PRIME

Prime 2250 System

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incl. 1 CRT.

Features

- An economical, high-performance 32-bit supermini ideal for distributed processing applications
- Compact design and quiet operation suitable for office installation
- Firmware-controlled central processor with business and floating-point instructions
- Easy-to-use operator interface allows one-step system initialization
- High-speed, bipolar cache memory for reduced memory access time
- Protection rings and embedded operating system for ensured memory security
- Diagnostic processor for verifying system integrity
- Up to 32 terminals supported
- Compatible with industry-standard, high-level languages plus a wide range of systems and applications software products
- Full software- and hardware-compatibility with the Prime 50 Series

Description

The Prime 2250 is a high-performance, low-cost office system ideal for distributed processing network nodes or compact, multiuser system applications. The basic Prime 2250 system includes a two-board central processor unit (CPU), a communications controller with eight asynchronous and one synchronous communications lines, one 68Mb disk and one cartridge tape unit with a multifunctional disk/tape controller, 512Kb of memory and a diagnostic processor that also acts as a system console interface.

The Prime 2250 supports up to 32 terminals in an interactive environment of up to 128 processes. It uses the multifunctional PRIMOS® operating system which supports interactive and batch processing and is compatible across Prime's entire product line. This product line compatibility offers users software investment protection because programs developed on a Prime system will run on any other Prime system – without modification. Additionally, the Prime 2250 can be networked to other Prime systems using PRIMENET™ communications software and compatible standard Prime 50 Series peripherals and controllers.

Designed to fit easily into any office environment, the Prime 2250 features attractive styling and low noise levels. The system is packaged in a 30-inch cabinet that includes an eight-board chassis with power supply, space for two 68- or 158Mb non-removable disks and two 1/4-inch cartridge tapes, a power distribution unit and a cable connector bulkhead for easy user reconfiguration of terminal and communications lines. The CPU, memory, disk/tape controller and communications controller use five of the eight available board slots. The remaining three slots can be used for additional memory, communications controllers, a line printer controller and other peripheral controllers.

Operator Interface

The Prime 2250 has been designed for ease of use. Operators interact with the system using the control panel and a hardcopy or video system console, which can also be used as a terminal. The control panel – easily accessed from the front of the system – includes a ready status indicator and a write protect switch for each disk drive, an online and a file protected indicator, plus two switches and two indicators for remote diagnostics. In addition, the panel features a system power switch and indicator, a master clear switch and halt indicator and a keylock to ensure authorized control panel use.

Users – technical and non-technical – can bring up the Prime 2250 by simply depressing the control panel system power switch. This enables logic power supplies. When power is stabilized, the diagnostic processor runs a microverification routine and reports the results on the system console. Then, it verifies that the CPU and memory are operational, and loads the appropriate operating system boot routines into main memory. These, in turn, fetch and configure the PRIMOS operating system. When the operator satisfies the system's request for date and time, the Prime 2250 is fully operational.

Cache Memory

Cache memory greatly reduces effective memory access time by storing frequently used instructions and data in high-speed, bipolar memory. The Prime 2250's cache memory storage capacity is 2Kb with a hit rate of 85%. Efficient circuit configuration provides a cache memory access time of 80 nanoseconds and an effective main memory access time of only 230 nanoseconds. In addition, a "write-through" algorithm eliminates bus delays during main memory writes by letting information be written through cache. This allows the overlap of main memory write cycles with instruction fetch and execution from the cache.

Instruction Set

The standard Prime 2250 instruction set is compatible with all Prime 50 Series machine instructions. Addressing compatibility means user programs written for any other Prime system will run on the Prime 2250 without alteration.

More than 550 instructions enhance operating system communication, data handling and process coordination. Highly flexible address formation techniques let all instructions use any one of four user-accessible base registers and 32-bit indirect words in any combination. This lets all memory reference instructions access the entire virtual address space.

The Prime 2250 instruction set takes advantage of the 32-bit cache data paths and internal architecture. Seven of the eight 32-bit general-purpose registers can be used as index registers. These can also be used for compiler optimization or as fixed-point and logical accumulators. Additional registers include two floating-point and two field address and length registers, each 64 bits long. Four other 32-bit registers include procedure base, stack base, link base and auxiliary base registers.

Regulations and Power

The Prime 2250 has been certified to meet U.S. Safety and Noise Emission Regulations – U.L. and FCC EMI – as well as Canadian safety regulations. The system can be configured for North American and European ac power sources. An external power conditioning module is available for use in areas where commercially supplied power suffers from transient disturbances.

Remote Diagnostics

The Prime 2250 includes a sophisticated diagnostic processor that lets a diagnostic specialist control any system – locally or remotely. This provides fast, effective troubleshooting for identifying a hardware problem and for performing comprehensive system software diagnostics.

The local system operator or administrator initiates remote access simply by pushing the REMOTE ENABLE button on the control panel. A second button places the remote terminal in control mode. The remote system administrator can then run the system – including tasks like bootloading and online operations – from the remote terminal.

Two control panel indicator LEDs display the state of the remote communications link. One LED indicates a remote user has been allowed to dial into the system and monitor operation. The second LED indicates whether or not a remote access is in progress.

Software

The multiuser PRIMOS operating system lets the Prime 2250 – and the entire Prime 50 Series – perform both interactive and batch operations. PRIMOS software supports reentrant procedures allowing many users to share a single copy of a software module. Languages the PRIMOS operating system supports include ANSI '74 COBOL, ANSI '77 FORTRAN, BASIC/VM, RPG II, PL/I, Pascal and Prime Macro Assembler. Additionally, the system supports the Source-Level Debugger, PRIME/POWER query and report facilities, DBMS – Prime's CODASYL-compliant database management system – DBMS Query/Report Writer, MIDASPLUS (Multiple Index Direct Access System), FORMS (Forms Management System), Prime/TAPS (Terminal Application Processing System), and Prime's Office Automation System. A wide range of applications packages is available from the Prime Users Library Service (PULSE), and from third-party vendors.

Networking

The Prime 2250 is particularly suited for network and distributed processing environments. Its basic configuration includes the necessary hardware to support IBM BISYNC for HASP and 2780/3780 emulation, and High-level Data Link Control (HDLC) protocol for Prime-to-Prime and X.25 packet-switching network communications.

PRIMENET software lets Prime computers communicate among themselves, with terminals and with other manufacturers' systems, locally or worldwide. Using PRIMENET facilities, users can log into remote systems, share files and develop distributed applications. Hardware options are available to support Control Data 200UT, Univac 1004, Honeywell GRTS, ICL 7020 RJE protocols, as well as IBM 3270 device emulation.

For local area networks, the Prime 2250 can be linked – using RINGNET communications software and a PRIMENET Node Controller (PNC) – with any other Prime 50 Series system.

High-Speed Address Translation Buffer

Frequently used virtual-to-physical address translations are stored in the high-speed Segment Table Lookaside Buffer (STLB). The STLB's large storage capacity ensures an STLB hit rate of greater than 99% minimizing address translation overhead. Access to the STLB is completely overlapped with access to cache for maximum speed.

Protection Rings

A comprehensive, hardware-controlled memory protection system ensures software system integrity. A hierarchical multi-ring protection mechanism allows users access to specified programs, while protecting other programs and databases from unauthorized access. This same mechanism guards the operating system from inadvertent intrusion.

Input/Output

Several peripheral products designed for the office environment are packaged within the Prime 2250 cabinet. Sealed 68- or 158Mb Winchester disks provide users a highly reliable file and software storage medium. Featuring space for two of these disk drives, the basic Prime 2250 can provide up to 316Mb of online storage. An expansion cabinet can house one or two additional drives for a maximum of 632Mb of online storage.

Users can back up disk-stored data with industry-standard 1/4-inch tapes providing up to 15Mb of storage each. PRIMOS utilities let users dump data – physically or logically – from disk to tape and back.

The single disk/tape controller contains local intelligence for easy fault diagnosis. The Prime 2250's nine-line communications controller – the Intelligent Communications Subsystem, Model 1 (ICS1) – also provides this capability. With eight asynchronous and one synchronous communications lines, the ICS1 supports terminals and RJE emulators, as well as PRIMENET networking software.

A variety of printing devices – band printers, matrix printers, letter-quality printers and matrix plotters – are supported by the Prime 2250. The system's printer interface can be a serial asynchronous communications line or a parallel interface device used with the unit record controller. Video and hardcopy terminals are also available.

System Integrity

The Prime 2250 provides hardware system integrity through comprehensive error detection and reporting mechanisms. Microverification routines, invoked automatically when the system is initialized, test the validity of the CPU, as well as the disk/tape and communications controllers. While the Prime 2250 is running, parity checking ensures data integrity throughout the CPU, memory, I/O bus, disk and communications controllers. Main memory error detection and correction detects double-bit errors and corrects single-bit errors.

To ensure disk data integrity, each record is preceded by a permanently recorded header. Hardware verifies that the intended disk record is the one being accessed. In addition, each disk record is protected by an Error Correction Code that allows correction of burst errors up to 11 bits long.

Specifications

Main memory: 512Kb expandable to 4Mb
Disk storage: 68Mb expandable to 632Mb
Tape storage: One or two 15Mb 1/4-inch cartridges
Virtual address space: 512Mb
Cache memory access time: 80 nanoseconds
Main memory access time: 230 nanoseconds
Noise level: Less than 55 DBA
Dimensions: 76cm H x 53cm W x 79cm D (30"H x 21"W x 31"D)
Power requirements: 115Vac, 13 amps running current or 230Vac, 7 amps running current

PRIME®

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