

The Plexus® P/95 is a powerful, 32-bit computer specifically designed for the popular UNIX® operating system. Over 10 Gbytes of on-line storage capacity, support for 128 users, and such special features as mirrored disks and optical storage make the P/95 a truly unique system suitable for a wide variety of user applications.

The high performance of the P/95 is based upon an innovative multiprocessor design coupled with an MC68020 job processor running at 25 MHz and a sophisticated cache design. A large main memory and a choice of high-performance peripherals complete the performance emphasis. This multiprocessor architecture is tightly linked with a tuned implementation of the Unix operating system for maximum multiuser performance.

OEM integration flexibility is assured by the use of industry-standard disk, tape, terminal and printer interfaces making it possible to attach a wide variety of peripheral devices to the P/95. A 17-slot VMEbus extends this flexibility to the board level to meet sophisticated OEM requirements.

The P/95 runs Sys5, the Plexus implementation of the Unix operating system, along with industry-standard programming languages, making it compatible with a wide variety of existing applications. In addition, the P/95 is object-code compatible with the full-line of Plexus 68020-based systems, making it easy to transport applications from one Plexus system to another.



FEATURES

Performance

- Multiprocessor architecture
- 25 MHz MC68020 job processor
- Sophisticated cache design
- Optional MC68881 floating point co-processor
- MC68020-based communications processors
- Multiple Advanced Mass Storage Processors for disk I/O
- Optional 6250 bpi 9-track tape backup

Reliability

- ECC main memory
- 30,000 hour MTBF disk drives
- Mirrored disk utility
- Proven Unix operating system
- Built-in diagnostic modem
- Modular construction for easy service

Expandability and Capacity

- Up to 4 Communications Processors each providing up to 32 serial ports and 4 parallel ports
- Up to 48 Mbytes of main memory
- 142 Mbytes to 6.7 Gbytes of on-line magnetic disk storage
- Over 8 Gbytes of "write-once" optical storage
- Multiple, high-speed tape drives for data backup
- Up to 4 Expansion Cabinets for housing additional tape and disk storage devices

Standard Hardware & Software

- Industry-standard peripheral interfaces
- VME I/O bus
- Unix Sys5 operating system
- Popular database management software
- Wide variety of applications software packages

MULTIPROCESSOR DESIGN

The performance of the P/95 is achieved by a special multiprocessor architecture optimized for the Unix operating system. The architecture links a 32-bit job processor with multiple I/O processors, each a powerful microcomputer in its own right. During operation the job processor performs data processing functions while multiple high speed Advanced Mass Storage Processors handle disk I/O, and multiple Communications Processors handle terminal I/O and data communications.

MC68020 Job Processor

The P/95's job processor is based on the powerful MC68020 microprocessor running at 25 MHz. The P/95 architecture augments the microprocessor with a two level cache memory, a 128-bit memory path, and a high-speed memory map. These performance assists allow the MC68020 to execute at a very high clock rate without wait states.

Cache Memory

A two-level cache memory accelerates performance of the P/95's job processor. The two caches hold the most recently accessed code and data for a program. The CPU first checks the internal 256 byte cache. If the desired information is not found an external, four set associative, 16 Kbyte cache is then checked. With most applications the information will be found in cache memory 95% of the time, in which case no processor wait states are required. The result is dramatically improved processor operation.

Data moves between the processor and cache over a 32-bit dedicated memory bus. Data is transferred between the cache and main memory over a logical 128-bit bus. The four-to-one ratio between the size of these two buses gives the P/95 another performance advantage; each time a cache miss occurs and main memory is accessed for information the 128-bit bus returns four times the information requested. This additional information is then ready and waiting in cache memory for the next processor request and processing can proceed without wait states.

High-Speed Memory Map

The P/95 memory management is accomplished through a high-speed hardware memory map. The map translates virtual addresses to physical addresses and provides hardware memory protection.

Memory management is on a page basis, each user program has access to 4096 pages of 4 Kbytes each. Read/Write/Execute protection is provided on a page-by-page basis.

Floating Point Co-Processor

The power of the MC68020 job processor can be further enhanced with an optional MC68881 floating point co-processor. The high-level instruction set of the MC68881 includes 35 arithmetic operations that execute concurrently with the operation of the main job processor to perform larger-number calculations in a significantly reduced time.

Communications Processor

The VMEbus Communications Processor (VCP), containing an MC68020 processor, 29C101 bit slice DMA processor and 1 Mbyte of memory, is dedicated to managing asynchronous and synchronous communication protocols. In conjunction with various Link Cards and the main job processor, the VCP is capable of managing terminal I/O, asynchronous modems, serial and parallel printer output as well as specific synchronous protocols.

Various Link Cards are available which define and support specific physical interfaces between the VCP and a range of modems and terminals. All serial ports are RS232 compatible. Individual Link Cards define the number of active signals being generated to and from the VCP.

Each VCP is capable of supporting up to 32 serial ports and 4 parallel ports. Each port can operate—either asynchronously or synchronously—at a continuous transmission rate of 9600 bits per second with burst rates up to 19.2 Kbps.

For further information please refer to the VMEbus Communications Processor data sheet.

Advanced Mass Storage Processor

Disk I/O in the P/95 is handled by up to five Advanced Mass Storage Processors (AMSP). The AMSP enables the P/95 to utilize high capacity disk drives employing the enhanced SMD (ESMD) interface. The AMSP utilizes an advanced microprocessor-based (MC68000) design to achieve high throughput and implement advanced performance features such as overlapped seek operations, overlapped data transfers, and 32-bit ECC error control to ensure data integrity. Each AMSP can support a maximum of 4 disk drives. Multiple AMSPs can run in parallel when very fast access or support for very large amounts of data storage is required.

PERFORMANCE PERIPHERALS

Tape Backup Options

The P/95 offers both 1/4-inch cartridge and 1/2-inch 9-Track tape drives. The cartridge tape drive features streaming operation for fast disk backup and provides media compatibility with smaller Plexus systems. Both 1600/3200 bpi and 1600/3200/6250 bpi IBM/ANSI compatible 9-Track 1/2-inch drives are offered for rapid backup of large amounts of data. The latter of these drives is capable of storing 180 Mbytes of data in less than 20 minutes on a standard 2400 foot tape reel.

Fast, High-Capacity Disks

The disk drives offered with the P/95 have been selected with an emphasis on capacity and performance. Disks are offered with capacities from 142 to 443 Mbytes. Average access times on these drives are as low as 25 msec with a mean time between failure rating as high as 30,000 hours.

Optical Disk

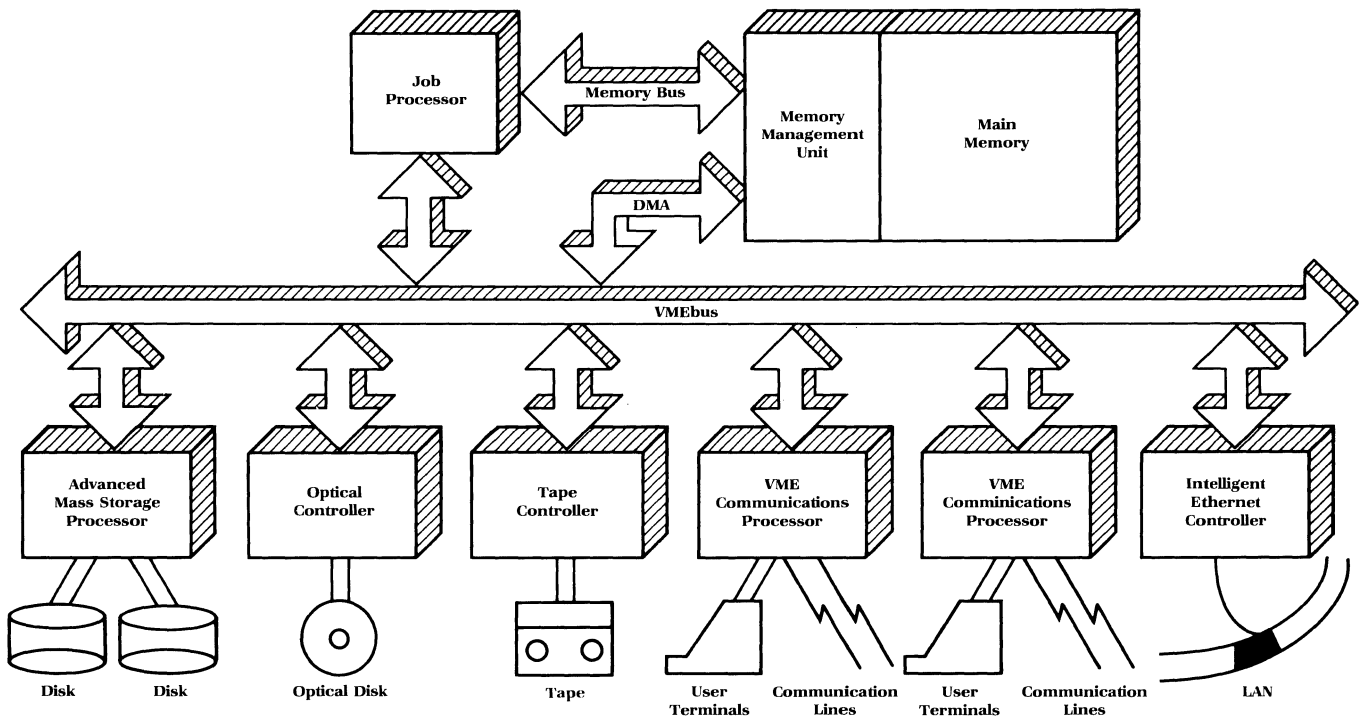
For low-cost storage of large amounts of data, the P/95 offers a WORM (write-once, read-many) optical disk drive. One 12-inch optical disk can store as much as 1 Gbyte of data per side. The 10-year life of optical media makes it excellent for archiving valuable information. Optical drives are housed in the P/95 expansion cabinet with up to 8 supported in a single P/95 system.

RELIABILITY

ECC Memory and Disk

The P/95 features automatic memory error detection and correction through a hardware error correction scheme. Each time main memory is accessed, dedicated hardware in each memory module performs error correction, without additional system overhead.

P/95 MULTIPROCESSOR ARCHITECTURE



Error detection/correction is performed via 7-bit error code appended to each 32-bit word stored in memory.

Disk errors are handled by the built-in error correction facilities of the AMSP controller. During a disk read operation, the disk controller can detect and automatically correct an erroneous burst up to 11 bits in length. Error detection and correction is performed via a 32-bit error code appended to each sector ID or data field when the field is written to the disk.

Mirrored Disk Utility

The Plexus mirrored disk utility, *mirutil*, allows a system administrator to set up two disks as mirror images of each other; all information is then simultaneously written to both disks. If one disk fails, the second disk automatically continues to service user requests. This feature is particularly beneficial in environments where system availability and prevention of data loss are important.

Self Test, Easy Repair

The P/95 design emphasizes ease of problem identification and service. Every time a P/95 is turned on, each processor automatically performs an extensive self-test. A built-in auto-dial/auto-answer

modem is a standard P/95 feature facilitating remote isolation of hardware and software problems (U.S. only).

All P/95 modules are easy to access and replace. Using spare modules, mean time to repair is under 30 minutes and requires no special tools.

EXPANDABILITY AND CAPACITY

The P/95 has been designed with large capacity and ease of expansion in mind.

The P/95 comes with one VCP supporting up to 32 users. Up to three additional VCPs, each supporting 8 to 32 users in increments of 8, can be added. Maximum capacity of a P/95 system is 128 users.

The P/95 can be configured with 4 to 48 Mbytes of main memory on three boards. Memory is available in 4, 8, or 16 Mbyte modules based on 256K RAM chips.

Disk storage capacity of the P/95 is more than 10 Gbytes. Disks are housed in the P/95 main cabinet and in Expansion Cabinets. A total of 4 Expansion Cabinets can be configured with each system. The Expansion Cabinets are the same height and style as the main cabinet presenting an attractive appearance.

SPECIFICATIONS

Job Processor

Processor	MC68020
Speed	25 MHz
Cache size	16 Kbytes
Cache design	4-set associative, write-back
Floating point	Optional MC68881 co-processor

Memory

Maximum capacity	48 Mbytes
Increments	4, 8, 16 Mbytes
Access	128-bit bus
Error handling	Single-bit detection/ correction Double-bit detection

Disk Subsystem

Capacity (Mbytes)	142	286	443
Avg. seek time (msec)	20	20	15
Avg. latency (msec)	8.3	8.3	10
Avg. access time (msec)	28.3	28.3	25
Transfer rate (Mbytes/sec)	1.2	2.5	2.4
Platter size (inches)	8	8	9
Number of platters	5	6	9
Number of heads	8	10	20
Controller interface	SMD	ESMD	ESMD
MTBF (hours)	30,000	30,000	20,000
Weight (pounds)	33	31	81

Optical Disk

Capacity	1 Gbyte/side
Transfer rate	3.8 Mbytes/sec
Avg. latency	27 msec
Avg. access time	150 msec
Interface	SCSI
Configurability	8 max. per P/95 system

Tape Subsystem

Tape drive	1/4"	1/2"	1/2"
	Cart- ridge	Open Reel	Open Reel
Density (bpi)	8000	1600/ 3200	1600/ 3200/ 6250
Tape speed (ips)	90	100/50	100/50/ 70
Capacity (Mbytes)	60	46/92	46/92/ 180
Controller interface	QIC-02	Pertec Cipher	Pertec Cipher
Configurability	Base Cabinet	1 per Expan. Cabinet	1 per Expan. Cabinet
Weight (pounds)	10	80	100

Advanced Mass Storage Processor

Transfer rate	3 Mbytes/sec
Interfaces supported	SMD and ESMD disks
Other functions	Error checking and recovery; overlapped seek and seek optimization
Configurability	4 disks per controller; 5 controllers per system maximum

VMEbus Communications Processor

Processor	MC68020 @ 12.5 MHz 29C101 bit slice @ 12.5 MHz
Memory	1 Mbyte
Serial ports	8, 16, 24, or 32
Parallel ports	4 Maximum
Speed	Synchronous at up to 19.2 Kbaud
Physical interface	DB-9, Telco, IBM PC compatible printer support

I/O Bus

Bus standard	VMEbus
Total slots	17
Number of 6U vs. 9U slots available	3, 6, or 9 slots designated as 6U

AC Power Required

	115 VAC	230 VAC
Line voltage	±10%	±10%
Line frequency	49-61 Hz	49-61 Hz
Power source per cabinet	20 amps	10 amps

PHYSICAL CHARACTERISTICS

	Main Cabinet	Expansion Cabinet
Outside width	19.75"	25.5"
	144 cm	57 cm
Outside depth	42"	37"
	94 cm	83 cm
Outside height	35.5"	35.5"
	80 cm	80 cm
Weight (empty)	373 lbs	285 lbs
Temperature limits	50-90° F	50-90° F
Noise limits	62 db	62 db

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Specifications subject to change.