

Computer Consoles Power 5/32

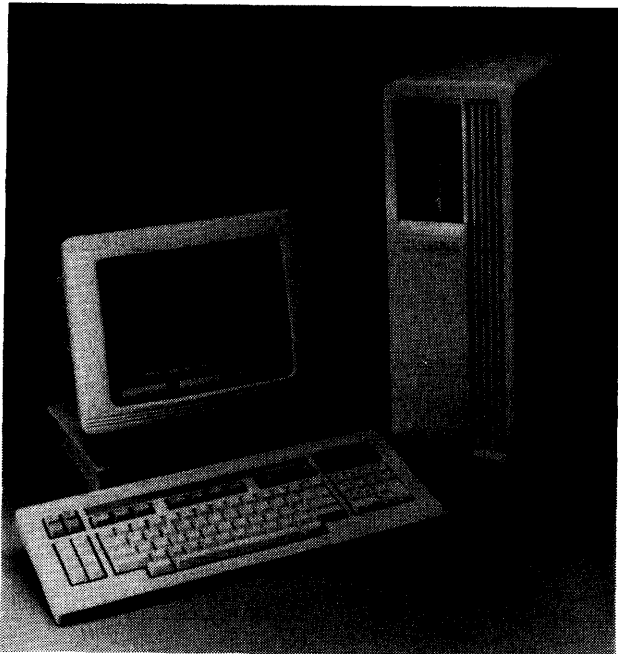
MANAGEMENT SUMMARY

The Computer Consoles Incorporated supermicro product line comprises one model, the Power 5/32. CCI is concentrating its efforts in the supermicro marketplace with this Unix-based computer system, targeted for high performance computing, office, and communications markets.

CCI is concentrating the Power 5/32 on high reliability and transaction processing markets and to specific target areas that request custom solutions. CCI intends to penetrate the federal and state government market, along with the legal and financial services markets. The company designed the 5/32 to serve a range of business needs, from a basic standalone system with up to sixteen users to a networked system which, according to CCI, can support thousands of workstations and peripherals.

According to CCI, the 5/32 delivers the processing power and speed of a larger Unix computer in a desktop package. The 5/32 uses a Motorola MC68010 microprocessor; the MC68010 is combined with CCI's proprietary Memory Management Unit (MMU), resulting in a CPU that works together with either two or four megabytes of main memory.

CPU speed is 12.5 MHz and is coupled with zero wait state implementation. The CPU supports virtual memory and also supports instruction continuation following a page fault. Also included with the main processing unit is a ➤



Computer Consoles Incorporated's Power 5/32 runs under the Unix operating system and supports from 2MB to 4MB of main memory and from 85MB to 170MB of disk storage. The Power 5/32 uses the Motorola MC68010 microprocessor and can support up to 16 workstation users.

Computer Consoles' Power 5/32 is intended for a range of technical and commercial applications in office and departmental computing environments, such as state government and the financial services industry. The 5/32's operating system is Unix 4.2 BSD and runs CCI's Officepower office automation software.

MODELS: Power 5/32.
MEMORY: 2MB to 4MB.
DISK CAPACITY: 85MB to 170MB.
WORKSTATIONS: Up to 16.
PRICE: \$39,120 (eight user system).

CHARACTERISTICS

VENDOR: Computer Consoles, Inc., 97 Humboldt Street, Rochester, New York 14609. Telephone (716) 482-5000.

DATA FORMAT

BASIC UNIT: 16-bit word.

INTERNAL CODE: ASCII.

MAIN STORAGE

The 5/32 computer uses 32-bit internal registers with 16-bit data transfer operations. The computer's parity-checked main memory consists of two or four megabytes of 256K dynamic RAM (DRAM) located on a nine-inch square mezzanine card alongside the single main processor board.

PROCESSING COMPONENTS

The Power 5/32 uses the Motorola MC68010 microprocessor to control its central processing unit (CPU). The MC68010 is coupled with CCI's proprietary Memory Management Unit (MMU) to create a CPU that works in conjunction with two megabytes or four megabytes of main memory. A system monitor PROM and the realtime clock are also part of the main processing unit.

The memory management design allows the CPU to operate at 12.5 MHz with zero wait states out of the entire main memory.

The 5/32 system architecture uses intelligent subsystems containing MC68000 microprocessors and local memory. The two subsystems are the communications subsystem and the storage subsystem. (An expansion port for one of the three available options is provided.)

The major components of the communications subsystem are an MC68000 microprocessor operating at 8 MHz with zero wait states out of 128KB local dynamic RAM memory (parity-checked), four asynchronous ports, and two high-level data link control (HDLC) ports with DMA control.

The communications subsystem is governed by the MC68000 microprocessor, which is responsible for all serial communications duties needed for PTNet (ports suited for CCI Powerterminals) and asynchronous I/O devices. Data transfer to and from the four asynchronous ports is done ➤

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CHART A. SYSTEM COMPARISON

MODEL	Power 5/32
SYSTEM CHARACTERISTICS	
Date of introduction	September 1985
Date of first delivery	October 1985
Microprocessor type	MC68010
Microprocessor cycle time	12.5MHz
Operating system	Unix 4.2 BSD
Upgradable from	—
Upgradable to	—
Number of users	16-24
Number of serial/parallel I/O ports	14
Number of expansion slots	1
MEMORY	
Minimum capacity (bytes)	2M
Maximum capacity (bytes)	4M
DISK STORAGE	
Minimum capacity (bytes)	85M
Maximum capacity (bytes)	170M
NUMBER OF WORKSTATIONS	
COMMUNICATIONS PROTOCOLS	
	TCP/IP; FTP; UUCP; SNA; bisyn; X.25; Omnet; Ethernet

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

➤ realtime clock and a system monitor PROM. The clock is equipped with battery backup. The system monitor PROM supplies power-up bootstrap program, debugging firmware, and some self-diagnostic tests.

The microprocessor in the 5/32 uses instruction continuation rather than instruction restart to handle page faults. With instruction continuation, the microprocessor stores its internal state only when a page fault occurs, responds to the page fault, and then continues executing the instruction. According to CCI, this method of handling page faults adds to the processing speed of the 5/32.

Additional memory is available in a 2MB increment. One board can be added for a main memory capacity of 4MB. The 5/32 supports one 85MB, 5¼-inch disk drive and has expansion capability to support a second drive; maximum disk capacity is 170MB. An optional 45MB streaming cartridge tape drive can also be configured on the 5/32.

The Powerterminal II workstation is based on the Motorola 68008 processor and is local intelligence-based. The PowerTerminal II workstation provides 29 lines by 80 columns and features 98 keys, with seven cursor control keys. The display is reverse video and includes underlining and blink attributes.

The operating system of the 5/32 is based on Unix 4.2 BSD. Unix 4.2 BSD is designed with an hierarchical file structure and includes support tools and utilities to assist programmers and software developers.

The 5/32 supports C and Fortran programming languages and are included with the Unix 4.2 BSD operating system. CCI also supports Cobol, Basic, and Pascal programming languages.

➤ solely by the microprocessor. Data movement for both HDLC ports is augmented by a DMA controller. The MC68000 microprocessor is coupled with 128KB of parity-checked local memory (DRAM) for code storage and data buffering. This DRAM is accessible only to the 68000 and the DMA controllers.

The major components of the storage subsystem include an MC68000 microprocessor running at 8 MHz and zero wait states out of 128KB dynamic RAM (parity-checked). A disk controller chip with associated DMA logic controls the disk interface, while the tape interface is controlled by a parallel interface/timer (PI/T) coupled with a DMA controller. The disk and tape controllers oversee the operation of one or two 85MB disk drives and a 45MB cartridge streamer tape drive.

The MC68000 microprocessor in the storage subsystem is responsible for directing the flow of disk and tape data between the main memory and its own local memory. All data movement to and from the 5/32 main memory is done through the subsystem microprocessor; it also processes all disk and tape I/O requests. Thus, as in the other subsystems, the MC68000 microprocessor within the storage subsystem acts as an intelligent DMA controller between the main memory and the subsystem buffer. The subsystem's microprocessor also executes a large part of the disk driver function, thereby offloading that overhead from the system's CPU.

The storage subsystem has 128KB of dynamic RAM (DRAM) available to it for all program storage and data buffering. This DRAM is accessible only by the subsystem's microprocessor and the local DMA controller. The DMA controller has access to all of the local DRAM.

INPUT/OUTPUT CONTROL

The storage subsystem microprocessor contains a state machine (programmable logic array) that provides direct memory access for the disk and tape, allowing data transfers to and from the disk and tape drive without processor intervention.

The state machine also provides bus arbitration for the I/O main bus to the processor, disk, and tape sections. The arbiter/DMA controller is designed to guarantee no loss of data to either the disk or tape during I/O operations. Disk and tape I/O operations can happen simultaneously.

Each subsystem contains its own bus structure and functions independently. An expansion port is also included to support one of the three optional Power 5/32 subsystems. The subsystems are tied to the main processing unit by a bus which handles 24-bit addresses and 16-bit data transfers.

The storage subsystem includes a QIC-02 interface to a streaming tape drive. Control of the QIC-02 interface is divided into two sections: command transfer and data block transfer. A parallel interface/timer (PI/T) transfers commands to the tape drive and reads status information from it. A programmable logic array state machine controls tape data block reads and writes. Up to 256 blocks of tape data (512 bytes) can be transferred at one time. The state machine automatically requests data transfers to and from local memory. Tape speed is 90 inches per second and 8,000 bits per inch. This equals a data transfer rate of approximately 4.5MB per minute.

CONFIGURATION RULES

The features of the basic Power 5/32 system include an MC68010 CPU; 2MB of main memory, expandable to 4MB; one 85MB, 5¼-inch disk drive, with expansion capability

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CHART B. DISK/DISKETTE DEVICES

MODEL	ST506	ST506-1
Type	Winchester	Winchester
Size (inches)	5¼	5¼
Number of surfaces	—	—
Formatted capacity per drive (bytes)	85M	170M
Interface/controller	DMA	DMA
Number of drives per interface/controller	1	2
Average access time (nanoseconds)	30 ns	30 ns
Data transfer rate	5M/second	5M/second
Sectors/tracks per surface	—	—
Bytes per sector/track	—	—
Comments	—	—

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➤ For communications, the Power 5/32 can connect to both Omninet and Ethernet networking systems. The Omninet option allows connection of the 5/32 to a local area network (LAN). Omninet can support up to 64 stations on one system. Another Omninet option uses a 5/32 as a network server, tape server, disk server, and/or printer server in an Omninet network. Finally, the Ethernet option may be used to create a LAN and includes two RS-232 synchronous ports for X.25 protocol and for communicating with an IBM mainframe using SNA or bisynchronous communications.

Application packages for the 5/32 include OfficePower, which is an integrated, multifunction package designed for office personnel. In addition to OfficePower, numerous other packages designed for universities and hospitals are offered by CCI. The Unify relational data base management system is offered with the system.

COMPETITIVE POSITION

With CCI offering both a supermicro system, the Power 5/32, and a supermini system, the 6/32, the company is positioning itself to compete against other vendors who offer supermicrocomputer lines that are compatible with their larger minicomputer product offerings. For example, CCI competes with Data General, who offers both a supermicro and a larger minicomputer system that are both compatible. CCI also competes with Wang VS Systems in the office automation market.

The Power 5/32 directly competes with Data General's Desktop Generation Series. The Desktop Generation Model 45 and the Power 5/32 are equal in their memory capacities, each supporting up to 4MB. In disk capacities the two systems are also similar, with the 5/32 supporting 170MB of disk compared with the Model 45's 142MB disk capacity. Both systems are geared for general data processing and office automation environments. However, the Power 5/32 has double the amount of workstations; 16 for the 5/32 and eight for the Desktop Model 45.

The Power 5/32 also competes closely with AT&T's low-end 3B system, the 3B2/300. While the 3B2/300 supports less memory and disk, the 3B2/300 supports 2MB of memory and 32MB of disk, the AT&T system can support up to 18 workstations, two more than the 5/32. The two ➤

➤ ability to support a second disk drive; and a streaming tape cartridge for archiving data and loading software. Also supported are four RS-232 ports with speeds up to 9600 baud for connecting terminals, printers, modems, or creating a network to an additional 5/32 computer; and two PTNet ports for connecting up to 16 CCI PowerTerminals. Software features include the Unix 4.2 BSD operating system and the Officepower integrated office system package.

Three expansion system options provide networking and communications capabilities, including additional RS-232 capability (the 8/2 option—see below); Omninet networking capability; and Ethernet networking capability. Only one of these three options may be included on a single 5/32 processor. However, optional capabilities are in addition to those features included in the basic 5/32 computer. Additionally, each Power 5/32 option also includes two RS-232 synchronous ports. These ports may be used to tie the 5/32 computer into a public packet-switched data network using X.25 protocol, and to enable communications with an IBM mainframe using a bisynchronous or SNA protocol.

The 8/2 option includes eight additional RS-232 asynchronous ports and two RS-232 synchronous ports. When connected to a single 5/32, users can share the same resources on the system, including Officepower software. As previously stated, along with additional asynchronous capability, the RS-232 option provides two RS-232 synchronous ports for the X.25 protocol and SNA or bisynchronous communications.

INPUT/OUTPUT UNITS

See Chart B for disk and diskette devices.

See Chart C for workstations.

See Chart D for printers.

COMMUNICATIONS

The Power 5/32 Omninet option allows connection of the 5/32 computer to an Omninet Local Area Network (LAN). Omninet transfers data at the rate of 1MB per second and can support up to 64 stations on one system. Two RS-232 synchronous ports can link the 5/32 network to a public data network and to an IBM mainframe.

The Power 5/32 Ethernet capability makes it possible to link a 5/32 into an Ethernet network. The 5/32 Ethernet option is compatible with systems using the Unix 4.2 BSD operating system or having compatible TCP/IP software. The Ethernet option also includes two RS-232 ports for using X.25 and for communicating with an IBM mainframe using SNA or bisynchronous communications. ➤

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CHART C. WORKSTATIONS

MODEL	Powerterminal II
DISPLAY PARAMETERS	
Max. chars./screen	2,320
Buffer capacity	—
Screen size (lines x chars.)	29 x 40
Tilt/swivel screen	Yes
Symbol formation	—
Character phosphor	Green
Total colors/no. simult. displayed	—
KEYBOARD PARAMETERS	
Style	Typewriter
Character/code set	ASCII
Detachable	Yes
Program function keys	98
TERMINAL INTERFACE	RS-232/PTNet
COMMENTS	

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➤ systems are based on different chips. The 3B2/300 is based on a WE 32100 processor chip while the 5/32 is based on a MC68010 microprocessor. Both systems are marketed for office use.

Finally, the Power 5/32 also sees competition from the IBM System/36. Although the 5/32 has more memory capacity than the System/36, 4MB for the 5/32 versus 2MB for the IBM model, the Model 5360 dominates in disk capacity, supporting up to 1.4GB of disk, compared with 170MB for the 5/32. The Model 5360 also outdistances the 5/32 in terms of workstations, allowing connection of up to 72 workstations. The 5/32 can connect up to 16 workstations.

ADVANTAGES AND RESTRICTIONS

The Power 5/32 affords advantages to users in search of a general-purpose supermicrocomputer using Unix System 4.2 BSD as its operating system. (The company intends to include Unix System V, release V.2 in future upgrades.) Although CCI is continuing to sell through OEM's, additionally the company is offering the Power 5/32 system through its own direct sales force. Currently, CCI has a large installed base for its supermicrocomputer system, which should continue to grow as the company goes after specific target areas.

In addition to selling the Power 5/32 line, CCI also offers the 6/32, a superminicomputer. One plus for customers is that Power 5/32 users can eventually change over to the 6/32 system without having to alter software. In this respect, CCI has joined the ranks of other vendors with the trend of offering both a supermicro and mini system, in an attempt to keep their installed user base contented. Supermicrocomputer customers are provided with an upward growth path, while protecting their initial hardware and software investments.

Another advantage of the Power 5/32 is its software offerings. CCI packages the system with the Officepower sys-

➤ Two RS-422-compatible HDLC ports can each support a PTNet arrangement of PowerTerminals. These ports are controlled by a 6 MHz Serial Communications Controller (SCC).

SOFTWARE

OPERATING SYSTEM: The Power 5/32 supermicrocomputer uses the Unix 4.2 BSD operating system. Unix 4.2 BSD provides a hierarchical file structure and allows many users to work on different tasks at the same time. The Unix 4.2 BSD operating system also includes support tools and utilities.

Along with its standard Unix capabilities, Unix 4.2 BSD includes a range of networking features which allow communications with other computer systems. Some of the networking features within the operating system include *Transmission Control Protocol/Internet Protocol (TCP/IP)* facilities, including telnet and *File Transfer Protocol (FTP)*, for transferring data within a multivendor network using various protocols. Other networking features include *Unix-to-Unix Copy Utility (UUCP)* for setting up networks to perform a variety of chores such as remote spooling, central filing and backup, remote data collections, and electronic mail.

DATA BASE MANAGEMENT: CCI offers the *Unify data base management system*, a Unix-based relational data base system. Unify provides non-procedural development tools and can make ad hoc queries using Unify SQL (Structured Query Language), a relational query language. Unify uses the RPT report writer to integrate records available to Unify and updates existing data bases by using data base management facilities. Unify also provides the capability to load and unload data bases from Unix files. This function makes possible the conversion of existing files to a 5/32 processor and also allows the transfer of files from a 5/32 to a mainframe computer.

LANGUAGES: In addition to supporting C and Fortran which are included with the Unix 4.2 BSD operating system, CCI supports the Cobol, Basic, and Pascal languages on its Power-series products.

COMMUNICATIONS: CCI offers various ways to tie the Power 5/32 system into communication networks with other computers. Power 5/32 communications software options offered include the following packages.

SNA communications support for linking the 5/32 computer to an IBM network using System Network Architecture (SNA) is available. *Bisynchronous communications* support for linking the Power 5/32 computer to an IBM network using BSC protocol is also supported. Other packages include an *X.25 protocol* support for linking the 5/32 to a public data network and support for an *Omninet Local Area Network* to link the 5/32 to other Omnet systems. And, support for an *Ethernet Local Area Network* to link the 5/32 computer to a high-speed LAN using coaxial cable is supported.

APPLICATIONS: CCI supports a number of application software packages on its Power-series computer systems. A sampling of the packages include: *Officepower* and *BRS/Search*.

Officepower contains a core group of features specially designed to automate those office procedures common to most businesses. These functions include a word processor for producing memos, reports, manuals, and other documents. It includes automatic page and section numbering, spelling checking, and formatting and text enhancement capabilities. Also included in the package are a variety of

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CHART D. PRINTERS

MODEL	4922	4919
Type	Letter-quality	Letter-quality
Speed	55 cps	19 cps
Bidirectional printing	Yes	Yes
Paper size	—	—
Character formation	—	—
Horizontal character spacing	Variable	Variable
Vertical line spacing	Variable	Variable
Character set	128	128
Controller/Interface	RS-232	RS-232
No. of printers per controller/interface	—	—
Printer dimensions, in. (h x w x d)	6.8 x 22.4 x 16.1	14.7 x 49 x 33
Graphics capability	No	No
Comments	—	—

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

tem, which is a sampling of various office application functions. In addition to this package, CCI has numerous applications packages for specific market niches, i.e., universities. Although initially the amount of Unix application software was not plentiful, CCI offers hundreds of Unix packages that can run on the Power 5/32.

USER REACTION

Because Datapro's 1985 Computer Users Survey did not include supermicros, we received no responses for the 5/32 system. CCI did not supply Datapro with a list of users we could contact for assessments of systems. □

office support tools called record applications for sending electronic mail, appointment scheduling, tracking telephone messages, and maintaining name and address lists. The User-Defined Application Package (UDAP) creates data bases for purchase orders and forms. An optional spreadsheet program for tasks ranging from budgets to business forecasts is available.

The Officepower system provides the capability for sending messages, documents, and records between Power-series computer systems. In conjunction with TCP/IP, which is resident in the 4.2 BSD operating system, the Officepower system's *Officepower File Transfer Protocol (OFTP)* supports electronic mail, distributed calendar scheduling, and shared print spooling.

BRS/Search is an information management tool that enables users to store records, documents, and other information in specially created data bases, without additional indexing or referencing. *BRS/Search* and the 5/32 can act as a central clearinghouse of information for a range of existing or acquired data bases. *BRS/Search* is targeted for publication companies that require full textual, retrieval, and customized manipulation and output of documents such as telemarketing service organizations, hospitals, law firms, and universities and organizations that need random search capabilities for industry-available data bases.

OPERATING ENVIRONMENT

The Power 5/32 system unit measures 22 inches (55.9 cm) high by 6.5 inches (16.5 cm) wide by 18 inches (45.7 cm) deep. The unit weighs between 45 and 50 pounds depending on the configuration.

The ideal operation environment for the Power 5/32 consists of an ambient temperature of 40 to 104 degrees Fahrenheit (5 to 40 degrees Celsius) during operation. The relative humidity is 20 to 80 percent during operation.

The electrical requirements for the 5/32 are 120 or 240 VAC, 50 Hz or 60 Hz.

SUPPORT SERVICES

DOCUMENTATION: CCI's documentation library includes guides, manuals on system administration, and detailed information on hardware and software. For example, manuals supplied include, *Power 5 Family of Computers*, *Unix Operating System*, and *Programming Languages*.

TRAINING/EDUCATION: CCI offers self-paced Officepower and administration training packages as well as classroom instruction at three domestic training locations or customer sites.

MAINTENANCE: Basic monthly maintenance plans are available for the 5/32 system. Through its Customer Service Organization, CCI has more than 80 sales and service locations. Additionally, CCI has established the National Support Center. CCI representatives can dispatch local CCI service engineers to provide on-site help. Customers may also obtain information and service by calling a toll-free hot line.

PRICING

POLICY: Computer Consoles Incorporated offers the Power 5/32 for purchase and lease. Through Computer Consoles Leasing Corporation (CCLC), customers can make leasing arrangements.

EQUIPMENT AND SOFTWARE PRICES

		Purchase Price (\$)	Basic Maint. Monthly (\$)	Class A	Class B	Installation Charge (\$)
				Soft-ware Charge (\$)	Soft-ware Charge (\$)	
5/32	Power 5/32 eight user system includes 4MB of memory, 170MB disk, cartridge tape, Unix operating system, 8 Powerterminal II, 1-8 user Officepower license, Spelling checker, and two 25-foot cables.	39,120	444	200	150	500

For additional pricing, contact CCI for specific packages. ■