696 timing specifications and offering the important features listed below, INTERFACER 4 excels in high performance industrial, scientific, and commercial applications.

SERIAL CHANNELS

- Two asynchronous/synchronous channels with 5 full RS-232C handshaking lines and DTE or DCE capability.
- One asynchronous channel with 5 full RS-232C handshaking lines, DTE or DCE capability, and optically isolated current loop interface.
- High speed synchronous communication with Baud rates up to 250K Baud with on-board clock source on two channels. RS-232C handshaking.
- Bi-directional synchronous clock drivers allow each channel to either transmit or receive sync clocks.
- Standard interface to ribbon cable connectors allow direct connection to DCE or DTE devices such as modems, CRT terminals, printers, and other computers.
- Sophisticated LSI USARTs offer full software programmability of all features, including baud rate and RS-232C handshaking.
- Independently selectable Baud rates from 50 to 19200 Baud on each channel.
- Interrupt on RS-232C status changes as well as standard transmit and receive interrupts on two channels.

PARALLEL CHANNELS

- Fully pin compatible CENTRONICS style parallel channel, with a complete complement of control and status lines.
- Direct connection to printers via standard ribbon cable and crimp-on connectors (no scramble wiring).
- USART style status register format for software compatibility with serial channel software.
- Universal parallel port with 16 data lines, strobe, attention, and enable lines.
- Latched input and output lines with 24 mA drive capability.
- Standard 26 pin connector mates with standard cables.
- Data DIP switch that can be sensed under software control.

COMMON FEATURES

- Transmit and receive interrupts on all serial channels and both parallel channels.
- Selectable 0, 1, 2 or 3 wait states allow operation with systems running at beyond 10MHz.
- Switch selectable port addressing to any 8 port block.
- Switch selectable user block select for up to 32 users at the same 8 port addresses with a common select port.
- Transmit and receive interrupt status ports allow determination of status without polling individual users.
- Transmit and receive interrupt control ports for masking each interrupt from each user.

Interfacer 4

SPECIFICATIONS

SERIAL CHANNELS

Channel Addressing...Configured as Relative Users 1-3 or 0, 1 and 3.

USART Type..LSI, 2651/2661 type.

Baud Rates...16, software selectable from 50 to 19200 Baud in asynchronous mode, crystal controlled. Up to 250K Baud with on-board clock in synchronous mode.

RS-232C Signals..Industry standard RS-232C drivers and receivers with 5 handshaking lines per channel (software controlled).

RS-232C Modes...All channels either DCE or DTE mode (selectable on header socket).

Synchronous Clocks.......................................Full synchronous clock driver circuitry on Relative users 0 or 2 and 3, capable of transmitting or receiving either clocks.

Current Loop...Optically isolated 20 mA with on-board or external current source on Relative User 1 only.

USART Parameters...Software controllable for all aspects of operation including synchronous parameters.

CENTRONICS PARALLEL CHANNEL

Channel Addressing..Configured as the DATA and STATUS registers of Relative User 0 or 2.

Data Lines...8 latched output lines with 24 mA drive.

Control Lines...AUTO FEED, INIT, and SELECT IN control lines supported with power-on state jumpering. Status LED lighted under software control.

Sense Switch...8 positions of DIP switch that can be sensed under software control through data port.

Status Lines...BUSY, ACKNLG, PE, ERROR, and SLCT status lines supported.

Strobe Line..1 uS in length after 1 uS data settling time.

Interrupt..Interrupt on ACKNLG standard, BUSY optional.

UNIVERSAL PARALLEL CHANNEL

Channel Addressing..Configured as the MODE and COMMAND registers of Relative User 0 or 2.

Data Lines...8 latched output lines with 24 mA drive.

Control Lines...Strobe, enable and attention lines with selectable polarity.

Interrupt..Interrupt on Strobe input.

Power Lines...Available power at connector: +5V at 100 mA, +12V at 25 mA, and -12V at 25 mA.

GENERAL

Board Addressing...DIP switch addressable as an 8 port block on any 8 port boundary.

User Selection..DIP switch selectable user block (users 0-3, 4-7 . . .14-27, or 28-31) with a 5 bit user select number (eight boards at same port address).

Interrupt Control...2 ports for independent masking of both transmit and receive interrupts.

Interrupt Status...2 ports for independent checking of pending transmit and receive interrupts.

Interrupt Jumpering......................................Each interrupt may be independently tied to any vectored interrupt line.

Wait States..Push pin selectable 0, 1, 2 or 3 wait states.

Optional Cabling..All connections through ribbon cable: 50 pin transition to 3 DB-25S connectors on the three serial channels.
40 pin transition to 36 pin "D" shell for connection to CENTRONICS style printer.
26 pin transition to DB-25S for universal parallel connection.

Power Consumption.......................................+8V at 650 mA typical, 850 mA maximum;
+16V at 100 mA typical, 250 mA maximum;
-16V at 100 mA typical, 250 mA maximum.

Technical Manual...Comprehensive technical manual with software programming examples.

PC board...High quality glass epoxy, with solder mask on both sides, component legend, and gold plated edge connector.

Sockets..High quality, low profile sockets for all DIP integrated circuits.

Recommended Environment...........................0 to 55 degrees centigrade, 0 to 80% relative humidity (non-condensing).

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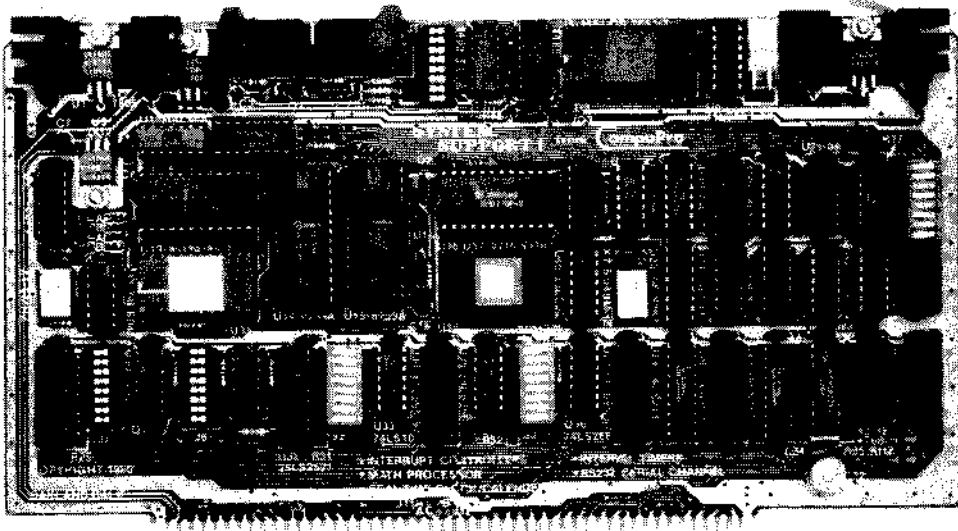
System Support 1

We've taken the most popular, and most needed, system support functions and put them on a single board - **SYSTEM SUPPORT 1.** You can use this sophisticated product to greatly expand the capabilities of your present machine, or combine it with one of our CPU boards to form the basis of a minimal computing system. **SYSTEM SUPPORT 1** is a multiple function product that offers several extremely useful features:

- Sockets provided for 4K of on-board EPROM, RAM, or micropower RAM (2716 pinout; not supplied with board), with battery backup available for one of the two sockets.
- Dual interrupt controllers handle 15 levels of interrupts (8 vectored interrupts from the bus and 7 interrupts generated on-board).
- Three 16 bit interval timers (cascade or use independently).
- Real time clock/calendar (year/month/day/time; all data available in BCD) with battery backup.
- Full RS-232 serial channel with software selectable Baud rate.
- Provision for optional high speed math processor (9511A or 9512, your choice).
- Power Fail signal generated upon power interruption.
- Selectable 1, 2, 4 or 8 wait states option to accomodate CPUs running at virtually any speed.
- ROM/RAM can be enabled or disabled by PHANTOM control.
- ROM/RAM can respond to the IEEE 24 bit (16 megabyte) extended address protocol.

SYSTEM SUPPORT 1 uses advanced LSI technology not only to provide the maximum number of functions in the minimum amount of board space, but to maintain a cost that's competitive with single function support boards that do a whole lot less. Use of this advanced technology, coupled with the **CompuPro** tradition of excellence in design, results in a versatile board whose many features belie its low price.

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SPECIFICATIONS

ROM/RAM (not supplied with board)
Type Used...2716 (single supply) EPROM or equivalent, HM6116, MK4802 RAM or equivalent.
Addressing..Any 4K boundary, switch selectable.
Extended Addressing.............................Any page, switch selectable; may be defeated.
Phantom Response..................................Switch selectable - block can appear or disappear in response to PHANTOM, and can also ignore PHANTOM if desired.
Block Disable...Switch can disable entire block.
Battery Backup.......................................Provides 4.5V DC (from battery used for clock backup) if Power Fail signal occurs.

INTERRUPTS
Number of Levels...................................15 total levels, 8 from S-100 Vectored Interrupt Lines, 7 generated on-board.
Priority...Fixed or Rotating, software selectable.
Interrupt Mask..Each interrupt individually maskable.
Polled Mode..Available for non-interrupting systems.
Controller Chips......................................8259A.

CLOCK/CALENDER
Time Format...12 or 24 hour modes, hours, minutes, seconds; each digit individually addressable with data available in BCD.
Date Format...Month, day, year, day of week; each digit individually addressable.
Time/Date Set...Each digit individually writeable.
Battery Backup...4.5 Volt alkaline battery (supplied) mounts off-board.
Battery Life...Greater than 1 year.

INTERVAL TIMERS
Number of Timers.....................................Three interval timers.
Timer Type..16 bit divide-down counter, can be cascaded.
Input Frequency..2 MHz, or optional external input.
Timer Modes...Interrupt on Terminal Count, Programmable One-shot Rate Generator, Square Wave Generator, Software Triggered Strobe, Hardware Triggered Strobe.
Chip Used..Intel 8253 or equivalent.

RS-232C SERIAL CHANNEL
Type of Transmission...............................Asynchronous.
Word Length...5 to 8 bits plus parity, software selectable.
Parity...Odd, even or none, software selectable.
Baud Rates..50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, software selectable.
Interrupt Outputs......................................Transmitter Empty and Receiver Ready.

MATH PROCESSOR
Type...LSI, 9511A or 9512 or equivalent.
Interrupt Outputs......................................End of Task, Service Request and Error.

GENERAL
Wait States...0, 1, 2, 4 or 8, switch selectable.
Number of I/O Ports.................................16, switch selectable to 16 port boundary.
PC Board...High quality epoxy glass, solder masked both sides, component legend, gold plated edge connector fingers.
Sockets..Provided for all ICs.
Power Consumption..................................800 mA typical, 1.25A maximum.
Technical Manual......................................Comprehensive, with numerous programming examples.
Cable Required..26 pin female transition to DB-25S (cable not provided with board).

Note: CompuPro products are available **Assembled/Tested**
with a 1 year limited warranty, or qualified under the **Certified**
System Component (CSC) high-reliability program (200 hour
burn-in, 2 year limited warranty, and direct exchange program
for defective boards).

Specifications subject to change without notice.

MPX-1
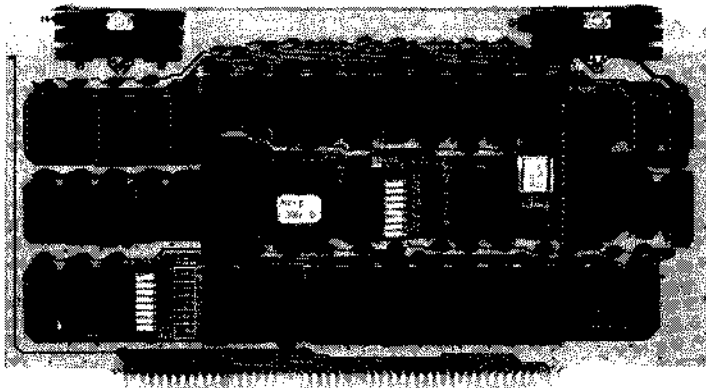
Dedicated to enhancing the performance of multi-user S-100 systems, the **MPX MULTIPLEXER CHANNEL** is a special purpose processor board that relieves the system's main CPU from having to handle repetitive I/O operations. Rather than having to interrupt the CPU every time a terminal is ready to receive a byte of data, and then waiting while the CPU executes several hundred bytes of code, the **MPX** can transfer the same byte of data almost instantly by "stealing" only two or three bus cycles. This eliminates 98 to 99% of the CPU time normally wasted on handling this kind of overhead, resulting in increased speed and throughput that dramatically improves the performance of any S-100 system in multi-user applications. Virtually a computer in itself (not just a stripped down board), the **MPX** includes the following important features:

- 6 MHz 8085AH-1 microprocessor.
- 2K of on-board 2716 EPROM, and 16K of on-board RAM, allows the 8085 to run concurrently with the main system CPU.
- EPROM socket can also accept 2732 or 2764 EPROMs.
- On-board interrupt controller interrupts the **MPX** when a device on the bus requires service.
- The **MPX** may call the CPU by generating an interrupt.
- Full IEEE 696/S-100 temporary master interface allows the 8085 direct bus access by interleaving with normal bus cycles ("cycle stealing").
- DMA (Direct Memory Access) cycles may address the full 24 bit (16 megabyte) extended address range.
- DPA (Direct Port Access) cycles allow emulation of Z80 I/O modes by permitting software control of all sixteen address lines.
- Fully compatible with any existing interfaces.
- Attention port allows the CPU to call the **MPX**.
- The **MPX** can respond to a bus interrupt acknowledge cycle; therefore, no other interrupt controller is required.
- For maximum user flexibility (and to allow for novel or special-purpose applications), the **MPX** may load software into its own RAM directly from the bus.

Thanks to the above hardware capabilities, the **MPX** efficiently - and transparently - automates the transfer of data between user programs and peripheral interfaces. However, in addition to performing data transfers for serial I/O ports, the **MPX** may serve as a resource scheduler for high speed devices by sending commands to, and processing completion interrupts from high speed DMA disk controllers. For extra flexibility, the **MPX** may load software from the bus into its integral on-board RAM and then execute that code, allowing the function of the **MPX** to change dynamically in response to changes in the system requirements.

The **MPX** is a new piece of hardware that makes truly efficient multiprogramming an affordable reality.

MPX-1

SPECIFICATIONS

Processor.. 8085AH-1

Processor Speed.. 6 MHz, crystal controlled.

RAM Memory.. 16K high speed static (local).

ROM Memory.. 2K - 2716 type EPROM (local), optionally 2732 or 2764.

Interrupt Controller...................................... 8259A, responds to VIO-7* (response is local).

S-100 Bus Address Space Required................... Memory: none required.

                                          I/O: 1 port address.

Attention Port... Used to signal **MPX** from host processor.

Port Address.. Switch selectable to any of 256 I/O addresses.

DMA Cycle.. Conforms to IEEE 696/S-100 specifications.

DPA Cycle.. Conforms to IEEE 696/S-100 specifications.

Arbitration.. Can assume any of 16 priority levels per IEEE 696/S-100 specifications (switch selectable).

Type of DMA/DPA...................................... Single cycle, interleaved with normal bus cycles ("cycle stealing").

Maximum Transfer Rate............................... Just under 1 megabyte per second.

Number of DMA Address Bits....................... 24 for memory, 16 for I/O.

Data Transfer Width.................................... 8 bits.

Interrupt Output.. **MPX** may signal host on either INT*, NMI* or any vectored interrupt line.

Software Supplied.. ROM with standard function calls for performing block transfers. I/O functions, interrupt handlers, etc. Also included is a function to load and run programs to/from **MPX** local RAM.

Technical Manual... Comprehensive, with complete circuit description, theory of operation, and schematic.

PC Board.. High quality epoxy, solder masked on both sides, component legend, and gold plated edge connector fingers.

Sockets... High quality sockets provided for all ICs.

Note: CompuPro products are available **Assembled/Tested** with a 1 year limited warranty, or qualified under the **Certified System Component (CSC)** high-reliability program (200 hour burn-in, 2 year limited warranty, and direct exchange program for defective boards).
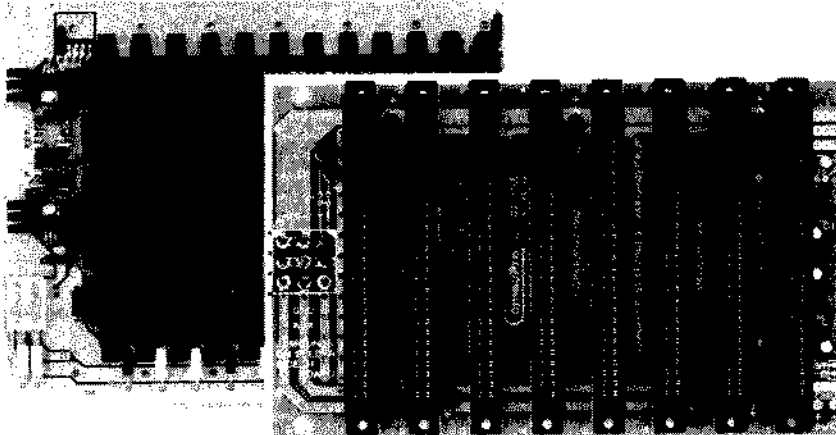
Motherboards

Whether for the business-oriented IEEE-696/S-100 Bus or the industrial-oriented STD Bus, **CompuPro** manufactures the motherboards you need to create an exceptional computing system. Thanks to true state-of-the-art design, these motherboards are exceptionally quiet, fast, and reliable. Active termination, full Faraday shielding of all signal traces, and heavy power busses with extensive capacitive bypassing are just some of the many features that make **CompuPro MOTHERBOARDS** the choice of professionals. A variety of formats allows you to pick the best possible configuration for your system's needs. All motherboards come with edge connectors (and most other components) already wave-soldered in place, and include the following features:

- S-100 Motherboards are available in 6, 12 and 20 slot versions.
- STD Motherboards are available in 8 and 16 slot versions.
- S-100 Motherboards have IMSAI compatible mounting.
- STD Motherboards fit Vector Electronics' card cages.
- S-100 Motherboards have active termination circuitry on all signal traces.
- Each motherboard has full Faraday shielding between all signal traces (plus additional shielding on the opposite side of the PC board) to minimize noise and crosstalk.
- All motherboards have convenient power connectors.
- Mating power connectors provided.
- All motherboards have connector for adding RESET button.
- All motherboards have capacitor bypassing to ground on all power traces.
- Edge connectors are spaced on 0.75" centers.
- Heavy power traces ensure high reliability.
- Gold-plated edge connectors provided for all slots.
- S-100 20 slot motherboard has extra fast-on connectors for more efficient +8 volt distribution.
- All motherboards second-sourced by Vector Electronics.

These important features make **CompuPro MOTHERBOARDS** the performance leaders for both the S-100 and STD busses. For upgrading older computers or forming the nucleus of a modern computing system, **CompuPro's** highly reliable, low noise, and cost-effective motherboards represent the best possible answer.

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Motherboards

SPECIFICATIONS

IEEE-696/S-100 MOTHERBOARDS

Number of Slots.............................6, 12 and 20 slots available.
Termination...............................Active termination on all signal lines at both ends of the motherboard.
Mounting....................................Compatible with IMSAI type chassis and Vector Electronics' card cages.
Dimensions................................6 slot: 6.5 x 9 inches.
                                                    12 slot: 11 x 9 inches.
                                                    20 slot: 17 x 9 inches.

STD MOTHERBOARDS

Number of Slots...........................8 and 16 slots available.
Mounting....................................Compatible with Vector Electronics' card cages.
Dimensions................................8 slot: 7 x 4.35 inches.
                                                    16 slot: 13 x 4.35 inches.

COMMON FEATURES

Shielding Method.........................Ground shield between every signal trace.
Bypassing....................................Thorough capacitor bypassing on all power traces.
Power Connection.........................All DC power connects through convenient PC mount plugs (mating connectors
                                                    provided).
RESET Connector........................Provided.
Edge Connectors..........................Gold-plated.
Connector Spacing.......................Centers spaced 0.75 inches.
PC Board......................................High quality FR4 epoxy glass, solder masked both sides, screened component
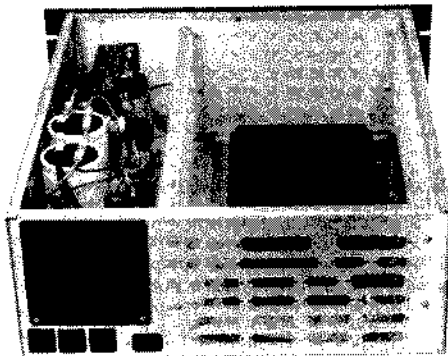   legend, plated through holes.

Computer Enclosure 2

desk top

rack mount

COMPUTER ENCLOSURE 2 provides the ideal foundation for an IEEE 696/S-100 computer system; and, thanks to an integral motherboard and constant-voltage power supply, you can start plugging in S-100 computer boards immediately after unpacking.

Like all other **CompuPro** products, **COMPUTER ENCLOSURE 2** offers the best possible combination of technical innovation and cost-effectiveness. The power supply and motherboard are state-of-the-art units which provide exceptional performance, while numerous convenience features add greatly to the overall usefulness. Here are some of the most significant features:

- Heavy-duty power supply provides fused outputs of +8.0, +16.0, and -16.0 Volts DC.
- Constant-voltage transformer allows cooler system operation, places less stress on board voltage regulators, and contributes to reliable operation in the face of varying line voltages.
- Rugged, all metal construction provides excellent shielding characteristics.
- Line filter minimizes the effect of power line spikes and RFI (and also keeps any computer RFI from getting back into the line), while the constant voltage transformer provides good line isolation.
- Fully terminated 20 slot motherboard, with Faraday shielding, accommodates high speed systems (up to 10 MHz system clock).
- Motherboard includes extensive bypassing on all power lines.
- Enclosure includes low noise fan for cool system operation, air filter, switched convenience outlets on rear, circuit breaker, lighted reset button, punchouts on rear for DB-25, DB-15, and DB-50 connectors.
- Available in either rack mount or desk top version.

Despite the impressive array of features, **COMPUTER ENCLOSURE 2** is still surprisingly cost-effective. When assembling an IEEE 696/S-100 system, it's important to get off to the right start: **COMPUTER ENCLOSURE 2** provides that best possible start.

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SPECIFICATIONS

ENCLOSURE

Dimensions...Approximately 18.5" deep, 7" high, 17" wide (desk top version); rack mount version has 19" wide front panel, with slides for easy pull-out from system rack cabinet.

Ventilation System..................................Low noise fan with air filter provides positive pressurization (air blows into the cabinet instead of sucking air out for superior ventilation).

Reset..Provided by switch that illuminates to indicate "Power-On" condition.

Auxiliary AC Outlets...............................3 switched convenience outlets provided on rear.

Line Transient Suppression...................Provided by line filter and constant voltage transformer.

Other Protection....................................5 Amp circuit breaker included.

Rear Panel Punchouts............................Twelve for DB-25 connectors; three for DB-15 connectors; two for DB-50 connectors; one for Centronics type connector; one for floppy disk connector.

MOTHERBOARD

Number of Slots......................................20 slots.

Termination...Actively terminated at both ends of motherboard.

Shielding Method...................................Ground shield between every signal trace.

Other Features.......................................Thorough bypassing on all power supply lines; convenient power plug for connecting all DC power; RESET connector provided.

POWER SUPPLY

Standard Input Power.............................117 VAC, 60 Hz.

Export Power Supply available.............Input 220, 230, 240 VAC; 50 Hz.

Available Voltages.................................+8.0 Volts DC at 25 Amps continuous; + 16.0 Volts DC at 3 Amps continuous; - 16.0 Volts DC at 3 Amps continuous.

Variation with Line Voltage...................Line and load regulation exceeds IEEE 696/S-100 bus voltage requirements (varies less than 5%, with full load, over 100 VAC to 130 VAC range).

Transformer Type...................................Ferro-resonant, constant-voltage.

Protection..All outputs fused.

Note: **COMPUTER ENCLOSURE 2** comes **Assembled/Tested** with a 1 year limited warranty.

STD CPU Z

PROCESSOR BOARD
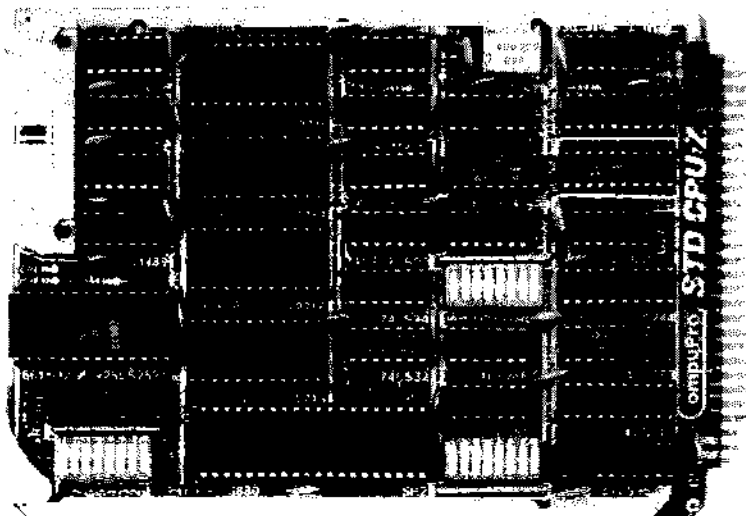
The **STD CPU Z** board is an 8 bit workhorse for the STD Bus that includes all standard Z80A features. . .and a whole lot more:

- Downward compatible with the vast library of 8080 software.
- Designed for clock speeds up to 6 MHz.
- High operating speed greatly increases system throughput.
- Provision for adding up to 8K bytes of on-board memory (2716 EPROMs, or HITACHI 6116 RAM chips; not included with board).
- On-board memory sockets can be disabled under software control to allow overlapping external RAM.
- Memory addressable on any 8K boundary with DIP switch.
- Memory sockets can be individually disabled.
- Power-on clear generates SYSRESET*.
- Selectable automatic wait state insertion for servicing M1* instructions - MRQ* - I/O RQ* - or the on-board memory (individually or severally selectable).
- Jump on SYSRESET* or power-on to any 256 byte boundary.
- On-board UART for serial communication with terminal or printer.
- Baud rate software selectable up to 19.2 KBaud.
- UART addressable as a 4 port block anywhere in the I/O map.
- Includes all functions necessary for a complete stand-alone computing system (CPU, UART, 8K optional memory).
- Printed circuit board second-sourced by Vector Electronics.

Now there's a cost-effective alternative to standard STD CPU boards; thanks to the on-board memory sockets and UART, STD CPU Z is a reasonably powerful stand-alone microcomputer that's ideally suited for such applications as industrial control. Running at 4 or 2 MHz (6 or 3 MHz with the CSC board), and fully compatible with the STD bus. **STD CPU Z** is cost-competitive with other CPU boards that do a whole lot less.

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STD CPU Z

SPECIFICATIONS

Clock Rate....................................2 or 4 MHz, jumper selectable.
Clock Rate (CSC optional)............3 or 6 MHz, jumper selectable.
Data Bus......................................8 bits, bidirectional.
Power-On-Jump............................DIP switch selectable to any 256 byte boundary.
Jump-On-Reset capability............Identical to Power-On-Jump.
UART...2651 type with software selectable Baud rate and other parameters.
UART I/O requirements...............4 ports anywhere in the I/O map, except ports FC - FF (hex), DIP switch selectable.
Memory Chips...............................2716 EPROMS, Hitachi HM6116 2K x 8 RAM, or equivalent.
Memory Sockets...........................One contiguous 8K block, addressable on any 8K boundary via DIP switch.
Memory Disable............................Bit 0 of port FF (hex) used to disable or enable the memory sockets.
I/O Wait State..............................One wait state, DIP switch selectable.
MRQ Wait State..........................One wait state, DIP switch selectable.
M1 Wait State..............................One wait state, DIP switch selectable.
On-Board Memory........................Provision for 8K bytes of RAM/EPROM.
SYSRESET*.................................Generated at power-on.
User Manual.................................Comprehensive, with complete circuit description and theory of operation.
Speed Upgrade.............................Crystal change when faster CPUs are installed.
PC Board.....................................High quality FR4 epoxy glass, solder masked both sides, screened component
legend, plated through holes.
Sockets..Provided for all ICs.
Power Consumption......................+5V at 475 mA typical (750 mA max);
+12V at 20 mA typical (50 mA max);
-12V at 20 mA typical (50 mA max).

16K STD RAM
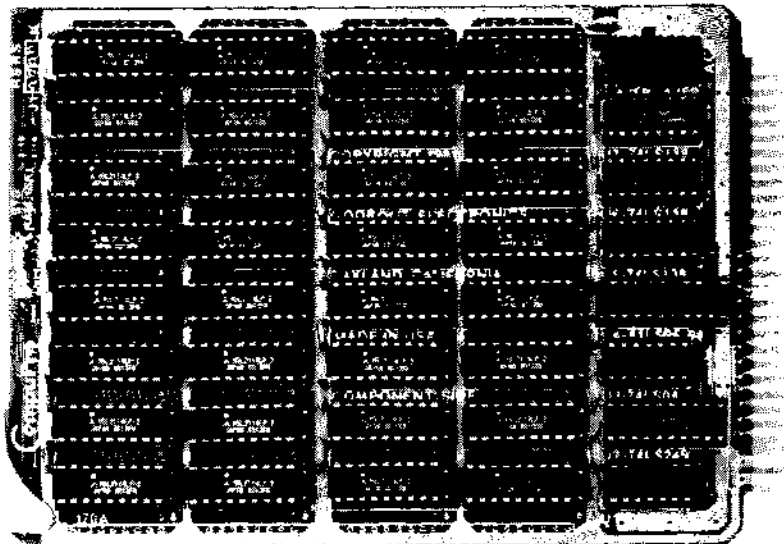
STD RAM - 16K from **CompuPro** is the answer for STD Bus applications requiring both versatile, and highly reliable, static memory storage This 16K x 8 memory board consists of two 8K blocks, addressable on any 8K boundary. The board may be optionally populated with the new XICOR 2214 shadow RAM chips, thus enabling the user to have nonvolatile memory. ("Shadow" RAMs use a fast RAM array that overlays non-volatile storage, thereby allowing for fast access along with easy permanent storage/retrieval by a single pulse.) Any number of 1K blocks may be populated with shadow RAMs, making **STD RAM - 16K** ideally suited to industrial control or other applications where non-volatile storage is crucial. This highly cost-effective memory includes the following important features:

- Fully static design for highest reliability and CPU independence.
- Two independently addressable 8K blocks.
- Both blocks can respond to the memory expansion line
- Fully socketed for easy maintenance.
- Meets all STD Bus timing requirements.
- Fully buffered bus drivers meet STD Bus requirements.
- Accepts shadow RAM chips in 1K increments (simply replace standard 2114 RAM chips provided with board) for up to 16K of non-volatile storage.
- Fast 300 nanosecond access time.
- Low power consumption.
- Fully bypassed for trouble-free operation in high-noise environments.
- Industrial quality PC board and components.
- PC board second-sourced by Vector Electronics.

Whether your STD Bus application is for industrial control or systems development, **CompuPro's STD RAM - 16K** delivers low power consumption, high reliability, fully static design, and the option for non-volatile storage using 2214s.

16K STD RAM

SPECIFICATIONS

Timing.. Conforms to STD Bus timing requirements.

Access Time................................300 nsec (faster versions available - consult Factory)

Board Addressing....................... Addressable as two 8K blocks, each block independently addressable to any 8k boundary.

Extended Addressing.................. MEMEXP line can be used with both 8K blocks.

Address Selection........................By push-on shunt blocks.

RAM Chips................................ 2114 type for standard RAM operation, XICOR 2214 for non-volatile operation.

Non-Volatile Capacity..................Up to 16K, expandable in 1K increments.

Sockets.. Provided for all ICs.

PC Board.....................................High quality FR4 epoxy glass, solder masked both sides, screened component legend, plated through holes, gold plated edge connector fingers.

Power Consumption......................1A typical, 1.5A maximum.

CompuPro®

CUSTOMER SERVICE INFORMATION

CompuPro products are available Assembled/Tested and with a 1 year limited warranty, or qualified under the Certified System Component (CSC) high-reliability program (200 hour burn-in, 2-year limited warranty, and direct exchange program for the boards in the event of malfunction).

Our paramount concern is that you be satisfied with any CompuPro product. If any product fails to operate properly, it may be returned to us for service; see warranty information below. If you need further information feel free to write us at:

Box 2355, Oakland Airport, CA 94614

LIMITED WARRANTY INFORMATION

CompuPro will repair or replace, at our option, any parts found to be defective in either materials or workmanship for a period of 1 year from date of invoice. Defective parts MUST be returned for replacement.

If a defective part causes a CompuPro product to operate improperly during the 1 year warranty period, we will service it free (original owner only) if delivered and shipped at owner's expense to and from our Service Center in Building 725, Oakland Airport, CA 94614. If improper operation is due to error or errors on the part of the purchaser, there may be a repair charge. Purchaser will be notified if this charge exceeds $50.00. If the warranty period has expired, service for CompuPro products is available at a rate of $50.00 per hour labor plus parts.

We are not responsible for damage caused by use of solder intended for purposes other than electronic equipment construction, failure to follow printed instructions, misuse or abuse, unauthorized modifications, use of our products in applications other than those intended by CompuPro, theft, fire, or accidents.

Return to purchaser of a fully functioning unit meeting all advertised specifications in effect as of date of purchase is considered to be complete fulfillment of all warranty obligations assumed by CompuPro, a Godbout Company. This warranty covers only products marketed by CompuPro, a Godbout Company and does not cover other equipment used in conjunction with said products. We are not responsible for incidental or consequential damages.

Prices and specifications are subject to change without notice.

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Hardware Price List

COMPUPRO PRODUCTS	ASM	CSC
SYSTEMS		
SYSTEM 816A	$ 5,495.00	$ 6,095.00
SYSTEM 816B	6,995.00	7,795.00
SYSTEM 816C	8,995.00	9,995.00
SYSTEM 816D	13,995.00	15,595.00
SYSTEM 816-O8	8,995.00	9,995.00
SYSTEM 816-O16	13,995.00	15,595.00
SYSTEM 816-68K	8,995.00	9,995.00
FLOPPY DISK SUB SYSTEM	3,295.00	N/A
S-100 BUSS BOARDS		
CPU 8085/88	$ 495.00	$ 595.00
CPU 8086/87	750.00	850.00
-8087 CHIP (factory installed)	300.00	N/A
CPU 286	1595.00	1750.00
CPU 16032	***	***
CPU 68K	895.00	850.00
CPU-Z	325.00	425.00
RAM 16	650.00	750.00
RAM 17-48	549.00	649.00
RAM 17-64	599.00	699.00
RAM 21	1,350.00	1,450.00
M-DRIVE/H	1,895.00	2,095.00
DISK 1	495.00	595.00
DISK 2 & SELECTOR	795.00	895.00
CHANNEL		
DISK 3	***	***
INTERFACER 1	295.00	370.00
INTERFACER 2	325.00	399.00
INTERFACER 3-5	599.00	699.00
INTERFACER 3-8	699.00	849.00
INTERFACER 4	450.00	495.00
SYSTEM SUPPORT 1	450.00	495.00
MPX 1	649.00	749.00
6 SLOT M/BOARD	140.00	190.00
12 SLOT M/BOARD	175.00	240.00
20 SLOT M/BOARD	265.00	340.00
ENCLOSURE 2 (DESK)	825.00	N/A
ENCLOSURE 2 (RACK)	895.00	N/A
STD BUS BOARDS		
STD CPU-Z	$ 335.00	$ 435.00
STD RAM-16	325.00	425.00
STD MB-8 M/BOARD	135.00	N/A
STD MB-16 M/BOARD	175.00	N/A

***CALL (415) 562-0638 FOR PRICES ON THESE NEW PRODUCTS. all prices are subject to change without notice. Please read data sheet descriptions, specific product specifications and contact your local dealer or the **CompuPro** factory for the latest pricing and availability.   Product scheduled for 2nd quarter 1983 introduction: RAM 22 256K × 8 or 128K × 16—works automatically with 8 or 16 bit systems.
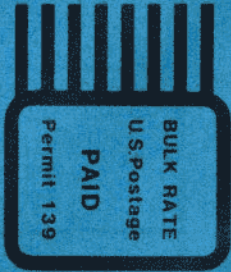
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