

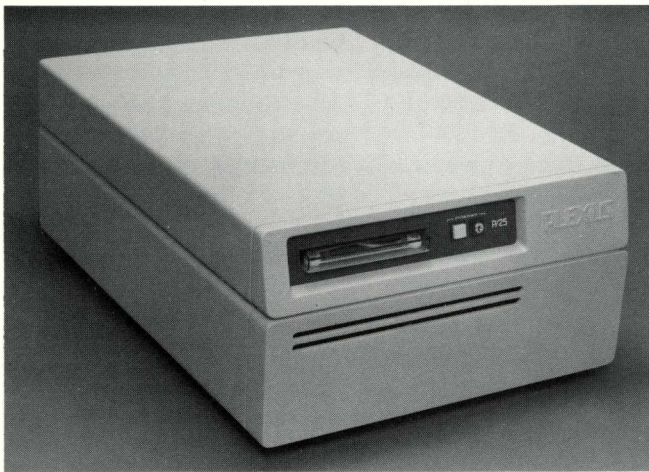
The Plexus P/25 is a 16-bit minicomputer specifically designed for the popular UNIX operating system. Housed in a compact, tabletop enclosure, the P/25 supports up to 16 terminal users.

Innovative multiprocessor design, large main memory and high-performance peripherals bring users the capabilities usually found only on the largest minicomputers, but at a cost per user that is competitive with small microcomputer systems.

Industry-standard disk, tape, terminal, and printer interfaces—along with an industry-standard I/O bus—make it easy to attach a wide variety of peripheral devices to the P/25.

An industry-standard operating system along with industry-standard programming languages make the P/25 compatible with a wide variety of existing applications software. In addition, the P/25 is software compatible with the larger Plexus P/40.

The P/25 computer system is ideal for the UNIX user who demands performance, reliability and, above all, the hardware and software that can only be provided by a computer system that utilizes industry standards.



FEATURES

Performance

- Multiprocessor architecture linking powerful job processor with up to four 16-bit I/O processors
- High-performance 16-bit I/O processor for disk and tape
- Up to 2 Mbytes of main memory
- Modular intelligent communications processors providing up to 16 serial ports and 2 parallel ports
- Up to 72 Mbytes (formatted) of high-speed Winchester disk storage in tabletop package
- Cartridge tape for streaming backup storage

Reliability

- Error checking and correcting main memory and disk memory
- Extensive use of LSI circuitry
- 10,000 hour MTBF disk drive
- Proven UNIX operating system
- Modular construction for easy repair

Standard Hardware

- Industry-standard peripheral interfaces
- Multibus I/O bus
- Industry-standard communications

Standard Software

- UNIX operating system and utilities
- C language
- COBOL
- CBASIC-16™
- MUMPS

Designed for the Office

- Portable tabletop enclosure
- Uses standard AC power

MULTIPROCESSOR DESIGN

The outstanding performance of the P/25 is made possible by a special multiprocessor architecture. The architecture links a powerful job processor with as many as four 16-bit I/O processors and allows each I/O processor to use burst multiplexed DMA to transfer data directly to and from main memory. Thus, I/O overhead is removed from the job processor and the P/25 can achieve high throughput while running UNIX. (See the P/25 block diagram.)

In a typical P/25 system the job processor and two I/O processors are linked together. During operation, the job processor performs computation and operating system functions while the I/O processors handle disk, tape, and serial I/O. This provides powerful support for multiple users with fast response to each user. The result is performance and throughput greater than other minicomputers that are 5 to 10 times as large in physical size.

To suit a wide variety of applications, P/25 models are available with a choice of memory sizes and disk capacity. While most are multiuser configurations supporting up to 16 serial ports, there are also single-user configurations for users requiring console-only operation.

Powerful Job Processor

The 16-bit P/25 job processor features more than 110 distinct instructions that operate on 7 data types, including bits, 32-bit words, and strings. For easy programming the processor has 16 general purpose registers and supports separate instruction and data spaces. The processor also supports privileged instructions.

Floating-point processing is performed for single-precision (32-bit) or double-precision (64-bit) addition, subtraction, multiplication, and division compatible with the proposed IEEE format.

The battery-operated real-time clock gives the job processor continuous access to the actual date and time of day. The clock is battery powered so that it remains operational even when AC power is removed from the system. The battery, which is automatically recharged when the system is on, lasts up to 60 days between charges so that correct time is maintained even during system shipment.

Large Main Memory

Up to 2 Mbytes of memory can be configured in a P/25 system using modules based on 64 Kbyte RAM chips. The P/25's large main memory provides ample space for UNIX and system buffers, and allows support of multiple users running large programs.

Mass Storage Controller

The controller module for the P/25's Winchester disk drive and streaming cartridge tape drive is a single module with its own 16-bit processor and memory. In addition to performing all error checking and recovery operations, the controller automatically performs diagnostics using a reserved disk track. It also ensures the completion of disk transfers in progress during power failures.

The intelligent mass storage controller has ample memory and processing capacity to perform file system functions, system backup operations, and caching algorithms. The controller is programmed by Plexus in the high-level C language.

Intelligent Communications Processor

In the P/25, all serial I/O tasks are handled by modular Intelligent Communications Processors (ICP's). Each ICP contains a 16-bit processor, 32 Kbytes of RAM (with parity), 16 Kbytes of PROM, 8 full-duplex serial ports, 1 parallel port, and 9 DMA channels.

The P/25 can be configured with up to two ICP's for a total of 16 serial ports and two parallel ports.

The ICP's powerful processor and large RAM memory allow segments of UNIX or customized communications and terminal handling programs to be downloaded to the ICP and executed locally.

The ICP's 8 serial ports are RS232C compatible and have the modem control lines necessary to support standard asynchronous and synchronous modems. Each port is capable of asynchronous or bisync protocols at software-selectable rates up to 19.2 Kbaud. All 8 ports can operate at the maximum rate simultaneously since each port has its own DMA channel. The job processor's diagnostic port can also be used as a system console or UNIX user port.

The parallel port that comes with the ICP is designed to support a line printer with a Centronics-type parallel interface.

PERFORMANCE PERIPHERALS

Fast, High-Capacity Disk Drive

The P/25 disk subsystem consists of a high-performance 8-inch Winchester disk drive. The standard P/25 disk drive provides 22, 36, or 72 Mbytes of formatted capacity and features a 1.2 Mbyte/sec data transfer rate and 10,000 hour mean time between failure (MTBF). Average access time is 28 msec for the 72 Mbyte drive and 38 msec for the 36 and 22 Mbyte drives.

To get the best performance from this fast, compact disk, the P/25 uses an intelligent disk controller which performs multiple sector transfers that span cylinders, automatic error recovery, and transparent error correction for burst errors up to 11 bits long.

Cartridge Tape Drive

The standard P/25 tape drive is 1/4-inch, 4-track, 8000 bpi unit that features streaming operation for fast disk backup. The tape drive stores 20 Mbytes of data in 3.7 minutes on a 3M-style cartridge tape.

BUILT-IN RELIABILITY

The two most common causes of downtime in small computer systems are memory errors and disk drive errors. The P/25 automatically detects and corrects these two types of errors.

ECC Memory and Disk

Memory errors are handled by the job processor. Every time main memory is accessed, the job processor provides single-bit error correction and double-bit error detection. Error detection and correction is performed via a 6-bit error code appended to each 16-bit word when it is stored in memory.

Disk errors are handled by the disk controller's error checking code logic. During a disk read operation, the disk controller can detect an erroneous data burst up to 32 bits in length and 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.

LSI Circuitry

Another common cause of downtime in small computers is component failure. To minimize component failures, the P/25 combines conservative circuit design with generous cooling so that component temperatures are kept as low as possible.

In addition, the P/25 makes extensive use of LSI circuitry, which is inherently more reliable because it reduces the total number of parts in a circuit.

Proven Operating System

To back up hardware reliability with software reliability, the P/25 features UNIX, a proven operating system that has become the industry standard for both large and medium-size minicomputers.

Self Test, Easy Repair

P/25 design emphasizes easy service just as strongly as it emphasizes reliability. Every time the P/25 is turned on, each processor automatically performs a complete self-test. Results are displayed on the system console and on arrays of light-emitting diodes mounted directly on the circuit boards.

The P/25 also features a diagnostic port that allows a terminal or modem to be connected directly to the job processor. The port can be used from a remote location to isolate many hardware and software problems.

All P/25 modules are easy to access and replace. Using spare modules, mean time to repair is under 30 minutes and requires no special tools.

EASY HARDWARE INTERFACING

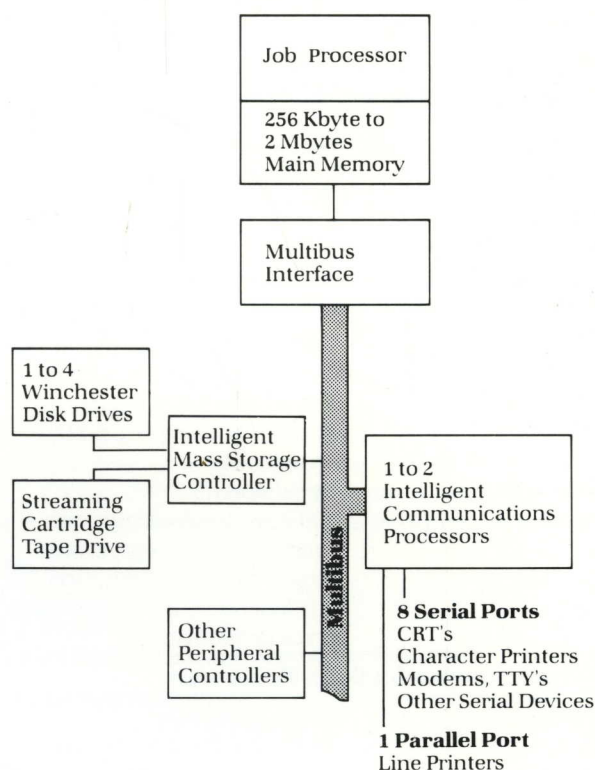
Industry-standard disk, tape, terminal and printer interfaces, along with an industry-standard I/O bus, make it easy to attach a wide variety of peripheral devices to the P/25.

The P/25 I/O bus conforms to the Multibus (IEEE 796) standard. Multibus products are currently available from more than 50 independent vendors and the number of different products, now well over 100, is growing rapidly. Already on the market are Multibus products for communications, data acquisition, bus interconnection, graphics, disk control, tape control, and many other functions. Thus, the Multibus allows P/25 hardware to be easily tailored to a wide variety of applications.

LANGUAGES FOR PORTABILITY

The P/25 has available standard languages designed to provide maximum compatibility with a wide variety of existing applications software. This can mean substantial savings in the time and money required to develop and debug applications. In cases where applications must be developed from the bottom up, UNIX with its many utilities offers an excellent environment for program development.

Plexus P/25 Block Diagram



Since the P/25 has standard programming languages, software developed on the P/25 has the advantage of being highly portable. High-level languages now available are:

- C
- COBOL
- CBASIC-16
- MUMPS

Others are in development. Check with your nearest Plexus sales office for availability and for reference information on a variety of applications packages and utilities.

COMPACT ENCLOSURE

The P/25 comes in a compact, tabletop cabinet that includes the switching power supply, processor and memory, controllers, system bus, cartridge tape drive, and disk drive. Access is through a panel on the side of the enclosure. Weight is typically 65 lb, so the entire system can be conveniently relocated when necessary.

The P/25 is designed to operate in an office environment. It features quiet operation and requires no special environmental control or power conditioning. The styling is modern and the subdued colors fit unobtrusively with any decor.

Optionally, the P/25 can be rack-mounted in a standard 19-inch RETMA rack or in a Plexus custom rack.

SPECIFICATIONS

Job Processor

Processor	16-bit Z8000
Floating-point	Conforms to proposed IEEE standard
Clock/calendar	Battery-powered
Diagnostics	Implemented using 16 Kbytes of on-board PROM and 2 Kbytes of on-board RAM

Memory

Size	Up to 2 Mbyte using 256, 512, or 1024 Kbyte modules
Configurability	2 modules (max.)
Word size	22 bits (2 bytes plus 6-bit error code)
Addressing modes	Byte, word
Cycle time	600 nsec (including error detection and correction)
Error handling	Single-bit error detection and correction, double-bit error detection

Intelligent Communications Processor

Intelligence	16-bit processor
Memory	32 Kbytes RAM (with parity), 16 Kbytes PROM
Serial ports	8 (full duplex) RS232C interface 19.2 Kbaud rate (max.) Modem support on all ports Hardware support for async and bisync protocols
Parallel ports	1 Centronics-type interface
Configurability	2 ICP's (max.)

Intelligent Mass Storage Controller

Intelligence	16-bit processor
Memory	128 Kbytes RAM, 16 Kbytes PROM
Interfaces supported	SMD disk, streaming cartridge tape
Other functions	Error checking and recovery, diagnostics, protection against errors during power failure

Disk Subsystem

Disk drive	8-in. Winchester (fixed)
Formatted capacity	Up to 288 Mbytes using 22, 36, or 72 Mbyte drives
Unformatted capacity	Up to 336 Mbytes using 25, 42, or 84 Mbyte drives
Number of drives	1 in tabletop enclosure, up to 4 in rack cabinet
Performance	Average access time: 28 msec (72 Mbyte drive); 38 msec (34, 20 Mbyte drives) 1.2 Mbyte/sec data transfer rate
Controller interface	SMD type

Tape Subsystem

Tape drive	streaming cartridge tape (3 M-style)
Number of drives	1
Density	8000 bpi, 4 tracks
Streaming mode speed	90 ips
Capacity	20 Mbytes
Disk backup time	3.7 min for 20 Mbytes
Controller interface	Archive type

I/O Bus

Bus standard	Multibus (IEEE 796)
Available slots	4 (max.)

AC Power Required

	115 VAC	230 VAC
--	----------------	----------------

Line voltage	115 VAC \pm 10%	230 VAC \pm 10%
Line frequency	49-61 Hz	49-61 Hz
Current (max.)	4 A	2 A

PHYSICAL CHARACTERISTICS

Overall Dimensions	in.	cm
Width	19	48
Depth	24	61
Height	10.5	27

Inside Dimensions

Width	Fits standard 19-in. RETMA rack
Depth	24 in. (61 cm)

Other Characteristics

Weight	65 lb (29 kg)
Heat dissipation (max.)	930 Btu/hr (235 Kg-cal/hr)
Noise	Less than 50 dB(A)

NOTE:

UNIX is a trademark of Bell Laboratories. Plexus Computers, Inc. is licensed to distribute UNIX under the authority of Western Electric Company.

Multibus is a trademark of Intel Corporation.
CBASIC-16 is a trademark of Digital Research.

Specifications subject to change.