F E A T U R E S

- ▲ Powerful 32-bit supermicrocomputer supporting up to 32 terminals

- ▲ Motorola 68020 operating at 16.7 MHz with zero wait states out cache

- ▲ 16 MB of demand-paged virtual memory per process

- ▲ Industry Standard UNIX System V Release 2.2 Operating System

- ▲ 2 MB RAM expandable to 16 MB

- ▲ 8 KB two set high speed associative data and instruction cache

- ▲ Supports 80 to 510 MB of internal mass storage using up to three 5.25 inch 80 MB, or 170 MB ESDI Disk Drives

- ▲ Integral 60 MB 1/4 inch Streaming Tape Drive

- ▲ Integral 1.6 MB Floppy Disk Drive

- ▲ Intelligent 8086-based File Processor Subsystem with 4 DMA Channels

- ▲ Up to two Intel 80286-based Multi-drop Communications Modules with 512 KB of on board RAM

- ▲ Up to 4 intelligent 8086-based Serial Communications Modules with 128 KB of RAM each

- ▲ Centronics Parallel Printer Port

- ▲ Optional Floating Point Co-processor

- ▲ Supports Optional MultiBus Expansion boards

- ▲ Local and Remote Diagnostics support down to field replaceable unit

- ▲ Wide range of Communication options including LAN, Async, Bisync, SNA, and X.25 Protocols

- ▲ Language products including C, FORTRAN, BASIC, Pascal, COBOL, DBL (Dibol compatible) & RPG II

- ▲ Development Tools include Text Processing and Archival tools, symbolic debuggers, program tracing utilities, plus some Berkeley utilities

OVERVIEW

▲ The Altos 3068 EP is a high performance 32-bit supermicrocomputer capable of providing support for up to 32 users. Based on the Motorola 68020 microprocessor, the system operates at 16.7 MHz with zero wait states out of its 8 KB cache memory, and offers outstanding performance at a very economical cost per user.

Performance is further enhanced by intelligent file processor and multi-drop communications boards. The standard system includes 2 MB of RAM and a high performance 80 or 170 MB ESDI disk drive. Memory may be expanded up to 16 MB while internal mass storage may be expanded to 510 MB (unformatted) by adding two 170 MB ESDI disk drives. Its design is optimized by UNIX System V, Release 2.2 operating system and features demand-paged virtual memory.

The Altos 3068 EP is a truly outstanding system that offers both performance and flexibility in a state-of-the-art computer geared to provide solutions to modern office automation and commercial application requirements.

HARDWARE

▲ Main Processor

The Altos 3068 EP is designed around the most powerful microprocessor available today – the Motorola 68020. This full 32-bit CPU, with its own high-speed on-chip address instruction cache, operates at 16.7 MHz with zero wait states, and offers the type of performance previously found only on expensive mainframe and superminicomputers. The efficient memory management unit is designed for high performance in the multiuser, multi-tasking environments. It supports both Altos' unique Multi-Context Caching™ Architecture and full demand-page virtual memory with 16 MBytes of virtual address space. The unit includes an 8 KByte, 2-set associative data and instruction cache for even faster operation. In addition, its performance may be further enhanced with an optional MC68881 floating point co-processor.

▲ Memory

Memory capacity in the Altos 3068 EP is highly flexible and expandable. The system may be configured from 2 MB to a full 16 MB of RAM using any combination of 2 MB, 4 MB or 8 MB memory boards. This allows you to tailor the system to your specific needs while providing an economical upgrade path as your needs change.

▲ File Processor Subsystem

This subsystem improves the performance of the CPU by allowing the CPU to dedicate its processing power to what it was designed to do best, applications. The file processor subsystem handles I/O processing, through its on-board 8 MHz Intel 8086 microprocessor. A four channel DMA controller manages peripheral devices to minimize I/O contention. Another important feature on this subsystem, which results in increased I/O throughput on the Winchester disk drives, is the ability to perform overlapped seeks. In addition, the file processor subsystem has a Centronics parallel port for printer support at speeds up to 900 lines per minute.

▲ Communications Subsystems

The Altos 3068 EP is offered in two standard series, the EPM and the EPS. The EPM series incorporates the Multidrop Communications subsystem as the standard communications interface. The EPS series uses the Serial communications subsystem for communications. Although both communications subsystems may co-exist within the same computer, the series is determined by the standard communications interface within the base system.

Multidrop Communications Subsystem The Altos Multidrop product is designed to give the Altos 3068 EPM the capability to support a large number of RS-232C devices on a single high speed communications port through one multi-drop interconnect cable. The cable is made up of an inexpensive shielded, twisted copper pair. This design approach saves space on the communications boards, extends RS-232C connections beyond the traditional 125' distance limitations, simplifies cable runs, and reduces cabling costs.

The Multidrop Communications Board has its own 6 MHz 80286 I/O processor and 512 KB of local RAM. It is capable of supporting up to 64 RS-232C devices (59 through the 1 Mbps interconnect cable and 5 through on-board ports). With 2 Multidrop boards, each Altos 3068 EPM system can connect to over 100 separate devices.

The standard Multidrop interface provides support for Altos WorkNet LAN and 2780/3780 Bisynchronous communications protocols. The Multidrop Communications Board comes equipped with a WorkNet port, for connectivity to the Altos WorkNet LAN, plus 4 serial ports (2 asynchronous/synchronous protocol ports and 2 asynchronous only ports). The UNIX Operating System provides throughput and support for up to 32 simultaneous users in addition to printers, modems, and other shared resource devices.

The Altos 3068 EPM standard configuration includes one (1) Multidrop Communications Board. A second board may be added to double the system's Multidrop capacity. Each board can support up to a 1500' Multidrop interconnect cable segment; two additional 1500' cable segments can be added at any time using repeaters. This provides a total Multidrop interconnect cable span of 4500' per board (over 30 times the standard RS-232C transmission distance).

Terminal Cluster Units (TCU) The intelligent Terminal Cluster Unit provides a serial interface from any asynchronous RS-232 device, at baud rates of 50 to 19.2K baud, to the high-speed long distance RS-422 cable connected to the Multi-drop Communications Expansion Board.

The TCU buffers data to and from up to 8 RS-232 devices and provides hand-shaking (flow control) for each.

Serial Communications Subsystem The Serial Communications board, standard in the EPS series, is an 8 MHz Intel 8086-based subsystem that offloads serial communications processing from the CPU. Each subsystem supports 10 RS-232 ports with up to two ports configurable for synchronous data and another port configurable as an RS-422 networking channel to connect to the Altos WorkNet II local area network. Increased flexibility is provided by allowing the line discipline for each port to be set independently with baud rates selectable up to 19.2 Kbps. When configured for synchronous or networking operation, up to 4 DMA channels can operate simultaneously to efficiently offload character interrupts by managing data transfer directly to the 128 Kb on-board RAM. The board supports a variety of communications protocols including IBM BSC 3270, 3780, SNA/SDLC, and X.25. By combining the networking capabilities of Work-Net with other Altos communications packages a single Altos system may be used as a gateway for up to 30 Altos computers to access other non-Altos environments.

▲ Data Storage

The Altos 3068 EP offers flexible data storage. Each system includes the following as standard equipment: an integral 80 or 170 MB ESDI disk drive, a 60 MB 1/4-inch streaming tape drive, and a 1.6 MB floppy disk drive. Up to two additional 80 or 170 MB disk drives may be installed in any combination for a maximum of 510 MB of internal mass storage.

▲ Modularity

A very important design objective of the Altos 3068 EP is modularity. While an entry-level system supports up to 16 users, memory, communications, mass storage options allow the system to support up to 32 simultaneous users with connectivity for over 100.

▲ *Operating System*

The Altos 3068 EP utilizes the industry standard UNIX System V, Release 2.2 Operating System, which has been tuned to the multiprocessor architecture of the Altos 3068 EP. Separate Intel 8086 processors in the file processor subsystem and in each 10-port serial communications subsystem plus an Intel 80286 processor in the Multidrop Communications Subsystem handle file and serial communications processing in real time, freeing the main Motorola 68020 processor and operating system to concentrate on executing applications.

Performance is further enhanced by incorporating support for demand-paged virtual memory in the memory management unit architecture. With a capacity of 16 MB of virtual address space per process in 1 KB page increments, the Altos 3068 EP can run applications much larger than actual physical memory. Another important feature on the Altos 3068 EP is that it supports "Record and File Locking." This maintains the integrity of records and files especially important in multiuser environments.

▲ *Development Tools*

The Altos 3068 EP offers an ideal environment for software design, development, and maintenance. An optimized C compiler for the MC68020 is available along with a complete selection of industry standard languages including FORTRAN, COBOL, BASIC, Pascal, DBL (Dibol Compatible), and RPG II. *Text processing* and *archival* tools are available to create and maintain source code and documentation while a *symbolic debugger* and a program *tracing* utility may be used to simplify debugging. Berkeley utilities available include vi editor, C Shell and electronic mail.

▲ *Diagnostics*

The Altos 3068 EP provides three major series of diagnostic tests to maintain maximum system availability. A "Power-On Test" confirms the operational status of major system components. A menu-driven "User Confidence Test" allows the non-technical system user to test the full functionality of the system. "Field Service Diagnostics" which can be run locally or executed remotely via a modem by a trained technician, help isolate failures down to the field replacable unit. These features help isolate problems easily while system modularity offers quick servicing and maximum system availability to the user.
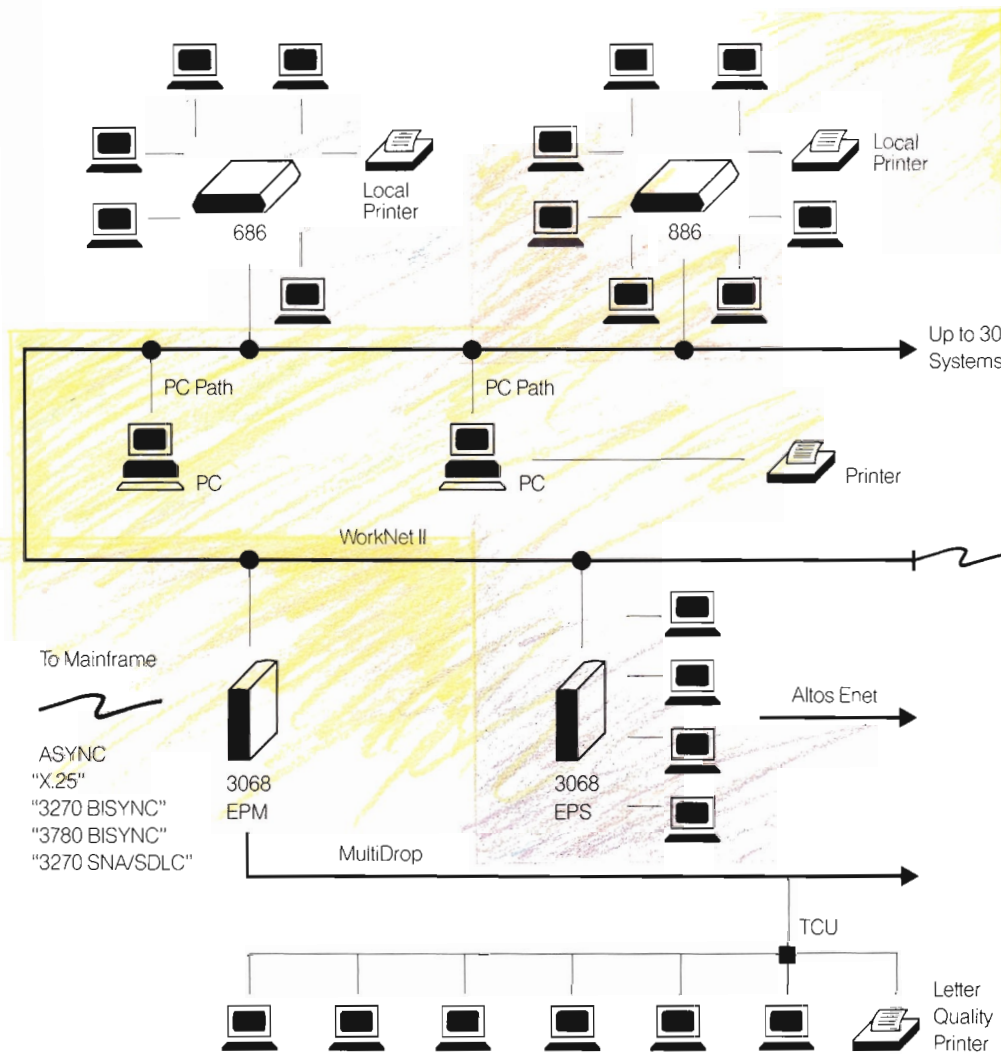
▲ *Productivity Tools*

Altos offers a full complement of application software solutions including the Altos Accountant Level III, a powerful general accounting software program, two outstanding database management systems, informix SQL and Unify, and the Altos Office Manager (AOM) Plus, a complete suite of office productivity tools combining word processing, electronic spreadsheet, database management, electronic mail, graphics, calendar management and communications in one menu-driven software program. In addition, an AOM Tool Kit is available as a development aid to facilitate installation of other vertical applications within the AOM Menu System. It also allows translation of AOM Menus into non-English languages and enables customization of Altos-supported software menus under the AOM Menu System.

▲ *Communications Services*

The Altos 3068 EP supports a wide variety of communications software products to meet your communications needs. Both the EPS and EPM Series support the Altos WorkNet II local Area Network, an inexpensive, easy-to-install communications network that transforms individual systems into a transparent distributed processing environment for up to 30 Altos systems. The software allows full access to files, programs, communications gateways, and peripheral devices that

Up to 30 Systems

PC Path

PC Path

PC

PC

Printer

WorkNet II

Local Printer

686

Local Printer

886

To Mainframe

ASYNC
"X.25"
"3270 BISYNC"
"3780 BISYNC"
"3270 SNA/SDLC"

3068 EPM

3068 EPS

Altos Enet

MultiDrop

TCU

Letter Quality Printer

are remotely located on the other systems. All resources on all systems on the network appear to users and programs as part of the local system. Altos PC Path, another communications software product supported by both Series, provides support for personal computers on this same network and allows the same file and peripheral sharing between MS/DOS and UNIX operating systems.

An Altos Enet LAN is available for both Series to provide a high speed LAN environment for connection to other systems which conform to the Ethernet Standard. The Altos Enet conforms to the Ethernet specifications (version 2.1) and supports connection to other Ethernet systems through TCP/IP. It uses the standard Ethernet cabling system which conforms to the IEEE 802.3 standards. This standard defines a 10 Mbps baseband networking scheme using CSMA/CD transmission technique. The Altos Enet processor also conforms to the Multibus physical description which both Altos 3068 EP Series support via an Altos Multibus Adaptor Board. Both Series also support 2780/3780 Bisynchronous communications protocols.

In addition, the EPS Series will support X.25 for Wide Area Public Data communications with packet switched networks. Software includes the X.3/X.28 PAD functions as well as X.29 remote host capabilities. It also supports both interactive display and remote batch facilities, required for IBM 3270 in Bisynchronous and SNA/SDLC network environments. The EPM Series will also support these communications protocols with an optional 10-Port Serial Communications Board.

S P E C I F I C A T I O N S

▲ *MainProcessor*   *EPS/EPM*
   CPU   MC68020
   Clock Rate   16.7 MHz
   Data Bus Size   32 bits
   Address Bus Size   32 bits
   On-chip Cache Size   256 Bytes

▲ *Floating Point Processor (Optional)*
   Processor   MC68881
   Data Format   IEEE-754 standard
   Precision   32-bit single
                                     64-bit double

▲ *Main Memory*
   Minimum RAM   2 MB
   Maximum RAM   16 MB
   RAM Board Sizes   2, 4, and 8 MB
   Error Detection   parity

▲ *Memory Management*
   Memory
   Management Unit   MC68461
   Address Translation
   Cache   512 entries
   Virtual Memory   16 MB per process
   Page Size   1 KB
   Contexts   128 in hardware
   Data/Instruction
   Cache-Size   8 KB
   Organization   2 set associative

▲ *Communication*

Processor Board	EPS	EPM
Processor	8086, 8 MHz	80286, 6 MHz
On Board RAM	128 KB	512 KB
DMA channels	4	4
Total Ports	10	6
Multidrop Ports	0	1
Asynchronous Only	7	5
Asynchronous Speed	up to 19.2 Kbps	
Synchronous Capable	1 full duplex	
	1 half duplex	
Networking Capable	1 (RS-422)	
Networking Speeds	.8 Mbps or 1.4 Mbps	
	(software selectable)	

▲ *Terminal Cluster Unit (TCU) — EPM Series*
   Interface to Multidrop
      Comm. Board   RS-422
   Interconnect Interface
      Medium   Drop Cable
   Number of RS-232C
      Ports Supported   8
   Terminal Communi-
      cations Protocol   Async
   Baud Rates Supported   50 to 19,200 bps
   Method of Baud Rate
      Selection   Software Selectable
   (standard 3086 Equipment includes 2 TCU-8's
      & drop cables)

▲ *File Processor Device*   *EPS/EPM*
   Controller Boards
   Processor   8086, 8 MHz
   DMA Channels   4
   Parallel Port   1
   Parallel Port Speed   50 Kbps

▲ *Hard Disk Options*
   Max Drive/Chassis   3
   Platter Size   5.25"
   Interface   ESDI
   Unformatted Size   80 MB   170 MB
   Formatted Size   63 MB   146 MB
   Average Seek Time   28 ms
   Data Transfer Rate   10 Mbps

▲ *Floppy Disk Drive*
   Max Drive/Chassis   1
   Media Type   double sided/dual density
   Media Size   5.25"
   Media Capacity   1.6 MB unformatted
                                     1.2 MB formatted

▲ *Tape Drive*
   Media Type   1/4" DC600 cartridge
   Operating Mode   90 ips, streaming
   Capacity   60 MB per cartridge
   Format   QIC-24
   Interface   QIC-35
   Number of Tracks   9
   Recording Mode   NRZI
   Back up time (60 MB)   20 minutes

▲ *Chassis Dimensions*
   Height   24"
   Width   8"
   Depth   22"
   Weight   68-86 lbs.

▲ *Environmental and Safety Standards*
   Meets FCC Docket 20780 Class A requirements.
   UL, CSA, TÜV (VDE 0806) approved.
   Conforms to IEC 380 specifications.
   Operating
   Temperature   +40 to +95 F.
                                     (+5 to +35 C.)
   Relative Humidity   20 to 80% (noncondensing)
   AC Power Range   100 to 127 VAC for 115 VAC
                                     200 to 253 VAC for 230 VAC
   Frequency Range   47 to 63 Hz

▲ *Warranty*
   This Altos product comes with a 90-day limited
   warranty.

▲ *Ordering Information*
   Prices and ordering information for this product
   are available through your Altos representative.