All About Supermini Systems

Although traditional 8- and 16-bit minicomputer systems have not yet disappeared, and may not do so as quickly as some analysts have predicted, they are most definitely an endangered species. Their obsolescence, if not extinction, can be attributed in no small part to the growth in popularity of superminicomputers. The enhanced computing power of the 32-bit superminis makes them better suited to computation-intensive technical applications than the traditional minis, and their expandability renders them better able to store and address the large data bases and perform the multiple application tasks increasingly required in both technical and commercial environments.

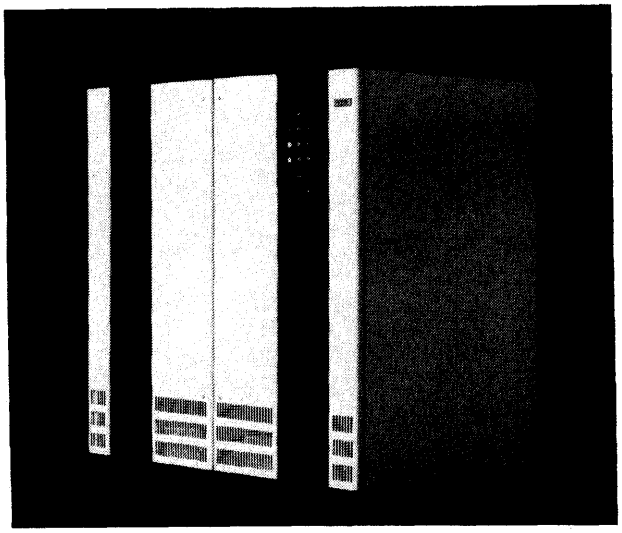
This report provides an up-to-date look at developments and directions in the burgeoning superminicomputer marketplace, and provides information, in concise comparison-chart form, on the hardware and software features of superminis marketed in the United States. Detailed explanations of the chart entries are also provided, along with tips to help you select a supermini that suits your application requirements.

Superminis represent the most dynamic segment of the market for medium-range computer systems, with sales growing at a rate of 45 percent a year. Superminis remain highly popular in the technical and scientific applications areas, and are becoming increasingly popular for commercial computing, with lower end systems moving rapidly into office and departmental environments. Efforts by vendors at the high end of the market have led superminis to challenge mainframes in power and configurability. This report presents the salient characteristics of 73 superminis from 24 vendors through detailed comparison charts. The report also explains the chart entries and provides information on trends in the supermini market.

WHAT IS A SUPERMINI?

A supermini can be generally characterized as a computer distinguished by:

- A word length of at least 32 bits.
- An I/O architecture in which at least 32 bits of data are moved into memory from auxiliary storage.
- A main storage capacity of 32 million bytes (MB) or less. (A few supermini systems support main memory in excess of 32MB.)
- A purchase price of approximately $100,000 and up for a basic configuration, including peripherals and controllers.



The 9955 is the new high-end system in Prime Computer's 50 Series of superminicomputers. Based on ECL (Emitter Coupled Logic) circuitry, the 9955 features processor power rated at 4 MIPS. It can support up to 254 workstations, as well as 16MB of main memory and 10GB of online disk storage.

The majority of the currently available superminis use a 32-bit word length. A 32-bit word neatly holds four 8-bit bytes or two of the 16-bit words used in most of the smaller minicomputers. (Some vendors offer supermini systems with larger word lengths; Harris Corporation's systems use a 48-bit word, and Elxsi's System 6400 has a 64-bit word length.)

While the foregoing definition is somewhat restrictive—eliminating 16-bit systems, no matter how powerful, from considerations—it is broad enough to accommodate a wide range of systems. It includes computers that run the gamut from single-user engineering stations like Apollo's Domain systems (which can be networked to create, effectively, a larger system) to systems that approach mainframe power, like Digital Equipment's VAX 8600, IBM's 4381 systems, Prime Computer's 9955, and Formation's IBM 370-compatible systems.

The systems covered in this report are generally based on proprietary architectures centered around TTL (Transistor to Transistor Logic) or ECL (Emitter Coupled Logic), or other larger-scale technologies. These systems are, thus, differentiated from 32-bit systems based on merchant microprocessors like National Semiconductor's 16032 and Motorola's MC68000 and MC68010. While some of those systems exhibit computing power and configurability approaching those of some standard superminis, the MPUs on which they are based employ 16- rather than 32-bit data buses. Thus, such MPU-based systems are not included here.

We have not entirely eschewed microprocessor-based systems, however; this report includes AT&T's 3B5 systems, which are based on a proprietary microprocessor with a full 32-bit I/O bus. More such systems are likely to be forth- ▷

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coming within the next few years, as new MPUs like National Semiconductor's 32032, Motorola's MC68020, and other full 32-bit microprocessors become readily available to serve as the basis for a new generation of systems with supermini-like architectures and functionality.

SUPERMINI ADVANTAGES

The advantages of superminis derive both from features of their internal architectures and from the high degree of processing power and configurability they exhibit. On the first score, superminis provide the following advantages as a result of their extended word lengths:

- *Increased addressability*—If an entire 16-bit word is used to specify a memory address, the maximum number of storage locations that can be directly addressed is only 2^{16} or 65,536. A 32-bit address, by contrast, can specify up to 2^{32} or *4.29 billion* distinct storage locations. Thus, the longer word length greatly increases a system's logical address space (that is, the total amount of storage that can be directly addressed), permitting effective use of both the large physical main storage capacities and the virtual memory facilities that characterize most superminis. Virtual memory, in turn, can greatly facilitate the development of programs for execution on multiprogrammed computers by enabling each programmer to act as if he or she had a very large single-level storage space totally at his or her disposal.

- *Increased precision*—A single 32-bit word provides enough precision to satisfy the demands of most scientific and commercial computations, and most of the superminis are also capable of processing double precision (64-bit) operands. Conversely, the common 16-bit minicomputer word length is too short to provide the required precision in many applications, necessitating the use of time-consuming multiple-word operations.

- *Increased instruction sets*—The longer word length typically makes more bits available for specifying the operation code of each instruction, as well as for specifying index registers, multiple accumulators, indirect addressing, and other parameters. Thus, the superminis can—and usually do—have larger and more powerful instruction repertoires than their 16-bit counterparts. As a result, a single supermini instruction can often do the work of several 16-bit instructions.

- *Increased performance*—A 32-bit supermini normally transfers twice as much information to or from main storage during each cycle as a 16-bit minicomputer, and this inherent performance advantage is further enhanced in many cases through storage interleaving, cache memories, and other power-boosting features. The three previously discussed advantages (increased addressability, greater precision, and more powerful instruction sets) also lead directly to increased performance in most applications.

On the second head, the CPU power and expandability of superminis make them adept in both technical and commercial applications. The sophisticated processor architectures of the systems allow them to process large amounts of data; some machines can perform as many as 5 million instructions per second (MIPS), and even the smallest superminis can operate at about 0.5 MIPS. That raw processing power makes superminis suitable for all types of CPU-bound, or computation-intensive, applications, including simulation, artificial intelligence, statistical modeling, and computer aided engineering (CAE) on the technical side, and business graphics on the commercial side.

Also, high memory capacities and disk configurability (frequently in excess of 1GB, that is, 1 billion bytes) make these systems ideal for storing and addressing large data bases, like those used in computer integrated manufacturing (CIM), which combines computer aided design (CAD), automated manufacturing, and production accounting functions (like material requirements planning). Those capabilities also make superminis strong performers in I/O-bound commercial applications like inventory control.

Furthermore, superminis generally possess communications capabilities that make them suitable for both standalone and distributed data processing. The typical supermini provides intrinsic support for a large number of local workstations. Moreover, most superminis can be networked to other systems either locally or remotely. Thus, they can be used as departmental host systems which can be accessed by PCs, and can, in turn, communicate with large organizational machines; some superminis are fully capable of acting as organizational hosts.

From a resource viewpoint, the power and flexibility of superminis permit them to integrate computing functions formerly divided among systems. Most superminis can simultaneously handle both technical/commercial solution applications and support functions (word processing and planning/decision support, for example) that used to be split between mainframes and minicomputers or timesharing systems. Thus, superminis can provide an economical means of consolidating organizational computing functions.

In the past, superminis had substantially higher price tags than most 16-bit computers, and were generally cost-effective only in applications that clearly required the level of sophistication they provide. Due to recent developments in on-board technology, however, many new superminis deliver 32-bit performance at a substantially lower price/performance ratio than was previously available. In fact, because of those technological improvements, many superminis now provide computing power and configurability similar to those of more expensive mainframes; powerful superminis can often deliver mainframe performance at a significantly lower price/performance ratio.

THE SUPERMINI MARKET

The supermini market is a high-growth segment of the data processing industry; it is fed by the desire of both technical

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and commercial enterprises for greater computing power at lower costs. International Data Corporation (IDC), a DP industry consulting firm based in Framingham, Massachusetts, estimates that U.S. shipments of medium-scale computer systems—a classification composed largely of superminis—will increase from 25,100 in 1984 to 38,900 in 1988, with the value of those shipments increasing from $6.5 billion to $9.8 billion. IDC also sees the installed base of those systems in the U.S. increasing from 110,400 units with a value of $33.9 billion in 1984 to 199,900 systems valued at $53.9 billion in 1988.

Venture Development Corporation, a Natick, Massachusetts-based management consulting and market research firm that serves the computer industry, predicts a 45 percent compound annual growth rate for supermini sales through 1986. Although superminis have traditionally been targeted more toward technical and engineering/scientific applications, Venture Development has identified the general business portion of the supermini market as the most active segment, with an average growth rate of 54.8 percent a year.

The growth in the general business sector reflects a trend toward integration of superminis—especially smaller ones—into departmental environments. With increased power in smaller and quieter packages, strong communications capabilities, and support for business graphics and office functions, lower end superminis are coming out of the computer room and into the office. In the past year, for example, several vendors, including Prime Computer (Model 2250), Wang Laboratories (Model VS65), Harris Corporation (Model H600), and Data General (Model Eclipse MV/4000 SC) have introduced compact, low-end superminis designed for office and departmental computing.

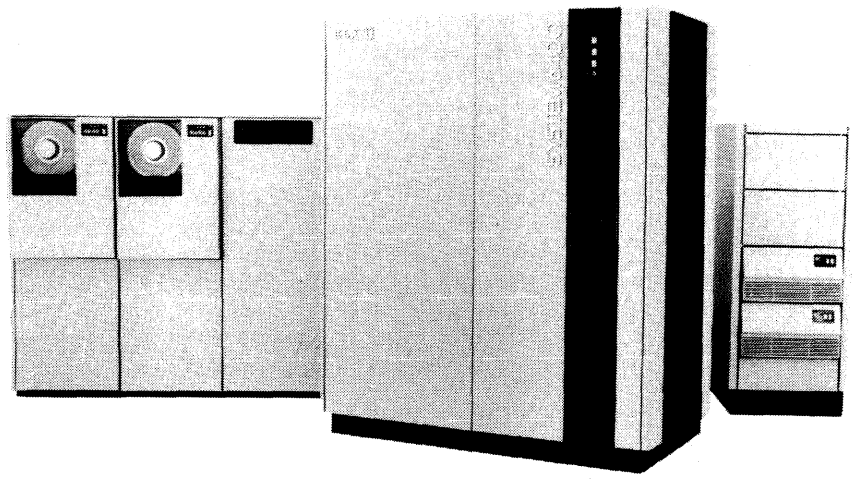
The fiercest competition in the supermini area, however, is at the high end of the market, where vendors vie to top each other in computing power, encroaching in the process on the mainframe preserve. In this segment of the market, Digital Equipment Corporation (DEC) and IBM have finally faced off directly. IBM recently debuted the dual processor 4381 Model Group 3, which processes about 5.13 MIPS; less than a week later, DEC announced the single processor VAX 8600, which comes in at about 4.45 MIPS and can be clustered with other VAX processors for increased power. In addition, Prime Computer introduced the 9955, which processes at 4.0 MIPS, and Gould added the 32/97 group, which reportedly delivers between 4.67 and 10.08 MIPS (the latter in a multiprocessor configuration). Even smaller vendors have joined the scramble toward enhanced power; Computer Consoles, Inc. (CCI) debuted the Power 6/32, which it claims can perform at up to 8.0 MIPS.

All of the aforementioned systems challenge the raw computing power of systems like IBM's lower-end 3083-EX mainframe (which, according to IDC estimates, runs at about 4.4 MIPS), and outstrip the new low-end 3083-CX, which comes in at about 3.3 MIPS.

This competition to deliver increasingly powerful superminis is certain to continue at least through the next year. Other entrenched vendors must now respond to their rivals' high-end maneuvers. Vendors will continue to expand their presence in the scientific/engineering/technical segment of the market, in which superminis have always fared well, and will strive to stake out turf in the fertile commercial sector.

An additional market trend worth noting is increased support for Unix among supermini vendors. Data General, DEC, Perkin-Elmer, Harris, and Gould have all debuted Unix-based operating systems as alternatives to their proprietary operating systems. In addition, new market players like AT&T and CCI are offering solely Unix-based computer systems.

One cannot construe this trend as a wholesale migration to Unix as a standard operating system for superminis. In the first place, not all of the systems are based on the same



Elxsi's System 6400 employs a 64-bit word as its basic data unit. Designed for aerospace and other scientific/technical applications, the system can be expanded to include 10 CPUs, and can handle up to 192MB of main memory and 100GB of disk storage. It can provide support for up to 1,000 users.

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version of Unix. Secondly, major vendors like DEC and DG offer the Unix systems as special-purpose alternatives to their primary operating systems, not as replacements for them. However, the move toward Unix does indicate the heavily entrenched vendors' acceptance of Unix as an alternative operating environment for which there is a demand. On the part of newer and smaller players, support for Unix provides a means for taking advantage of the growing application software libraries available for it—especially that for Unix System V, which is sponsored by AT&T.

COMPARISON CHARTS

The key functional characteristics of 73 commercially available superminis from 24 manufacturers are presented in the accompanying comparison charts. Most of the information in the charts was supplied or verified by the manufacturers during December 1984 and January 1985. The staff at Datapro Research greatly appreciates the vendors' cooperation in the preparation of these charts. A detailed vendor list appears after the comparison column explanations. *The absence of any specific company from our charts means that the company either failed to respond to our repeated requests for information or was unknown to us.*

All of the comparison chart entries are explained in the following paragraphs, together with discussions of their significance to prospective buyers and some guidelines for selecting the most appropriate superminis for specific applications.

Note: A dash (—) in a column indicates either that the vendor did not supply the requested information or that we were unable to complete the entry with the information that was supplied.

WORD LENGTH

One of the most important distinguishing characteristics of a computer is its word length, that is, the number of bits (binary digits) that can be stored in or retrieved from main storage during a single cycle. In general, the longer the word, the greater the efficiency and accuracy of a computer's internal operations. Nearly all of the superminis currently on the market have a 32-bit word length. Indeed, even if not entirely accurately, the 32-bit word length is the most frequently used criterion for distinguishing between the superminis and their smaller relatives. The entries also indicate the presence of additional bits used for parity checking or error correction (for example, the entry "32 + 5" indicates that each word location in main storage consists of 32 data bits and 5 error correction bits).

MAIN MEMORY

The minimum and maximum amount of main storage available for each computer, expressed in thousands of bytes (KB) or millions of bytes (MB).

DISK STORAGE CAPACITY

This indicates the minimum and maximum online storage capacities offered by the system. The indicated storage capacities are shown in millions of bytes (MB) and indicate the capacity of a single disk drive or the total capacity of two or more drives that can be connected to the system.

NUMBER OF WORKSTATIONS SUPPORTED

A very important consideration for many potential computer users is the number of workstations the system can support. Workstations, in this case, can mean most types of devices that can input and/or receive data from the computer. When the computer is used in a business environment, for example, the workstation would normally be a display terminal, a graphics workstation, or some other CRT-based device; in a manufacturing or distribution environment, the workstation could be a sensor or transmission unit that simply transmits signals back to the computer for processing.

PRICE RANGE

Ideally, these figures represent the upper and lower prices for system hardware, from the minimum processor complex to a fully configured system. The figures actually presented in the columns can vary according to vendor response. In cases in which only one figure is quoted (e.g., "From $100,000"), the price is usually that of the minimum processor complex only.

TARGET MARKET

This indicates the industries toward which the system is geared. In many cases, the market is indicated in general terms capable of further refinement. For example, "Engineering/scientific" can indicate a variety of submarkets, including computer-aided engineering and design (CAE and CAD, respectively), seismic data processing, and computation-intensive applications.

CENTRAL PROCESSOR

Although there are many variations in their internal architectures, the majority of currently available superminis are parallel, binary processors with a fixed word length of 32 bits.

The *number of directly addressable bytes* of main storage is one of the principal features that distinguishes the superminis from the smaller minicomputers. The short word lengths used in most minicomputers impose serious limitations upon the number of bits that can be assigned to hold the address part of each instruction. A typical 16-bit minicomputer instruction might consist of three parts: operation code, address mode field, and the address itself. If 6 bits are assigned to hold the operation code (permitting up to 64 distinct operations) and 2 bits are used to designate the addressing mode (permitting specification of indexing and/or indirect addressing), then only 8 bits are left to hold the address field. Since these 8 bits permit direct addressing of only 256 distinct memory locations, it is clear that other

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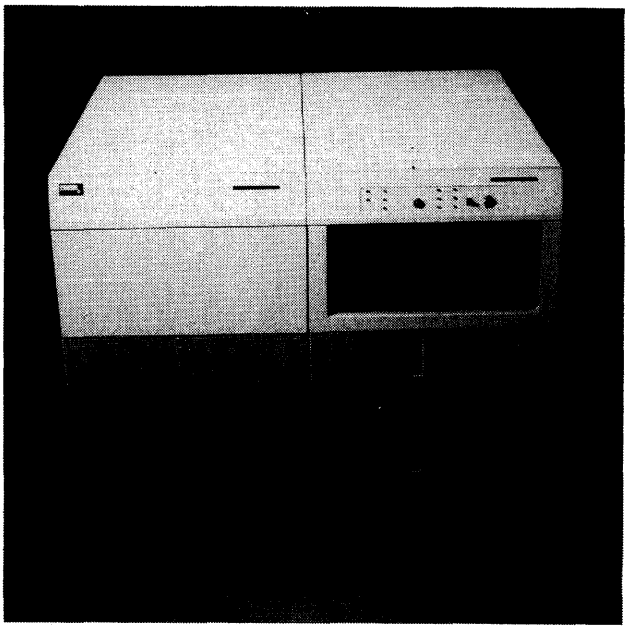
> means need to be employed to access most regions of the computer's main storage. The most common solutions to the problem are the use of multiword instructions, indexing, and indirect addressing.

The 32-bit word length used in most of today's superminis effectively removes this limitation. If just 16 of the 32 bits in each instruction word are used to hold the address field, up to 2^{16} or 65,536 distinct memory locations can be addressed. If a full 32-bit word is used to hold the address field, up to 2^{32} or 4.29 billion distinct locations (most of which would necessarily be in virtual memory rather than in real main storage) can be directly addressed.

Virtual memory is a facility that simplifies programming by providing a large addressable space on a high-speed disk storage unit that appears to the user as real main storage, and from which instructions and data are transferred into real main storage locations as required. Specialized hardware or software is required to perform the translations between virtual and real storage addresses, and to perform the necessary transfers of instructions and data between auxiliary storage and main storage. The number of addressable bytes of virtual memory is provided in this entry.

Hardware floating point facilities are included in the standard instruction repertoires of most currently available superminis. A hardware floating point removes the burden of performing floating point arithmetic from the CPU, and thus enhances system processing speed. In the absence of hardware floating point, floating point arithmetic would have to be performed through time- and space-consuming subroutines in the operating system.



Computer Consoles' Power 6/32 is a Unix-based system targeted toward office automation and software development applications. It can support over 128 users. Memory can be expanded to 8MB, and up to 8.2GB of online disk storage can be configured.

The entries under this heading usually indicate that the system's hardware floating point is single-precision (SP), double-precision (DP), triple-precision (TP), quadruple-precision (QP), or a combination of the foregoing. The precision of the floating point is an indication of the number of bits on which it can operate simultaneously, generally expressed in arithmetic increments of 32; for example, a single-precision floating point can operate on 32 bits simultaneously, a double-precision on 64, and so forth.

Battery backup permits an orderly shutdown of the system in the event of an electrical failure or another sudden interruption. If battery backup is not or cannot be implemented, all data in main storage at the time of the interruption can be lost. This entry indicates whether battery backup is standard, optional, or inapplicable to a system.

A *realtime clock or timer* is another essential element in most "time-conscious" systems. A realtime clock enables the program to determine the time of day, while an interval timer usually indicates the amount of time that has elapsed since the occurrence of some significant event. In many cases, the timer can trigger an interrupt signal when a predetermined interval of time has elapsed. The entry indicates whether the clock or timer is standard, optional, or inapplicable to the system.

CPU cycle time, nanoseconds indicates the time that elapses between the CPU's call for data and the delivery of that data from a storage device by the I/O section of the processor.

MIPS indicates how many millions of instructions the computer can execute per second. A MIPS rating is a commonly accepted means of assessing a system's performance.

The *16-/32-bit compatibility* entry indicates the extent of program compatibility between a supermini and the same vendor's 16-bit minicomputers (if any). "Direct" indicates that the vendor claims that the supermini's instruction set is a "compatible superset" of the instruction set used in the vendor's 16-bit computers, so that all programs written for the 16-bit computers can be executed without modification on the supermini. "Via mode bit" indicates that the supermini can be switched from its native operational mode into a "compatibility mode" in which it can execute some, if not all, of the programs written for the vendor's 16-bit computers.

MAIN STORAGE

Bytes fetched per cycle is the number of bytes accessed by main storage in a single read.

Cycle/access time, nanoseconds indicates two benchmarks of the system's main storage. The *cycle time* is a minimum time interval that must elapse between the starts of two successive accesses to any one storage location. Though cycle time ranks with word length as one of the most significant individual indicators of a computer's performance potential, one cannot assume that the computer >

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with the fastest cycle time will be the best overall performer in a particular application. Other parameters that have an important effect on a computer's performance include the flexibility and power of its instruction repertoire, the number of storage cycles it requires to execute each instruction, and its input/output capabilities. *Access time* is the actual elapsed time between the CPU's request for data and the time when that data is received (read) in memory.

Storage protection is a feature that prevents unauthorized writing in or reading from certain areas of main storage. The protection can be accomplished through hardware, software, or a combination of both. Though unnecessary in simple dedicated systems, an effective storage protection scheme is an essential element in multiprogramming and time-sharing environments. Some of the superminis feature elaborate storage protection schemes that divide the total logical address space into hierarchical segments or "rings" with varying degrees of protection against unauthorized access. The entry indicates whether storage protection is standard, optional, or inapplicable to the system.

Increment size, bytes denotes the size of the add-on units used to increase the system's main memory.

Cache memory is a high-speed storage unit that can significantly increase the performance of a computer by serving as a fast-access buffer between main storage and the central processor or the input/output subsystem. The entry indicates the capacity in bytes of the cache memory unit, if applicable to the system.

INPUT/OUTPUT CONTROL

The *number of I/O channels* indicates the maximum combination of high-speed and low-speed channels that can be used to connect peripheral controllers to the CPU. Low-speed lines are used to connect such devices as terminals, printers, and card equipment, while high-speed lines connect mass storage devices like disk and magnetic tape subsystems.

The *data transfer rate,* sometimes referred to as the "I/O bandwidth," is a measure of the computer's ability to transfer data to and from peripheral devices or other external sources through all available I/O channels, buses, and ports. The transfer rate is indicated in thousands or millions of bits per second (K or M bps) or thousands or millions of bytes per second (KB/sec. or MB/sec.).

COMMUNICATIONS

Maximum number of lines indicates how many data communications lines can be handled by a particular system. The types of lines are specified in the next two entries.

Synchronous lines are those featuring synchronous data transmission. In this mode of transmission, bits or characters (composed of 5 to 8 bits) of data pass through the line in blocks at a relatively constant rate regulated by synchronizing characters at the beginning of each block. The entries indicate whether synchronous lines are standard, optional, or not applicable to the system; where possible, the maximum speed of each line in bits per second (bps) is noted.

Asynchronous lines feature asynchronous data transmission, in which characters are transmitted individually at irregular rates. A start bit precedes each character, and a stop bit follows it. The entry tells whether asynchronous lines are standard, optional, or inapplicable, and also notes the line speed in bps.

Protocols supported indicates which intersystem communications conventions, if any, are supported through the availability of appropriate hardware and software facilities.

Type of LAN supported indicates local area networks that can be used to link the system to other computer systems within a limited area, such as an office building. An example would be Xerox's Ethernet LAN.

RJE terminals emulated indicates which of the popular remote job entry terminals, if any, the system can be equipped to emulate. Programs that emulate the functions of the IBM 2780, 3780, and Hasp terminals, for example, are available for most current superminis.

IBM 3270 emulation indicates whether the system can be equipped to emulate the functions of the widely used IBM 3270 display terminals.

PERIPHERAL EQUIPMENT

These entries provide details on the standard peripheral devices available for use with each computer system.

Disks supported indicates the types of disk media available for use on the system. Most responses indicate a mixture of fixed and removable disk drives. Fixed disk drives include those employing Winchester technology and those using older fixed-media technologies. Removable drives are those that employ disk packs and cartridges. This entry also supplies the storage capacities of the disk devices that are compatible with the system.

Serial printers generally range in speeds from about 30 to 600 or more characters per second (cps), employ various matrix and daisywheel technologies to print a character at a time, and are frequently able to print bidirectionally (that is, while the print head is moving in either direction across the page). These printers are usually used in smaller configurations, and provide excellent-quality hardcopy reports for far less money than the line-at-a-time printers usually used with larger systems. This entry indicates the speeds of the serial printers available for the system.

Letter-quality printers are low-speed serial printers (generally 30 to 55 cps) used in office automation applications to produce correspondence-quality documents. This entry provides the speeds of the letter-quality printers available for the system.

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Line printers operate at speeds of 100 to 2000 or more lines per minute (lpm) and are used most frequently in large configurations. This entry gives the speeds of the line printers available for use on the system.

Reel-to-reel tape drives indicates the applicability, the recording density in bits per inch (bpi), and the speed in inches per second (ips) of tape drives that accommodate industry-standard magnetic tape.

Streaming tape drives permit data to be transferred to a tape without the tape's stopping between data blocks; this high-speed transfer makes streaming tape drives valuable as backup media for fixed (especially Winchester) disks. This entry indicates the speed of the tape in inches per second (ips) and, where applicable, the presence of a start/stop mode that permits the streaming tape drive to emulate conventional tape subsystems.

Cassette/cartridge tape drives indicates the availability and recording densities in bits per inch (bpi) of I/O devices that accommodate low-cost magnetic tape cassettes or cartridges.

Other peripherals supported lists the additional peripheral devices that are available for each system. Typical entries include card readers and punches, plotters, laser printers, and graphics devices.

SOFTWARE

Software—the programming packages and languages used to direct the computer's operations—is a crucial component of any computer system. When you select a system, it is imperative that you carefully investigate the available software. Areas of investigation should include: operating systems; programming languages; preprogrammed utility packages, such as sorts and file maintenance; and application packages, such as payroll, graphics, CAD/CAM, and others. Prospective buyers should carefully note whether the software they will require is included in the cost of the system or offered at extra cost.

Vendors' claims and promises concerning the availability and capabilities of software should be carefully checked. This is particularly true of software that has been announced but not yet released. Sometimes the delivered product does not live up to its touted capabilities.

An *assembler* is a special-purpose program that uses the computer's power to facilitate the preparation of other programs. It enables the programmer to write his or her own programs in a simplified format that uses mnemonic operation codes and symbolic operand addresses. The assembler program then converts these symbolic instructions into their machine-language equivalents, producing computer programs ready for loading and execution. Entries here indicate the availability of an assembler, a macro assembler, or both. A macro assembler is another software tool to make the programmer's job easier. Macro routines can be called by the programmer and copied right into the program. This saves the programmer from having to recode the routine each time it is used, and also eliminates the possibility of keying errors when that part of the program is entered. As usual, there is a price to pay; macros usually consume large quantities of memory space.

Compilers are software tools that shift part of the program preparation task from the user to the computer itself by converting programs written in a simplified, procedure-oriented language into machine-language object programs. Compilers are now used in the vast majority of supermini installations because of their demonstrated ability to slash programming costs. This widespread availability has resulted from the development of more powerful central processors; compilation is an intricate process that requires the storage space and processing power provided by supermini systems.

Entries in this section of the charts may include widely used high-level programming languages like Cobol, RPG, Fortran, Basic, C, APL, PL/1, and Pascal, or proprietary languages that are available from a vendor for use on a particular system.

A word of warning here: if you use a language that is unique to a vendor, you may be faced with a problem if you eventually decide to change vendors. Your investment in software may be lost, for the programs generally will not operate on any other system.

The *operating system* facilitates the operation of a computer by handling such functions as: scheduling, loading, and supervising the execution of programs; allocating storage and I/O devices; initiating and controlling I/O operations; analyzing interrupt signals and dealing with errors; handling communications between the system and its human operator; and controlling multiprogramming or time-sharing operations.

The *operating system name* entry indicates, obviously, the name or names of the operating systems offered by the vendor for a specific system or model. A number of vendors offer more than one operating system for their machines. (For example, a manufacturer might offer both a proprietary realtime system and a timesharing, Unix-based operating system for the same supermini.)

Operating system type indicates the type of each operating systems available for the computer. Typical entries describing the available operating systems include: "batch," which means that the system processes one or more jobs sequentially and requires all data to be supplied before initiation; "interactive," which means that the system allows data and parameters to be entered as the job is executing; "realtime," which means that the system responds to external demands on a priority basis; or "timesharing," which means that the system allows multiple users to access the system and share all its resources at the same time. The operating systems for many of the current superminis are capable of supporting two, three, or all four of the above modes of operation simultaneously.

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Operating system implemented in firmware tells whether the language processor and the operating system are contained in microcode. The entries stipulate "fully", "partially", or "no" to indicate the extent of firmware implementation. Implementation of an operating system or language in firmware is advantageous to the user, for it frees more memory space for the user's programs and data. Also, because the microcode is generally contained in read-only memory, it is usually inaccessible to the user; thus, any possibility of the user's tampering with the language processor or operating system is eliminated and chances for error are reduced. Another advantage of firmware implementation is the ability to create more sophisticated and complex system functions at the hardware level. Microcode routines can be substituted for the usual subroutines, thereby increasing system performance.

A *database management system* (DBMS) is a software facility designed to manage and maintain data in a nonredundant structure so that the data will be conveniently available for processing by multiple applications. The DBMS organizes data elements in some predefined structure and keeps track of the relationships among the data elements, thereby facilitating information retrieval and report generation. The availability of an effective DBMS can greatly simplify applications programming tasks and increase the overall value of a data processing system. This entry provides the names of the principal database management systems available for the computer.

Principal industry application indicates the main types of software packages available for the computer's target market. Principal applications for the engineering/scientific market would include CAD/CAE and power generation; principal applications for the commercial market would include transaction processing, office automation, and general business packages. In some cases, the vendors have supplied the names of specific application packages for their target industries.

Other packages are those software products that are not principal market applications for the system; they are secondary packages that are available for use in the target market and collateral markets. For example, a vendor in the commercial market could list an office automation package as the principal industry application and a general accounting package—useful but not primary for the target market—as the other package.

PRICING & AVAILABILITY

Typical system configuration and price, intended to provide an accurate guide to the cost of the system, ideally shows a processor/peripheral configuration that would typically be used in the vendor's stated target business environment.

Although we requested full configurations and applicable prices, most vendors did not comply. Some provided only processor configurations and prices; others neglected altogether to provide hardware and pricing data. Where components and pricing for processor complexes only were supplied, we have left the information as is; potential buyers should thus be aware that the actual cost of a full system configuration could be many times that of the base processor price provided in the comparison chart. When vendors supplied no information, we developed our own sample configurations in many cases. Although we believe each configuration to be realistic and accurate, the reader must realize that, depending upon the configuration and pricing rules imposed by the vendor, the actual price of a workable system could vary from that supplied in the chart.

If you wish to buy two or more computers, it is worth noting that most of the manufacturers offer discounts from their list prices on orders for multiple computers.

Monthly maintenance of typical configuration provides the amount to be paid per month on a maintenance contract with the vendor for service and repair for the typical configuration.

Date of first delivery indicates when the first production model of each computer was delivered (or is scheduled to be delivered) to a customer.

Number installed to date shows how many systems of each type had been delivered to customers as of December 1984/January 1985.

COMMENTS

This final entry on the comparison charts is used to explain or amplify the preceding entries and to provide other pertinent information about each system's hardware, software, pricing, applications, or characteristics.

SUPERMINI MANUFACTURERS

Listed below, for your convenience in obtaining additional information, are the full names, addresses, and telephone numbers of the 24 vendors whose products are listed in the specification charts that follow.

Apollo Computer, Inc., 330 Billerica Road, Chelmsford, MA 01824. Telephone (617) 256-6600.

AT&T Information Systems, 1 Speedwell Avenue, Morristown, NJ. Telephone (201) 898-2000.

BTI Computer Systems, 870 West Maude Avenue, Sunnyvale, CA 94086. Telephone (408) 733-1122.

Computer Consoles, Inc. (CCI), 97 Humboldt Street, Rochester, NY 14609. Telephone (716) 482-5000.

Computer Designed Sytems, Inc., 10911 Olson Memorial Highway, Minneapolis, MN 55441. Telephone (612) 545-2855.

Data General Corporation, 4400 Computer Drive, Westboro, MA 01580. Telephone (617) 366-8911.

Digital Equipment Corporation (DEC), 146 Main Street, Maynard, MA 01754. Telephone (617) 897-5111.

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Elxsi, 2334 Lundy Place, San Jose, CA 95131. Telephone (408) 942-0900.

Formation, Inc., 823 East Gate Drive, Mt. Laurel, NJ 08054. Telephone (609) 234-5020.

Gould Inc., Computer Systems Division, 6901 West Sunrise Boulevard, Fort Lauderdale, FL 33313. Telephone (305) 587-2900.

Harris Corporation, Computer Systems Division, 2101 West Cypress Creek Road, Fort Lauderdale, FL 33309. Telephone (305) 974-1700.

Honeywell Information Systems, Inc., 200 Smith Street, Waltham, MA 02154. Telephone (617) 895-6000.

Ilene Industries Data Systems, Inc., 301 Stanley Boulevard, P.O. Box 186, Shelbyville, TN 37160. Telephone (615) 684-8731.

International Business Machines Corporation (IBM), Old Orchard Road, Armonk, NY 10504. Contact your local IBM representative.

Management Assistance Inc. (MAI), Basic Four Information Systems Division, 14101 Myford Road, Tustin, CA 92680. Telephone (714) 731-5100.

McDonnell Douglas Computer Systems Company (formerly Microdata Corporation), P.O. Box 19501, Irvine, CA 92713. Telephone (714) 250-1000.

Modular Computer Systems, Inc. (Modcomp), 1650 West McNab Road, Fort Lauderdale, FL 33309. Telephone (305) 974-1380.

NCR Corporation, 1700 South Patterson Boulevard, Dayton, OH 45479. Telephone (513) 445-2075.

Norsk Data N.A., 55 William Street, Wellesley, MA 02181. Telephone (617) 237-7945.

Perkin-Elmer Corporation, Data Systems Group, 2 Crescent Place, Oceanport, NJ 07757. Telephone (201) 870-4500.

Prime Computer, Inc., Prime Park, Natick, MA 01760. Telephone (617) 655-8000.

Sperry Corporation, Information Systems Group, P.O. Box 500, Blue Bell, PA 19424. Contact the local Sperry office.

Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, CA 95014. Telephone (408) 725-6000.

Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851. Telephone (617) 459-5000. □

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MANUFACTURER & MODEL	Apollo Computer, Inc. DN460	Apollo Computer, Inc. DN660	AT&T 3B5/100	AT&T 3B5/200
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB/4MB	1MB/4MB	1MB-8MB	1MB-8MB
DISK STORAGE CAPACITY	80MB-1GB	80MB-1GB	40MB-1.1GB	40MB-2.2GB
NO. WORKSTATIONS SUPPORTED	Single-user	Single-user	40	60
PRICE RANGE	$39,500-$54,500	$54,500-$79,000	From $57,000	From $73,000
TARGET MARKET	Engineering/scientific	Engineering/scientific	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	16M	—	—
Virtual memory	256MB	256MB	4GB	4GB
Hardware floating point	DP	DP	SP, DP	SP, DP
Battery backup	Standard	Standard	—	—
Real-time clock or timer	Standard	Standard	—	—
CPU cycle time, nanoseconds	—	—	—	—
MIPS	1.2	1.2	0.6	0.8
16-/32-bit compatibility	Not applicable	Not applicable	Not applicable	Not applicable
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	—	—	500	500
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	—	—	1M	1M
Cache memory, bytes	—	—	8K	8K
INPUT/OUTPUT CONTROL				
No. of I/O channels	3	3	—	25
Data transfer rate	12M bps	12M bps	4-8M bps	4-8M bps
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Not applicable	Not applicable	Std.; 56K bps	Std.; 56K bps
Asynchronous	19.2K bps	19.2K bps	Std.; 9600 bps	Std.; 9600 bps
Protocols supported	Hasp, X.25, TCP/IP, IBM 2780/3780 RJE	Hasp, X.25, TCP/IP, IBM 2780/3780 RJE	Async, Sync, TTY, RJE, UUCP	Async, Sync, TTY, RJE, UUCP
Type of LAN supported	Domain/Ethernet gateway	Domain/Ethernet gateway	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN
RJE terminals emulated	IBM 2780/3780 Hasp	IBM 2780/3780 Hasp	IBM 360 HASP	IBM 360 HASP
IBM 3270 emulation	Yes	Yes	—	—
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 80MB-1GB	Fixed & removable: 80MB-1GB	Fixed: 134MB; fixed/removable: 48MB	Fixed: 134MB; fixed/removable: 48MB
Serial printers	100/400 cps	100/400 cps	55-240 cps	55-240 cps
Letter-quality printers	Not applicable	Not applicable	—	—
Line printers	Not applicable	Not applicable	—	—
Reel-to-reel tape drives	Not applicable	Not applicable	—	—
Streaming tape drives	1600 bpi, 100 ips	1600 bpi, 100 ips	Start/stop; 25 ips	Start/stop; 25 ips
Cassette/cartridge tape drives	Not applicable	Not applicable	—	—
Other peripherals supported	Multibus, others	Multibus, others	—	—
SOFTWARE				
Assembler	—	—	—	—
Compilers	Fortran, C, Pascal, Lisp	Fortran, C, Pascal, Lisp	Fortran, C, Basic, RM/Cobol	Fortran, C, Basic, RM/Cobol
Operating system name	Aegis	Aegis	Unix System V	Unix System V
Operating system type	Multitasking	Multitasking	Timesharing	Timesharing
Operating sys. implemented in firmware	Partially	Partially	—	—
Database management system	D3M	D3M	dBase II, AT&T Ingres	dBase II, AT&T Ingres
Principal industry application	CAD/CAM/CIM/CAE, structural analysis, simulation, molecular modeling	CAD/CAM/CIM/CAE, structural analysis, simulation, molecular modeling	General business	General business
Other packages	Over 350 third-party packages	Over 350 third-party packages	OA, communications management control	OA, communications management control
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 1MB main memory; 80MB disk; multimode printer: $55,800	CPU; 1MB main memory; 80MB disk; multimode printer: $70,800	CPU; 2MB memory; 2 async controllers; 16 terminals; 48MB fixed/removable disk; two 134MB fixed disks; two 240 cps dot-matrix printers; Unix System V: $112,810	CPU; 2MB memory; 3 async controllers; 24 terminals; 48MB fixed/removable disk; two 134MB fixed disks; (3) 240 cps dot-matrix printers; Unix System V: $135,965
Monthly maintenance of typical configuration	$560	$709	$649	$826
Date of first delivery	1st quarter 1984	1st quarter 1984	March 1984	March 1984
Number installed to date	—	—	—	—
COMMENTS	High-performance monochrome engineering workstation	High-performance color engineering workstation		

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MANUFACTURER & MODEL	AT&T 3B5/300	AT&T 3B20S	AT&T 3B20A	AT&T 3B20D
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-8MB	2MB-16MB	2MB-16MB (per CPU)	5MB-16MB
DISK STORAGE CAPACITY	40MB-1.1GB	256MB-8.8GB	256MB-8.8GB	279MB-10.5GB
NO. WORKSTATIONS SUPPORTED	60	256	256	256
PRICE RANGE	From $101,500	From $230,000	From $330,000	From $340,000
TARGET MARKET	General business	Custom applications	Custom applications	Commercial transaction processing
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	4GB	16MB	16MB	16MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	—	Standard	Standard	Optional
Real-time clock or timer	—	—	—	—
CPU cycle time, nanoseconds	—	—	—	—
MIPS	0.8	1.0	1.5-1.8	0.9
16-/32-bit compatibility	Not applicable	Not applicable	Not applicable	Not applicable
MAIN STORAGE				
Bytes fetched per cycle	—	4	4	4
Cycle/access time, nanoseconds	500	400	400	400 (with cache)
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M	1M	1M	1M
Cache memory, bytes	8K	8K	8K (per CPU)	8K (opt.)
INPUT/OUTPUT CONTROL				
No. of I/O channels	25	—	—	—
Data transfer rate	4-8M bps	—	—	—
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Std.; 56K bps	9600 bps	9600 bps	9600 bps
Asynchronous	Std.; 9600 bps	9600 bps	9600 bps	9600 bps
Protocols supported	Async, Sync, TTY, RJE, UUCP	X.25, HDLC, RJE, UUCP, Hyperchannel	X.25, HDLC, RJE, UUCP, Hyperchannel	X.25, HDLC, RJE, UUCP, Hyperchannel
Type of LAN supported	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN	Ethernet, ISN
RJE terminals emulated	IBM 360 HASP	Yes	Yes	Yes
IBM 3270 emulation	—	—	—	—
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 134MB; fixed/removable: 48MB	Winchester: 279MB, 550MB; removable: 256MB	Winchester: 279MB, 550MB; removable: 256MB	Winchester: 279MB
Serial printers	55-240 cps	—	—	—
Letter-quality printers	—	—	—	—
Line printers	—	300/600/900/1200 lpm	300/600/900/1200 lpm	300/600/900/1200 lpm
Reel-to-reel tape drives	—	1600-6250 bpi/25-125 ips	1600-6250 bpi/25-125 ips	1600-6250 bpi/25-125 ips
Streaming tape drives	Start/stop; 25 ips	Start/stop; 25 ips	Start/stop; 25 ips	Start/stop; 25 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	—	—	—	—
SOFTWARE				
Assembler	—	—	—	—
Compilers	Fortran, C, Basic, RM/Cobol	Fortran, C, Basic, Pascal, LPI/Cobol	Fortran, C, Basic, Pascal, LPI/Cobol	Fortran, C, Basic, Pascal, LPI/Cobol
Operating system name	Unix System V	Unix System V	Unix System V	Unix RTR
Operating system type	Timesharing	Timesharing	Timesharing	Timesharing, realtime
Operating sys. implemented in firmware	—	—	—	—
Database management system	dBase II, AT&T Ingres	—	—	—
Principal industry application	General business	—	—	—
Other packages	OA, communications management control	Third-party packages	Third-party packages	—
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 4MB memory; 3 async controllers; 24 terminals; 9-track tape; two 134MB fixed disk drives; three 120 cps dot-matrix printers; Unix System V: $152,315	CPU; 4MB memory; console; 1600 bpi tape; three 256MB removable disk drives; 7 async comm. controllers; 40 terminals; 1200 lpm band printer; Unix System V: $381,100	CPU; 8MB memory; console; 1600 bpi tape; three 256MB removable disk drives; 7 async comm. controllers; 40 terminals; 1200 lpm band printer; Unix System V: $490,900	2 CPUs; 8MB memory; console; 9-track tape; three 279MB Winchester disk drives; 64 terminals; two 1200 lpm band printers: $511,680
Monthly maintenance of typical configuration	$1,922.50	$3,452	$3,549	Contact vendor
Date of first delivery	June 1984	March 1984	March 1984	March 1984
Number installed to date	—	—	—	—
COMMENTS			Dual processor system based on 3B20S	

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MANUFACTURER & MODEL	BTI Computer Systems BTI 8000	Computer Consoles, Inc. Power 6/32	Computer Designed Systems, Inc. Adviser 1400/32	Computer Designed Systems, Inc. Adviser 1800/64
WORD LENGTH	32 bits	32 bits	32+8 bits	64+8 bits
MAIN MEMORY	1MB-16MB	4MB-8MB	256KB-32MB	256KB-64MB
DISK STORAGE CAPACITY	64MB-8GB	160MB-8.2GB	24GB	54GB
NO. WORKSTATIONS SUPPORTED	256	128+	256	600+
PRICE RANGE	$110,000-$700,000	$165,000-$550,000	$35,000-$300,000	$40,000-$550,000
TARGET MARKET	General business	High-end Unix	Interactive applications, commercial	Interactive applications, commercial
CENTRAL PROCESSOR				
No. of directly addressable bytes	500K	1G	256M	512M
Virtual memory	500KB	2GB	Optional	Optional
Hardware floating point	DP	SP, DP, functions	SP, DP	SP, DP
Battery backup	Standard	Standard	Optional	Optional
Real-time clock or timer	Standard	Standard	Optional	Optional
CPU cycle time, nanoseconds	250	100	50	35
MIPS	—	8	—	—
16-/32-bit compatibility	Basic only	—	Optional	Optional
MAIN STORAGE				
Bytes fetched per cycle	—	4	8	16
Cycle/access time, nanoseconds	667	100	0.2	0.1
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M	4MB	512K	512K
Cache memory, bytes	None	56K	32K	64K
INPUT/OUTPUT CONTROL				
No. of I/O channels	32	25	612	—
Data transfer rate	67M bps	11MB/second	19.6MB/sec.	24.6MB/sec.
COMMUNICATIONS				
Max. number of lines	256	128	164	228
Synchronous	No	Opt.; 307K bps	Optional	Optional
Asynchronous	Std.; 19.2K bps	Std.; 19.2K bps	Optional	Optional
Protocols supported	2780/3780	BSC, SNA, X.25	All IBM	All IBM
Type of LAN supported	Not applicable	Ethernet	SNA, Ethernet, X.25	SNA, Ethernet, X.25
RJE terminals emulated	Not applicable	2780/3780	IBM	IBM
IBM 3270 emulation	Not applicable	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 64MB-254MB	Fixed & removable (16): 160/300/340/515MB	3GB	6.2GB
Serial printers	30/1200 cps	400 cps	—	—
Letter-quality printers	Not applicable	35/55 cps	—	—
Line printers	300-1200 lpm	300/600/1000 lpm	—	—
Reel-to-reel tape drives	800/1600 bpi	—	—	—
Streaming tape drives	—	1600/6250 bpi, 100 ips	—	—
Cassette/cartridge tape drives	45 ips	—	—	—
Other peripherals supported	Not applicable	—	—	—
SOFTWARE				
Assembler	Relocatable assembler	Yes	Assembler	Assembler
Compilers	Cobol, Fortran, Pascal, Basic	C, Fortran, Cobol, Pascal	—	—
Operating system name	—	Unix BSD 4.2/System V	Avos	Avos
Operating system type	Proprietary multitasking	Multitasking	Realtime, multitasking	Realtime, multitasking
Operating sys. implemented in firmware	Not applicable	—	Partially	Partially
Database management system	BTI/FMS	Ingres	Avos-Relational	Avos-Relational
Principal industry application	General business	Software development, office automation	Commercial	Commercial
Other packages	Not applicable	Office automation	—	—
PRICING & AVAILABILITY				
Typical system configuration and price	CPU with 1MB main memory; 64MB mass storage unit; cartridge tape drive; 8 comm. lines: $110,000	CPU; 8MB main memory; two 340MB disks; 6250 bpi tape drive; 600 lpm printer; 64 async ports; Unix license: $296,000	CPU with 256KB memory; power supply; console; printer; terminal; 80MB disk: $71,000	CPU with 256KB memory; power supply; console; printer; terminal; 80MB disk: $89,000
Monthly maintenance of typical configuration	$827	$1,750	$724	$910
Date of first delivery	2nd quarter 1982	3rd quarter 1984	June 1980	March 1981
Number installed to date	50	50	—	—
COMMENTS	Multiprocessor system with up to 8 CPUs		Accelerator gate array tri-port CPU	Accelerator gate array quad-port CPU

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MANUFACTURER & MODEL	Data General Corp. Eclipse MV/4000 SC	Data General Corp. Eclipse MV/4000 DC	Data General Corp. Eclipse MV/4000	Data General Corp. Eclipse MV/8000 C
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-4MB	2MB-8MB	1MB-8MB	1MB-4MB
DISK STORAGE CAPACITY	38.6MB-77.2MB	70MB-240MB	50MB-9.4GB	50MB-9.4GB
NO. WORKSTATIONS SUPPORTED	8	16	64	128
PRICE RANGE	From $38,400	Contact vendor	From $25,000	From $58,000
TARGET MARKET	General business, office automation	General business, office automation	General business, office automation	General business, office automation
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	64K-512M	—	—
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	—	—	—	—
Real-time clock or timer	—	—	—	Standard
CPU cycle time, nanoseconds	—	—	—	—
MIPS	0.6	—	0.6	1.2
16-/32-bit compatibility	Direct	Direct	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	200	200	200	220
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 2M	1M, 2M, 4M, 8M	512K, 1M, 2M	4M
Cache memory, bytes	None	None	None	16K
INPUT/OUTPUT CONTROL				
No. of I/O channels	2	—	9	8
Data transfer rate	—	3MB/sec.	5MB/sec.	—
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Opt.; 56K bps	Opt.; 56K bps	Opt.; 888KB/sec.	Opt.; 888KB/sec.
Asynchronous	Std.; 38.4K bps	Std.; 38.4K bps	Optional	Optional
Protocols supported	TCP/IP; X.25	X.25, SDLC, Hasp II	X.25, SDLC, Hasp II, SNA	X.25, SDLC, Hasp II, SNA
Type of LAN supported	Xodiac, IEEE802	Xodiac, IEEE802	Xodiac, IEEE802	Xodiac, IEEE802
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Winchester: 38.6MB, 120MB	Winchester: 70MB, 120MB	Fixed: 73MB-592MB; removable: 96MB-277MB	Fixed: 73MB-592MB; removable: 96MB-277MB
Serial printers	340 cps	340 cps	340 cps	340 cps
Letter-quality printers	35/55 cps	35/55 cps	35/55 cps	35/55 cps
Line printers	—	—	230-1200 lpm	230-1200 lpm
Reel-to-reel tape drives	Not applicable	Not applicable	800-6250 bpi, 75 ips	800-6250 bpi, 75 ips
Streaming tape drives	Not applicable	Not applicable	Start/stop; 30 ips	Start/stop; 30 ips
Cassette/cartridge tape drives	6400 bpi, 60 ips	6400 bpi, 60 ips	Not applicable	Not applicable
Other peripherals supported	Diskette	Diskette	Laser printers	Laser printers
SOFTWARE				
Assembler	—	—	—	—
Compilers	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp
Operating system name	AOS/VS; MV/UX; DG/UX	AOS/VS; MV/UX; DG/UX	See Comments	See Comments
Operating system type	Multiprogram.; timeshare	Multiprogram.; timeshare	Multipr.; r-t; timeshare	Multipr.; r-t; timeshare
Operating sys. implemented in firmware	—	—	—	—
Database management system	DG/DBMS, DG/SQL	DG/DBMS, DG/SQL	DG/DBMS, DG/SQL	DG/DBMS, DG/SQL
Principal industry application	CEO (Comprehensive Electronic Office), CFO	CEO (Comprehensive Electronic Office), CFO	CEO (Comprehensive Electronic Office), CFO	CEO (Comprehensive Electronic Office), CFO
Other packages	Third-party packages	Third-party packages	Third-party packages	Third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 1MB memory; 737KB floppy disk; 38MB disk; 8 async/2 sync comm. lines; IEEE 802.3 interface; DG/UX operating system; software entitlements: $34,800	Contact vendor	CPU; 1MB memory; 73MB disk; 1600 bpi tape drive; 8-line async controller; Dasher D410 terminal; 2 cabinets; AOS/VS right-to-use: $62,000	CPU; 1MB memory; 147MB fixed disk; streaming tape drive; 600 lpm band printer; 16-line async comm. controller; 16 terminals; AOS/VS operating system: $134,200
Monthly maintenance of typical configuration	$269	Contact vendor	$391	$1,021
Date of first delivery	September 1984	1985	December 1982	March 1984
Number installed to date	—	—	—	—
COMMENTS			Runs AOS/VS, AOS/RT32, DG/UX, MV/UX operating systems	Runs AOS/VS, AOS/RT32, DG/UX, MV/UX operating systems

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MANUFACTURER & MODEL	Data General Corp. Eclipse MV/8000 II	Data General Corp. Eclipse MV/10000	Digital Equipment Corporation (DEC) VAX-11/725	Digital Equipment Corporation (DEC) VAX-11/730
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-12MB	1MB-16MB	1MB-3MB	1MB-5MB
DISK STORAGE CAPACITY	50MB-14.2GB	73MB-28.4GB	52MB	20MB-2GB
NO. WORKSTATIONS SUPPORTED	128	192	8	24
PRICE RANGE	From $81,000	From $154,000	From $24,950	From $21,500
TARGET MARKET	General business, office automation	General business, office automation	General business, engineering/scientific	General business, engineering/scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	SP, DP	SP, DP, integer funct.	SP, DP, extended	SP, DP, extended
Battery backup	—	—	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	270	270
MIPS	1.2	2.5	—	0.36
16-/32-bit compatibility	Direct	Direct	Via mode bit	Via mode bit
MAIN STORAGE				
Bytes fetched per cycle	—	—	4	4
Cycle/access time, nanoseconds	220	140	810	810
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 2M	1M, 2M	1M	1M
Cache memory, bytes	16K	16K	None	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	13	23	—	—
Data transfer rate	18MB/sec.	28MB/sec.	1.5MB/sec.	1.5MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Opt.; 888KB/sec.	Opt.; 888KB/sec.	Std.; 19.2K bps	Std.; 19.2K bps
Asynchronous	Optional	Optional	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	X.25, SDLC, Hasp II, SNA	X.25, SDLC, Hasp II, SNA	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync
Type of LAN supported	Xodiac, IEEE802	Xodiac, IEEE802	Ethernet	Ethernet
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 73MB-592MB; removable: 96MB-277MB	Fixed: 73MB-592MB; removable: 96MB-277MB	Fixed/removable: 52MB	Fixed & removable: 10.4MB-456MB
Serial printers	340 cps	340 cps	40-240 cps	40-240 cps
Letter-quality printers	35/55 cps	35/55 cps	25-34 cps	25-34 cps
Line printers	230-1200 lpm	230-1200 lpm	170-1200 lpm	170-1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 75 ips	800-6250 bpi, 75 ips	—	—
Streaming tape drives	Start/stop; 30 ips	Start/stop; 30 ips	Start/stop; 25 ips	Start/stop; 25 ips
Cassette/cartridge tape drives	Not applicable	Not applicable	Not applicable	Not applicable
Other peripherals supported	Laser printers	Laser printers	Laser printers, voice synthesis, graphics dev.	Laser printers, voice synthesis, graphics dev.
SOFTWARE				
Assembler	—	—	Macro assembler	Macro assembler
Compilers	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal
Operating system name	See Comments	See Comments	VAX/VMS	VAX/VMS; Ultrix-32
Operating system type	Multipr.; r-t; timeshare	Multipr.; r-t; timeshare	Batch, realtime	Batch, r.-t.; timeshare
Operating sys. implemented in firmware	—	—	No	No
Database management system	DG/DBMS, DG/SQL	DG/DBMS, DG/SQL	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb
Principal industry application	CEO (Comprehensive Electronic Office), CFO	CEO (Comprehensive Electronic Office), CFO	General business, engineering scientific	General business, engineering scientific
Other packages	Third-party packages	Third-party packages	Office automation, numerous third-party packages	Office automation, numerous third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 2MB memory; 16-line async controller; tape unit; 190MB disk sub-system; cabinet; system console; AOS/VS right-to-use: $163,000	CPU; 2MB memory; 16-line async controller; 190MB disk; 800/1600 bpi tape drive: $232,000	CPU; 2MB memory; 2 cartridge tape drives; 52MB f/r disk; async comm. controller; Ethernet adapter; 4 workstations; 170 lpm dot-matrix printer; VAX/VMS lic. & warranty; DECnet license: $53,630	CPU; 2MB memory; dual cassette tape; 121MB fixed disk; comm. interface; streaming tape; 20 workstations; two 300 lpm printers; VAX/VMS license: $88,345
Monthly maintenance of typical configuration	$967	$1,500	$422	$692
Date of first delivery	August 1983	May 1983	November 1983	May 1982
Number installed to date	—	—	—	—
COMMENTS	Runs AOS/VS, AOS/RT32, DG/UX, MV/UX operating systems	Runs AOS/VS, AOS/RT32, DG/UX, MV/UX operating systems		

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MANUFACTURER & MODEL	Digital Equipment Corporation (DEC) VAX-11/750	Digital Equipment Corporation (DEC) VAX-11/780	Digital Equipment Corporation (DEC) VAX-11/782	Digital Equipment Corporation (DEC) VAX-11/785
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-8MB	2MB-64MB	1MB-8MB	2MB-64MB
DISK STORAGE CAPACITY	121MB-19GB	121MB-30GB	121MB-30GB	121MB-30GB
NO. WORKSTATIONS SUPPORTED	128	384	384	384
PRICE RANGE	From $54,000	From $145,000	From $320,000	From $195,000
TARGET MARKET	General business, engineering/scientific	General business, engineering/scientific	General business, engineering/scientific	General business, engineering/scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP, QP
Battery backup	Optional	Optional	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	320	200	200	133
MIPS	0.72	1.06	1.9 (approx.)	1.5 (approx.)
16-/32-bit compatibility	Via mode bit	Via mode bit	Via mode bit	Via mode bit
MAIN STORAGE				
Bytes fetched per cycle	8	8	8	8
Cycle/access time, nanoseconds	400 (cache enabled)	290 (cache enabled)	290 (cache enabled)	166 (cache enabled)
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 2M, 3M, 4M	2M, 4M	—	2M, 4M
Cache memory, bytes	4K	8K	8K	32K
INPUT/OUTPUT CONTROL				
No. of I/O channels	1-5	1-8	1-8	1-8
Data transfer rate	1.5-2MB/sec.	13.3MB.sec.	13.3MB.sec.	13.3MB.sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Opt.; 1MB/sec.	Opt.; 1MB/sec.	Opt.; 1MB/sec.	Opt.; 1MB/sec.
Asynchronous	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 19.2K bps
Protocols supported	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 121/456/516MB; rem.: 10.4/205/256MB	Fixed: 121/456/516MB; rem.: 10.4/205/256MB	Fixed: 121/456/516MB; rem.: 10.4/205/256MB	Fixed: 121/456/516MB; rem.: 10.4/205/256MB
Serial printers	40-240 cps	40-240 cps	40-240 cps	40-240 cps
Letter-quality printers	25-34 cps	25-34 cps	25-34 cps	25-34 cps
Line printers	170-1200 lpm	170-1200 lpm	170-1200 lpm	170-1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips
Streaming tape drives	Start/stop; 25 ips	Start/stop; 25 ips	Start/stop; 25 ips	Start/stop; 25 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Laser printers, voice synthesis, graphics dev.	Laser printers, voice synthesis, graphics dev.	Laser printers, voice synthesis, graphics dev.	Laser printers, voice synthesis, graphics dev.
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal
Operating system name	VAX/VMS; Ultrix-32	VAX/VMS; Ultrix-32	VAX/VMS	VAX/VMS; Ultrix-32
Operating system type	Batch, r.-t.; timeshare	Batch, r.-t.; timeshare	Batch, realtime	Batch, r.-t.; timeshare
Operating sys. implemented in firmware	No	No	No	No
Database management system	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb
Principal industry application	General business, engineering scientific	General business, engineering scientific	General business, engineering scientific	General business, engineering scientific
Other packages	Office automation, numerous third-party packages	Office automation, numerous third-party packages	Office automation, numerous third-party packages	Office automation, numerous third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 3MB memory; 2 mag. tapes; 121MB fixed disk; 256MB rem. disk; async.-comm. interface; hard-copy console; 20 terminals; two 600 lpm printers; VAX/VMS lic. & warranty: $206,195	CPU; 4MB memory; four 456MB fixed disks; 4 tape drives; two comm. controllers; console; 40 terminals; 1200/800 lpm printer; 12 ppm laser ptr.; VAX/VMS: $396,515	Dual CPU; 4MB shared memory; four 456MB fixed disks; 4 tape drives; 12 ppm laser ptr.; two 600 lpm ptrs.; 60 terminals; VAX/VMS: $575,395	CPU; 4MB memory; four 456MB fixed disks; 4 tape drives; 2 comm. controllers; console; 40 terminals; 1200/800 lpm printer; 12 ppm laser ptr.; VAX/VMS: $442,515
Monthly maintenance of typical configuration	$1,303	$2,577	$3,697	$2,416
Date of first delivery	November 1980	January 1978	April 1982	June 1984
Number installed to date	—	—	—	—
COMMENTS	Can be configured in VAXcluster with 15 other processors and storage controllers	Can be configured in VAXcluster with 15 other processors and storage controllers	Asymmetrical, dual 11/780 system using r shared memory	Can be configured in VAXcluster with 15 other processors and storage controllers

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MANUFACTURER & MODEL	Digital Equipment Corporation (DEC) VAX 8600	Elxsi System 6400	Formation, Inc. F4000 Information System	Formation, Inc. F4000-AP Information System
WORD LENGTH	32 bits	64 bits	32 bits	32 bits
MAIN MEMORY	12MB-32MB	8MB-192MB	256KB-8MB	256KB-8MB
DISK STORAGE CAPACITY	456MB-164GB	Up to 100GB	70MB-5GB	70MB-5GB
NO. WORKSTATIONS SUPPORTED	512	1,000	46	—
PRICE RANGE	From $500,000	$350,000-$2,000,000	$75,000-$300,000	$100,000-$300,000
TARGET MARKET	General business, engineering/scientific	Scientific/engineering, CAD/CAM/CAE	OEM, software development	OEM, software development
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	2G	16M	16M
Virtual memory	4GB	4GB	16MB	16MB
Hardware floating point	SP, DP, QP; accelerated	SP, DP, double extended	DP	DP
Battery backup	Standard	Optional	None	None
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	80	50	200	200
MIPS	4.45 (approx.)	6-60	0.225	0.4
16-/32-bit compatibility	Via mode bit	Not applicable	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	8	16	4	4
Cycle/access time, nanoseconds	560	400	800/200	800/200
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	4M	8M	256KB or 1MB	256KB or 1MB
Cache memory, bytes	16K write-back	16K-160K	None	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	1-11	8	4	4
Data transfer rate	20MB/sec.	64MB/sec.	5MB/sec.	5MB/sec.
COMMUNICATIONS				
Max. number of lines	—	Over 1,000	100	100
Synchronous	Opt.; 1MB/sec.	Optional	Opt.; 19.2K bps	Opt.; 19.2K bps
Asynchronous	Opt.; 19.2K bps	Std.; 19.2K bps	Opt.; 9600 bps	Opt.; 9600 bps
Protocols supported	SDLC, HDLC, DDCMP, X.25, ADCCP, SNA, DNA, Bisync	Hasp	SDLC, BSC, ASCII	SDLC, BSC, ASCII
Type of LAN supported	Ethernet	Ethernet	SNA	SNA
RJE terminals emulated	IBM 2780/3780	Hasp	Hasp	Hasp
IBM 3270 emulation	Yes	No	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 121/456/516MB; rem.: 10.4/205/256MB	Fixed & removable: 300MB-474MB	Fixed: 100/135/635MB	Fixed: 100/135/635MB
Serial printers	40-240 cps	Not applicable	180 cps	180 cps
Letter-quality printers	25-34 cps	55 cps	None	None
Line printers	170-1200 lpm	600/1200 lpm	300/600/1000 lpm	300/600/1000 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-125 ips	800-6250 bpi, 125 ips	72/200KB	72/200KB
Streaming tape drives	Start/stop; 25 ips	Not applicable	None	None
Cassette/cartridge tape drives	—	Not applicable	None	None
Other peripherals supported	Laser printers, voice synthesis, graphics dev.	Graphics devices and terminals	Card reader, byte multiplexer	Card reader, byte multiplexer
SOFTWARE				
Assembler	Macro assembler	Assembler	Assembler	Assembler
Compilers	Fortran, RPG II, Lisp, DSM, Cobol, Basic, C, PL/1, Ada, Pascal	Cobol, Fortran, Pascal, C, Basic, Mainsail	Cobol, Fortran, Basic, RPG II, PL/1	Cobol, Fortran, Basic, PL/1
Operating system name	VAX/VMS	Embos; Elxsi Unix	Batch, r.-t., timeshare	Batch, r.-t., timeshare
Operating system type	Batch, realtime	Interact., batch, r.-t.	Partially	Partially
Operating sys. implemented in firmware	No	Partially	TMS; any 370-compatible	TMS; any 370-compatible
Database management system	VAX DBMS, VAX Rdb	EDMS (relational)	Program development, online applications	Program development, online applications
Principal industry application	General business, engineering scientific	CAD/CAM/CAE, seismic, semiconductor, aerospace, univ. research		
Other packages	Office automation, numerous third-party packages	Numerous third-party packages	IBM 370-compatible packages	IBM 370-compatible packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 12MB memory; 104 async lines; four 456MB fixed disks; tape drive; 1200/800 lpm ptr.; 12 ppm laser ptr.; 10 workstation ptrs.; 64 terminals; DECnet & VAX/VMS: $806,760	CPU; 8MB main memory; disk drive; tape drive; line printer; communications lines; terminals: $475,000	CPU with 1MB main memory; 135MB disk; 72KB tape; 300 lpm printer; console; service processor; 8 workstations: $100,300	CPU and auxiliary processor; 2MB main memory; 135MB disk; 72KB tape; 300 lpm printer; service processor; console; 8 workstations: $123,800
Monthly maintenance of typical configuration	$3,893	$2,500	$852	$852
Date of first delivery	April 1985	1983	3rd quarter 1981	1982
Number installed to date	Not applicable	80	70	70
COMMENTS	Can be configured in VAXcluster with 15 other processors and storage controllers; ECL-based	Expandable to 10 CPUs for linear performance growth without changing hardware/user software	Optional fault tolerant configuration. Software-compatible with IBM 370	Optional fault tolerant configuration. Software-compatible with IBM 370

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MANUFACTURER & MODEL	Gould, Inc. Concept 32/27	Gould, Inc. Concept 32/67	Gould, Inc. Concept 32/97	Gould, Inc. PowerNode 6000
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	512KB-16MB	1MB-16MB	4MB-16MB	2MB-16MB
DISK STORAGE CAPACITY	80MB-5.4GB	80MB-5.4GB	80MB-5.4GB	80MB-5.4GB
NO. WORKSTATIONS SUPPORTED	32	128	128	128
PRICE RANGE	$75,000-$150,000	$100,000-$250,000	$300,000-$500,000	$100,000-$250,000
TARGET MARKET	Engineering/scientific	Engineering/scientific	Engineering/scientific	Unix applications
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	16M	16M	16M
Virtual memory	Not applicable	Not applicable	Not applicable	16MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Optional	Not applicable	Not applicable	Not applicable
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	150	150	75	150
MIPS	0.8	1.7-3.0	4.7-10.0	1.7-3.0
16-/32-bit compatibility	Not applicable	Not applicable	Not applicable	Not applicable
MAIN STORAGE				
Bytes fetched per cycle	4	4	4	4
Cycle/access time, nanoseconds	300	300	300	300
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	256KB, 500KB, 1MB	1MB	1MB	1MB
Cache memory, bytes	None	32K	32K std.; 64K opt.	32K
INPUT/OUTPUT CONTROL				
No. of I/O channels	128	128	128	128
Data transfer rate	26.67MB/sec.	26.67MB/sec.	26.67MB/sec.	26.67MB/sec.
COMMUNICATIONS				
Max. number of lines	32	—	—	—
Synchronous	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps
Asynchronous	—	—	—	—
Protocols supported	—	—	—	—
Type of LAN supported	GM-MAP	GM-MAP	GM-MAP	Ethernet
RJE terminals emulated	—	—	—	—
IBM 3270 emulation	—	—	—	—
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB
Serial printers	120/350 cps	120/350 cps	120/350 cps	120/350 cps
Letter-quality printers	30/55 cps	30/55 cps	30/55 cps	30/55 cps
Line printers	300/600/1000 lpm	300/600/1000 lpm	300/600/1000 lpm	300/600/1000 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips
Streaming tape drives	Start/stop, 100 ips	Start/stop, 100 ips	Start/stop, 100 ips	Start/stop, 100 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Card, paper tape, analog I/O, graphics devices	Array processor, graphics devices	Array processor, graphics devices	Graphics devices
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Fortran, Cobol, Pascal, Basic	Fortran, Cobol, Pascal	Fortran, Cobol, Pascal, Basic	Fortran, Pascal, C, Ada
Operating system name	MPX-32	MPX-32; UTX-32	MPX-32; UTX-32	UTX-32
Operating system type	Realtime	Realtime; multitasking	Realtime; multitasking	Multitasking
Operating sys. implemented in firmware	No	No	No	No
Database management system	Seed/Relgraph/Total	Seed/Relgraph/Total	Seed/Relgraph/Total	Mistress/Unify
Principal industry application	Simulation, scientific computing	Scientific computing	Scientific computing	—
Other packages	—	—	—	Q-Office, spreadsheets
PRICING & AVAILABILITY				
Typical system configuration and price	CPU with 1MB main memory; 680MB mass storage; 300 lpm printer; tape unit; 8 communications lines; CRTs: $98,000	6731: CPU, 1MB memory; Floating Point Accelerator; 8 async lines; CRT; 340MB miniWinchester disk subsystem; add-on 340MB disk; streaming tape subsystem; MPX-32 operating system; Fortran 77: $140,945	9705: CPU, 4MB memory;. Floating Point Accelerator; 8 async lines; CRT; 340MB miniWinchester disk subsystem; add-on 340MB disk; streaming tape subsystem; Unix operating system; Fortran 77: $300,200	6031E: CPU, 2MB memory; Floating Point Accelerator; CRT; 8 async lines; 340MB disk subsystem; add-on 340MB disk; streaming tape subsystem; Unix operating system; Fortran 77: $122,900
Monthly maintenance of typical configuration	$900	$1,012	$1,715	$1,142
Date of first delivery	—	—	—	—
Number installed to date	Not applicable	Not applicable	Not applicable	Not applicable
COMMENTS	Single-slot 32-bit CPU	Available with tightly coupled dual processor (Internal Processing Unit)	Available with tightly coupled dual processor (Internal Processing Unit)	Available with tightly coupled dual processor (Internal Processing Unit)

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MANUFACTURER & MODEL	Gould, Inc. PowerNode 9000	Harris Corporation H60	Harris Corporation H700	Harris Corporation H800
WORD LENGTH	32 bits	48 bits	48 bits	48 bits
MAIN MEMORY	4MB-16MB	768KB-12MB	384KB-12MB	768KB-12MB
DISK STORAGE CAPACITY	80MB-5.4GB	80MB-1.6GB	80MB-22.7GB	80MB-22.7GB
NO. WORKSTATIONS SUPPORTED	128	32	128	128
PRICE RANGE	$300,000-$500,000	$69,900-$120,000	$49,900-$62,000	$139,000-$170,000
TARGET MARKET	Unix applications	Engineering/scientific	Engineering/scientific	Engineering/scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	12M	12M	12M
Virtual memory	16MB	48MB	48MB	48MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Not applicable	None	None	None
Real-time clock or timer	Standard	Optional	Optional	Optional
CPU cycle time, nanoseconds	75	300	300	180
MIPS	4.6-10.0	0.88 (single precision)	0.88 (single precision)	1.6 (single precision)
16-/32-bit compatibility	Not applicable	Not applicable	Not applicable	Not applicable
MAIN STORAGE				
Bytes fetched per cycle	4	—	—	—
Cycle/access time, nanoseconds	300	335	335	335
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1MB	1.5M	1.5M	1.5M
Cache memory, bytes	32K std.; 64K opt.	6K	6K	6K
INPUT/OUTPUT CONTROL				
No. of I/O channels	128	5	24	31
Data transfer rate	26.67MB/sec.	19MB/sec.	19MB/sec.	19MB/sec.
COMMUNICATIONS				
Max. number of lines	—	32	224	224
Synchronous	Opt.; 56K bps	Standard	Standard	Standard
Asynchronous	—	Standard	Standard	Standard
Protocols supported	—	X.25, sync, async, isochronous	X.25, sync, async, isochronous	X.25, sync, async, isochronous
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	—	See Comments	See Comments	See Comments
IBM 3270 emulation	—	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB
Serial printers	120/350 cps	—	—	—
Letter-quality printers	30/55 cps	200 cps	200 cps	200 cps
Line printers	300/600/1000 lpm	730/1000/1200 lpm	730/1000/1200 lpm	730/1000/1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips
Streaming tape drives	Start/stop, 100 ips	25 ips	25 ips	25 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Graphics devices	Card readers	Card readers	Card readers
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Fortran, Pascal, C, Ada	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo
Operating system name	UTX-32	VOS	VOS	VOS
Operating system type	Multitasking	Batch, multitask, r.-t.	Batch, multitask, r.-t.	Batch, multitask, r.-t.
Operating sys. implemented in firmware	No	No	No	No
Database management system	Mistress/Unify	Oracle, Info	Oracle, Info	Oracle, Info
Principal industry application	—	Engineering administration	Engineering administration	Engineering administration
Other packages	Q-Office, spreadsheets	Numerous	Numerous	Numerous
PRICING & AVAILABILITY				
Typical system configuration and price	9005: CPU, 8MB memory; Floating Point Accelerator; 340MB miniWinchester disk subsystem; 1000 lpm printer; streaming tape subsystem; Unix operating system: $355,000	Contact vendor	Contact vendor	Contact vendor
Monthly maintenance of typical configuration	$1,715	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	—	June 1984	May 1983	June 1979
Number installed to date	Not applicable	Not applicable	—	—
COMMENTS	Available with tightly coupled dual processor (Internal Processing Unit)	Uses office power. Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.	Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.	Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.

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MANUFACTURER & MODEL	Harris Corporation H1000	Honeywell Information Systems, Inc. DPS 6/95	Ilene Industries Model 9000	IBM 4361 Model Group 3
WORD LENGTH	48 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1.5MB-12MB	2MB-16MB	1MB-16MB	2MB-4MB
DISK STORAGE CAPACITY	80MB-22.7GB	67MB-4GB	100MB-32GB	258MB-40.3GB
NO. WORKSTATIONS SUPPORTED	192	128	512	1024
PRICE RANGE	$250,000-$291,000	From $105,000	$250,000-$800,000	From $56,500
TARGET MARKET	Engineering/scientific	General business	Scientific, realtime, timesharing	Commercial, engineering/ scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	12M	16M	16M	—
Virtual memory	48MB	Not applicable	16MB	16MB
Hardware floating point	SP, DP	SP, DP	QP	SP, DP, extended
Battery backup	None	Optional	Optional	—
Real-time clock or timer	Optional	Standard	Standard	Standard
CPU cycle time, nanoseconds	75	125	100	—
MIPS	4.8 (single precision)	—	3+	0.38 (approx.)
16-/32-bit compatibility	Not applicable	Direct	Not applicable	—
MAIN STORAGE				
Bytes fetched per cycle	—	4	8	—
Cycle/access time, nanoseconds	335	500	315	—
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1.5M	4M	1M	—
Cache memory, bytes	6K	8K	None	8K
INPUT/OUTPUT CONTROL				
No. of I/O channels	31	24	256	3
Data transfer rate	19MB/sec.	19.2KB/sec.	20MB/sec. (aggregate)	17K bps-1.86MB/sec.
COMMUNICATIONS				
Max. number of lines	224	128	512	—
Synchronous	Standard	92 opt.; 19.2K bps	1M bps	Optional
Asynchronous	Standard	4 std./92 opt.; 9600 bps	Standard; autobaud	—
Protocols supported	X.25, sync, async, isochronous	SDLC, HDLC, SNA, DSA	SDLC, Hasp, SNA, BSC, X.25	Bisync, SDLC, X.25, 3270
Type of LAN supported	Ethernet	None	Ethernet	—
RJE terminals emulated	See Comments	IBM 2780/3780	Not applicable	—
IBM 3270 emulation	Yes	Yes	No	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 80MB-675MB	Fixed: 67MB, 256MB; Removable: 80MB	100MB-32GB	Fixed & removable: 64.5MB-2.52GB
Serial printers	—	100/400 cps	Not applicable	80-340 cps
Letter-quality printers	200 cps	35/55 cps	35/55 cps	—
Line printers	730/1000/1200 lpm	300/600/900/1200 lpm	300-5000 lpm	325-2000 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-125 ips	800/1600/6250 bpi	800/1600/6250 bpi	200-6250 bpi/12.5-50 ips
Streaming tape drives	25 ips	Not applicable	Not applicable	Start/stop; 100 ips
Cassette/cartridge tape drives	—	Not applicable	Not applicable	—
Other peripherals supported	Card readers	650KB diskette; card readers; doc. handlers	Card devices, plotters, graphics devices	Laser printers, card equipment
SOFTWARE				
Assembler	Macro assembler	Assembler	Procedure-oriented macro	—
Compilers	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo	Cobol, Fortran, Basic, Pascal, RPG	APL, Fortran, Basic, Cobol, RPG, Text	Pascal/VS, Fortran, Basic, VS APL, PL/1, Cobol, RPG II
Operating system name	VOS	GCOS 6 Mod 400	AOS; RTS	See Comments
Operating system type	Batch, multitask, r.-t.	Realtime	Multitasking; realtime	—
Operating sys. implemented in firmware	No	No	Not applicable	—
Database management system	Oracle, Info	DM6	AOS DMS	DL/1, SQL/DS
Principal industry application	Engineering administration	Manufacturing, distribution, pharmacy	Scientific, realtime	Commercial, engineering/ scientific
Other packages	Numerous	Office automation, accounting	Technical writing, simulation, graphics	Office automation
PRICING & AVAILABILITY				
Typical system configuration and price	Contact vendor	CPU with 2MB main memory; 80MB disk; printer port; console; Multiple Device Controller; Commercial Instruction Processor; Scientific Instruction Processor; 4 workstation ports: $105,000	CPU; 1MB memory; 100MB disk; 600 lpm printer; tape unit; 16 terminal lines: $250,000	CPU; 2MB memory; 2 consoles; 129MB disk storage; tape drive; 650 lpm printer; comm. controller; 16 terminals: $141,181
Monthly maintenance of typical configuration	Contact vendor	$642	Contact vendor	$895
Date of first delivery	July 1984	November 1983	1st quarter 1985	December 1984
Number installed to date	—	—	Not applicable	—
COMMENTS	ECL-based system. Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.		Bit- and software-compatible with XDS CPU and CPR systems	Runs DOS/VSE, SSX/VSE, VM/SP, VM/370

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MANUFACTURER & MODEL	IBM 4361 Model Group 4	IBM 4361 Model Group 5	IBM 4381 Model Group 1	IBM 4381 Model Group 2
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-12MB	2MB-12MB	4MB-16MB	4MB-32MB
DISK STORAGE CAPACITY	516MB-80.6GB	516MB-121GB	800MB-403GB	800MB-403GB
NO. WORKSTATIONS SUPPORTED	1024	1024	1024	1024
PRICE RANGE	From $135,000	From $180,000	From $370,000	From $500,000
TARGET MARKET	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	16MB	16MB	16MB	16MB
Hardware floating point	SP, DP, extended	SP, DP, extended	SP, DP, extended	SP, DP, extended
Battery backup	—	—	—	—
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	—	—
MIPS	0.79	1.14	2.1	2.7
16-/32-bit compatibility	—	—	—	—
MAIN STORAGE				
Bytes fetched per cycle	—	—	16	16
Cycle/access time, nanoseconds	—	—	68	68
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	—	—	—	—
Cache memory, bytes	8K	16K	8K	32K
INPUT/OUTPUT CONTROL				
No. of I/O channels	6	6	12	12
Data transfer rate	17K bps-3MB/sec.	17K bps-3MB/sec.	22MB/sec.	22MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Optional	Optional	Opt.; 9600 bps	Opt.; 9600 bps
Asynchronous	—	—	—	—
Protocols supported	Bisync, SDLC, X.25, 3270	Bisync, SDLC, X.25, 3270	Bisync, SDLC, X.25, 3270	Bisync, SDLC, X.25, 3270
Type of LAN supported	—	—	—	—
RJE terminals emulated	—	—	—	—
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 64.5MB-2.52GB	Fixed & removable: 64.5MB-2.52GB	Fixed: 317.5MB-2.52GB; fixed/rem: 70/280MB	Fixed: 317.5MB-2.52GB; fixed/rem: 70/280MB
Serial printers	80-340 cps	80-340 cps	80-340 cps	80-340 cps
Letter-quality printers	—	—	—	—
Line printers	325-2000 lpm	325-2000 lpm	650-3600 lpm	650-3600 lpm
Reel-to-reel tape drives	200-6250 bpi/12.5-50 ips	200-6250 bpi/12.5-50 ips	200-6250 bpi/12.5-50 ips	200-6250 bpi/12.5-50 ips
Streaming tape drives	Start/stop; 100 ips	Start/stop; 100 ips	79 ips	79 ips
Cassette/cartridge tape drives	—	—	556-6250 bpi/75-200 ips	556-6250 bpi/75-200 ips
Other peripherals supported	Laser printers, card equipment	Laser printers, card equipment	Laser printers, card equipment	Laser printers, card equipment
SOFTWARE				
Assembler	—	—	—	—
Compilers	Pascal/VS, Fortran, Basic, VS APL, PL/1, Cobol, RPG II	Pascal/VS, Fortran, Basic, VS APL, PL/1, Cobol, RPG II	Pascal/VS, Fortran, Basic, VS APL, PL/1, Cobol, RPG II	Pascal/VS, Fortran, Basic, VS APL, PL/1, Cobol, RPG II
Operating system name	See Comments	See Comments	See Comments	See Comments
Operating system type	—	—	—	—
Operating sys. implemented in firmware	—	—	—	—
Database management system	DL/1, SQL/DS	DL/1, SQL/DS, IMS/VS-DB	DL/1, SQL/DS, IMS/VS-DB	DL/1, SQL/DS, IMS/VS-DB
Principal industry application	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific
Other packages	Office automation	Office automation	Office automation	Office automation
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 2MB memory; 2 consoles; 193.5MB disk storage; tape drive; two 650 lpm printers; comm. controller; 16 terminals: $240,231	CPU; 4MB memory; 2 consoles; 258MB disk storage; 4 tape drives; two 650 lpm printers; comm. controllers; 16 terminals: $343,889	CPU; 8MB memory; 2 consoles & printer; 2.52GB disk storage & control; 4 tape units & control; two 1200 lpm printers; comm. controller; 32 terminals: $806,237	CPU; 16MB memory; 2 consoles & printer; 5.4GB disk storage & control; 6 tape units & control; two 2000 lpm printers; 2 comm. controllers; 64 terminals: $1,160,504
Monthly maintenance of typical configuration	$1,340	$1,603.50	$3,196.50	$5,524.50
Date of first delivery	2nd quarter 1984	1st quarter 1984	3rd quarter 1984	1st quarter 1984
Number installed to date	—	—	—	—
COMMENTS	Runs DOS/VSE, SSX/VSE, VM/370	Runs DOS/VSE, SSX/VSE, VM/370, MVS/370	Runs MVS/XA, DOS/VSE, MVS/370, VM/370; can also use DB2 for database management	Runs MVS/XA, DOS/VSE, MVS/370, VM/370; can also use DB2 for database management

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MANUFACTURER & MODEL	IBM 4381 Model Group 3	MAI/Basic Four Model 8010	MAI/Basic Four Model 8020	MAI/Basic Four Model 8030
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	8MB-32MB	1MB-4MB	1MB-6MB	2MB-8MB
DISK STORAGE CAPACITY	800MB-604GB	75MB-2.2GB	75MB-2.2GB	75MB-2.2GB
NO. WORKSTATIONS SUPPORTED	1024	20	52	96
PRICE RANGE	From $825,000	$49,000-$200,000	$60,000-$300,000	$92,000-$500,000
TARGET MARKET	Commercial, engineering/ scientific	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	16M	16M	16M
Virtual memory	16MB	2.28GB	2.28GB	2.28GB
Hardware floating point	SP, DP, extended	SP	SP	SP
Battery backup	—	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	160	160	160
MIPS	5.13 (approx.)	0.04	0.08	1.2
16-/32-bit compatibility	—	32-bit only	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	16	4	4	4
Cycle/access time, nanoseconds	—	480	480	480
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	—	0.5M, 1M, 2M, 4M	0.5M, 1M, 2M, 4M	0.5M, 1M, 2M, 4M
Cache memory, bytes	32K (per processor)	None	None	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	18	2	2	2
Data transfer rate	32MB/sec.	100MB/sec.	100MB/sec.	100MB/sec.
COMMUNICATIONS				
Max. number of lines	—	20 async	52 async	96 async
Synchronous	Opt.; 9600 bps	Standard	Standard	Standard
Asynchronous	—	Standard	Standard	Standard
Protocols supported	Bisync, SDLC, X.25, 3270	2770/3770, 2780/3780	2770/3770, 2780/3780	2770/3770, 2780/3780
Type of LAN supported	—	B4Net, SNA	B4Net, SNA	B4Net, SNA
RJE terminals emulated	—	2770/3770, 2780/3780	2770/3770, 2780/3780	2770/3770, 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 317.5MB-2.52GB; fixed/rem: 70/280MB	Fixed: 144MB; Removable: 75MB, 285MB	Fixed: 144MB; Removable: 75MB, 285MB	Fixed: 144MB; Removable: 75MB, 285MB
Serial printers	80-340 cps	120/160 cps	120/160 cps	120/160 cps
Letter-quality printers	—	45 cps	45 cps	45 cps
Line printers	650-3600 lpm	150/300/600/1000 lpm	150/300/600/1000 lpm	150/300/600/1000 lpm
Reel-to-reel tape drives	200-6250 bpi/12.5-50 ips	800/1600 bpi, 175 ips	800/1600 bpi, 175 ips	800/1600 bpi, 175 ips
Streaming tape drives	79 ips	Start/stop, 100 ips	Start/stop, 100 ips	Start/stop, 100 ips
Cassette/cartridge tape drives	556-6250 bpi/75-200 ips	90 ips	90 ips	90 ips
Other peripherals supported	Laser printers, card equipment	High-speed data, RS-232-C I/O	High-speed data, RS-232-C I/O	High-speed data, RS-232-C I/O
SOFTWARE				
Assembler	—	—	—	—
Compilers	Pascal/VS, Fortran, Basic, VS APL, PL/1, Cobol, RPG II	Basic, Cobol	Basic, Cobol	Basic, Cobol
Operating system name	See Comments	Boss/VS	Boss/VS	Boss/VS
Operating system type	—	Multitasking, realtime	Multitasking, realtime	Multitasking, realtime
Operating sys. implemented in firmware	—	Partially	Partially	Partially
Database management system	DL/1, SQL/DS, IMS/VS-DB	Origin	Origin	Origin
Principal industry application	Commercial, engineering/ scientific	General-purpose interactive business	General-purpose interactive business	General-purpose interactive business
Other packages	Office automation	OA, pharmacy, manufacturing, construction, property management	OA, pharmacy, manufacturing, construction, property management	OA, pharmacy, manufacturing, construction, property management
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 24MB memory; 2 consoles & printer; 7.5GB disk storage & control; 8 tape units & control;; three 2000 lpm printers; 4 comm. controllers; 128 terminals: $1,886,748	1 CPU; 1MB memory; 144MB fixed disk; 5 EVDT terminals; 150 lpm printer; magnetic tape streamer; Boss/VS operating system: $62,445	2 CPUs; 1MB memory; two 285MB removable disks; 16 EVDT terminals; 600 lpm printer; magnetic tape streamer; Boss/VS operating system: $153,175	3 CPUs; 2MB memory; two 285MB removable disks; 20 EVDT terminals; 4 HVDT terminals; 300 lpm printer; 600 lpm printer; magnetic tape streamer; Boss/VS operating system: $207,000
Monthly maintenance of typical configuration	$7,992.50	$412	$1,008	$1,381
Date of first delivery	2nd quarter 1985	October 1983	October 1983	October 1983
Number installed to date	—	1,000+	1,000+	1,000+
COMMENTS	Runs MVS/XA, DOS/VSE, MVS/370, VM/SP, others; also uses DB2 as DBMS; a dual processor system			

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MANUFACTURER & MODEL	McDonnell Douglas Computer Systems Co. M9000	McDonnell Douglas Computer Systems Co. M9100	McDonnell Douglas Computer Systems Co. M9208	Modcomp Classic 32/85
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	512KB-4MB	1MB-4MB	2MB-6MB	2MB-64MB
DISK STORAGE CAPACITY	130MB-1GB	260MB-1GB	260MB-2GB	13MB-1GB
NO. WORKSTATIONS SUPPORTED	128	128	208	256+
PRICE RANGE	From $100,000	From $130,000	From $176,000	$150,000-$350,000
TARGET MARKET	General business	General business	General business	Realtime applics., eng./sci., process control
CENTRAL PROCESSOR				
No. of directly addressable bytes	4M	4M	6M	64M
Virtual memory	4MB	4MB	6MB	64MB
Hardware floating point	Not applicable	Not applicable	Not applicable	SP, DP, TP
Battery backup	Standard	Standard	Standard	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	150	150	150	100
MIPS	—	—	—	2.4
16-/32-bit compatibility	Yes	Yes	Yes	Direct
MAIN STORAGE				
Bytes fetched per cycle	4	4	4	4
Cycle/access time, nanoseconds	300	300	300	400
Storage protection	Standard	Standard	Standard	Std.; 7-bit ECC
Increment size, bytes	512M	1M	1M	2M
Cache memory, bytes	None	None	None	64K
INPUT/OUTPUT CONTROL				
No. of I/O channels	16 DMA	16 DMA	16 DMA	64
Data transfer rate	840KB/sec.	840KB/sec.	840KB/sec.	8MB/sec.
COMMUNICATIONS				
Max. number of lines	128	128	208	64
Synchronous	9600 bps	9600 bps	9600 bps	Optional
Asynchronous	9600 bps	9600 bps	9600 bps	Opt.; 110-19.2K bps
Protocols supported	2780/3780, SDLC, SNA	2780/3780, SDLC, SNA	2780/3780, SDLC, SNA	X.25, 2780/3780
Type of LAN supported	Not applicable	Not applicable	Not applicable	None
RJE terminals emulated	2780/3780	2780/3780	2780/3780	2780/3780
IBM 3270 emulation	Yes	Yes	Yes	No
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 130MB, 260MB	Fixed: 260MB	Fixed: 260MB	Winchester, cart., f/r: 13.5MB-264MB
Serial printers	120/180/300/400 cps	120/180/300/400 cps	120/180/300/400 cps	64-440 lpm
Letter-quality printers	33 cps	33 cps	33 cps	None
Line printers	150/300/600/1200 lpm	150/300/600/1200 lpm	150/300/600/1200 lpm	300/600/1000 lpm
Reel-to-reel tape drives	Not applicable	Not applicable	Not applicable	800/1600 bpi, 75 ips
Streaming tape drives	Start/stop; 25-100 ips	Start/stop; 25-100 ips	Start/stop; 25-100 ips	Start/stop, 25 ips
Cassette/cartridge tape drives	Not applicable	Not applicable	Not applicable	None
Other peripherals supported	Not applicable	Not applicable	Not applicable	Data capture terminals
SOFTWARE				
Assembler	Yes	Yes	Yes	Assembler/macro assemb.
Compilers	Basic, English, All, Natural Language	Basic, English, All, Natural Language	Basic, English, All, Natural Language	Fortran, Cobol, Pascal, Coral 66
Operating system name	Reality	Reality	Reality	Max IV; Max 32
Operating system type	Multitasking	Multitasking	Multitasking	Realtime
Operating sys. implemented in firmware	Partially	Partially	Partially	Partially
Database management system	Reality	Reality	Reality	Infinity
Principal industry application	General business	General business	General business	Factory automation
Other packages	Office automation	Office automation	Office automation	None
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 512KB memory; 130MB fixed disk; ½-inch streaming tape drive; 600 lpm printer; 24 ports: $147,000	CPU; 1MB memory; 260MB fixed disk; ½-inch streaming tape drive; 600 lpm printer; 32 ports: $160,000	CPU; 2MB memory; 260MB fixed disk; ½-inch streaming tape drive; 600 lpm printer; 48 ports: $208,000	CPU, 4MB memory; 256MB disk & controller; magnetic tape unit; 2 async terminal controllers; 10 CRTs; 2 matrix printers; 1 line printer: $248,400
Monthly maintenance of typical configuration	—	—	—	$2,400
Date of first delivery	1st quarter 1982	4th quarter 1984	4th quarter 1984	June 1984
Number installed to date	700	Not applicable	Not applicable	20+
COMMENTS	Formerly known as Microdata Sequel		Special hardware/microcode implementation increases performance two times	

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MANUFACTURER & MODEL	NCR Corp. 9300	Norsk Data N.A., Inc. ND-530/ND-550	Norsk Data N.A., Inc. ND-560/ND-570	Perkin-Elmer Corp. 3205
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-4MB	1.25MB-72MB	2.25MB-72MB	1MB-4MB
DISK STORAGE CAPACITY	40MB-4GB	70MB-7.2GB	70MB-7.2GB	50MB-1.2GB
NO. WORKSTATIONS SUPPORTED	210	128	128	16
PRICE RANGE	$65,000-$300,000	See Comments	See Comments	$12,950-$41,000
TARGET MARKET	General business	Technical/scientific	Technical/scientific	General-purpose commercial, scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	4M	4.2G	4.2G	4M
Virtual memory	128MB	8.4GB	8.4GB	16MB
Hardware floating point	DP	SP, DP	SP, DP	SP, DP
Battery backup	None	Auto restart	Auto restart	Optional
Real-time clock or timer	—	Standard	Standard	Standard
CPU cycle time, nanoseconds	150	120	120	—
MIPS	0.33	1.2 (530)/2.7 (550)	4.3 (560)/6.8 (570)	0.5
16-/32-bit compatibility	Direct	Via multiport memory	Via multiport memory	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	4	4	4 (ND-560)/8 (ND-570)	4
Cycle/access time, nanoseconds	450	400	400	400
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M	1MB, 4MB	1MB, 4MB	1M
Cache memory, bytes	None	None	16K (560)/64K (570)	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	8	3	3	32
Data transfer rate	2MB/sec.	2.1MB/sec.	2.1MB/sec.	1.5MB/sec.
COMMUNICATIONS				
Max. number of lines	210	64	64	16
Synchronous	Std.; 9600 bps	Opt.; 307.1K bps	Opt.; 307.1K bps	Std.; 19.2K bps
Asynchronous	Std.; 19.2K bps	Std.; 9600 bps	Std.; 9600 bps	Std.; 19.2K bps
Protocols supported	Async, bisync, X.25, 2780/3780	SDLC, Hasp, SNA, BSC, IBM 2780/3780	SDLC, Hasp, SNA, BSC, IBM 2780/3780	ADCCP, SDLC, HDLC, Hasp, IBM 2780/3780, 3270
Type of LAN supported	SNA	Ethernet, HDLC	Ethernet, HDLC	Ethernet
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780, Hasp	IBM 2780/3780, Hasp	2780/3780, Hasp
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 40MB-4GB	Fixed & removable: 70/140/288/450MB	Fixed & removable: 70/140/288/450MB	Fixed & removable: 32MB-600MB
Serial printers	80-325 cps; 360/720 lpm	80/300 cps	80/300 cps	180 cps
Letter-quality printers	33 cps	38/55 cps	38/55 cps	55 cps
Line printers	600/900/1200/2000 lpm	600/1000 lpm	600/1000 lpm	300/600/1200 lpm
Reel-to-reel tape drives	800/1600/GCR, 45/200 ips	1600/6250 bpi, 125 ips	1600/6250 bpi, 125 ips	800/1600/6250 bpi
Streaming tape drives	Not applicable	Start/stop, 90 ips	Start/stop, 90 ips	Not applicable
Cassette/cartridge tape drives	15 ips	90 ips	90 ips	Not applicable
Other peripherals supported	Card reader	Card reader	Card reader	Card reader
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Cal, Cal Macro
Compilers	Cobol, Basic, Pascal	Cobol, Fortran, Ada, Pascal, APL, C, Simula	Cobol, Fortran, Ada, Pascal, APL, C, Simula	Cobol, Fortran, Basic, Pascal, RPG II, C
Operating system name	ITX	Sintran	Sintran	OS/32; Xelos
Operating system type	Multitasking	R.-t., batch, timeshare	R.-t., batch, timeshare	Realtime; multitasking
Operating sys. implemented in firmware	Partially	Partially	Partially	—
Database management system	ITX/DBS	Sibas (Codasyl)	Sibas (Codasyl)	Reliance
Principal industry application	General commercial, medical, industrial	Simulation/scientific computing	Simulation/scientific computing	General-purpose commercial
Other packages	Third-party	Office automation	Office automation	Numerous third-party applications
PRICING & AVAILABILITY				
Typical system configuration and price	CPU, 2MB memory; 310MB disk storage; 720 lpm printer; 20 CRTs; ITX operating system; ITX Cobol: $113,227	ND-500/2 CPU; 4.25MB memory; ND-100/CX front end; 450MB fixed disk; 16 terminals; 6250 bpi magnetic tape; 1000 lpm band printer; 55 cps letter-quality printer: $315,000 (ND-530 & -550)	ND-500/2 CPU; 6.25MB memory; ND-100/CX front end; 450MB fixed disk; 16 terminals; 6250 bpi magnetic tape; 1000 lpm band printer; 55 cps letter-quality printer: $450,000 (ND-560)/ $525,000 (ND-570)	CPU; 1MB memory; loader; 8-line communications controller; floating point; 50MB (25MB fixed/ 25MB removable) disk; console Video Display Unit: $27,950
Monthly maintenance of typical configuration	$857	$2600 (530)/$3000 (550)	$3500 (560)/$4400 (570)	$295
Date of first delivery	June 1983	—	—	1983
Number installed to date	—	—	—	—
COMMENTS	Employs VLSI technology, Small Computer System Interface (SCSI) peripherals	ND-530 is priced from $125,000, ND-550 from $185,000. MIPS rates are for optimized Fortran.	ND-560 is priced from $250,000, ND-570 from $325,000. MIPS rates are for optimized Fortran.	Can be used in fault tolerant dual processor configuration

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MANUFACTURER & MODEL	Perkin-Elmer Corp. 3210	Perkin-Elmer Corp. 3230	Perkin-Elmer Corp. 3250XP	Perkin-Elmer Corp. 3200MPS
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-4MB	1MB-16MB	2MB-16MB	2MB-16MB
DISK STORAGE CAPACITY	32MB-7.2GB	67MB-144GB	67MB-576GB	67MB-576GB
NO. WORKSTATIONS SUPPORTED	32	64	256	256
PRICE RANGE	$30,000-$51,000	$74,150-$81,000	$125,000-$185,000	$185,000-$300,000
TARGET MARKET	General-purpose commercial, scientific	General-purpose commercial, scientific	General-purpose commercial, scientific	General-purpose commercial, scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	4M	16M	16M	16M
Virtual memory	16MB	16MB	16MB	16MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Optional	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	—	—
MIPS	1.0	2.0	3.0	5-21
16-/32-bit compatibility	32-bit only	32-bit only	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	4	16	16	16
Cycle/access time, nanoseconds	500	500	500	500
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M	1M, 2M	2M	2M
Cache memory, bytes	None	1K	8K	12K
INPUT/OUTPUT CONTROL				
No. of I/O channels	1023	1023	1023	1023
Data transfer rate	8MB/sec.	8MB/sec.	40MB/sec.	40MB/sec.
COMMUNICATIONS				
Max. number of lines	32	128	256	256
Synchronous	Opt.; 2M bps	Opt.; 2M bps	Opt.; 2M bps	Opt.; 2M bps
Asynchronous	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	ADCCP, SDLC, HDLC, Hasp, IBM 2780/3780, 3270	ADCCP, SDLC, HDLC, Hasp, IBM 2780/3780, 3270	ADCCP, SDLC, HDLC, Hasp, IBM 2780/3780, 3270	ADCCP, SDLC, HDLC, Hasp, IBM 2780/3780, 3270
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	2780/3780, Hasp	2780/3780, Hasp	2780/3780, Hasp	2780/3780, Hasp
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 32MB-600MB	Fixed & removable: 32MB-600MB	Fixed & removable: 32MB-600MB	Fixed & removable: 32MB-600MB
Serial printers	180 cps	180 cps	180 cps	180 cps
Letter-quality printers	55 cps	55 cps	55 cps	55 cps
Line printers	300/600/1200 lpm	300/600/1200 lpm	300/600/1200 lpm	300/600/1200 lpm
Reel-to-reel tape drives	800/1600/6250 bpi	800/1600/6250 bpi	800/1600/6250 bpi	800/1600/6250 bpi
Streaming tape drives	Not applicable	Not applicable	Not applicable	Not applicable
Cassette/cartridge tape drives	Not applicable	Not applicable	Not applicable	Not applicable
Other peripherals supported	Card reader	Card reader	Card reader	Card reader
SOFTWARE				
Assembler	Cal, Cal Macro	Cal, Cal Macro	Cal, Cal Macro	Cal, Cal Macro
Compilers	Cobol, Fortran, Basic, Pascal, RPG II, C	Cobol, Fortran, Basic, Pascal, RPG II, C	Cobol, Fortran, Basic, Pascal, RPG II, C	Cobol, Fortran, Basic, Pascal, RPG II, C
Operating system name	OS/32; Xelos	OS/32; Xelos	OS/32; Xelos	OS/32; Xelos
Operating system type	Realtime; multitasking	Realtime; multitasking	Realtime; multitasking	Realtime; multitasking
Operating sys. implemented in firmware	—	—	—	—
Database management system	Reliance	Reliance	Reliance	Reliance
Principal industry application	General-purpose commercial	General-purpose commercial	General-purpose commercial	General-purpose commercial
Other packages	Numerous third-party applications	Numerous third-party applications	Numerous third-party applications	Numerous third-party applications
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 1MB memory; loader; 2-line communications controller; selector channel; disk subsystem; 32MB disk; console Video Display Unit; OS/32 right of copy: $47,000	CPU; 1MB memory; loader; 2-line communications controller; battery backup; console Video Display Unit: $74,150	CPU; 1MB memory; loader; writable control store; 2-line communications controller; battery backup; console Video Display Unit: $125,000	CPU; Auxiliary Processing Unit (APU); 2MB memory; floating point processor; writable control store; loader; 2-line communications controller; console Video Display Unit: $185,000
Monthly maintenance of typical configuration	$320	$360	$763	$1,240
Date of first delivery	1981	1981	1983	1983
Number installed to date	—	—	—	—
COMMENTS	Can be used in fault tolerant, dual processor configuration	Can be used in fault tolerant, dual processor configuration	Can be used in fault tolerant, dual processor configuration	Supports up to 9 APUs. Can also be used in fault tolerant, dual processor configuration

All About Supermini Systems

MANUFACTURER & MODEL	Prime Computer, Inc. 2250	Prime Computer, Inc. 2550	Prime Computer, Inc. 9650	Prime Computer, Inc. 9750
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	512KB-4MB	2MB-4MB	2MB-8MB	4MB-12MB
DISK STORAGE CAPACITY	632MB	2.7GB	10GB	10GB
NO. WORKSTATIONS SUPPORTED	32	64	96	128
PRICE RANGE	$29,000-$52,400	$90,000-$126,000	$126,000-$153,000	$231,000-$258,000
TARGET MARKET	General business	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	512M	512M	512M	512M
Virtual memory	—	—	—	—
Hardware floating point	—	—	—	—
Battery backup	None	None	None	None
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	160	160	160	100
MIPS	0.47	0.73	0.9	1.75
16-/32-bit compatibility	—	—	—	—
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	230	180	138	105
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	—	—	—	—
Cache memory, bytes	2K	16K	16K	16K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	—	—	—
Data transfer rate	2MB/sec.	5MB/sec.	5MB/sec.	8MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	1.2K-65K bps	1.2K-65K bps	1.2K-65K bps	1.2K-65K bps
Asynchronous	50-19.2K bps	50-19.2K bps	50-19.2K bps	50-19.2K bps
Protocols supported	Async, sync, bisync, Hasp, HDLC X.25	Async, sync, bisync, Hasp, HDLC X.25	Async, sync, bisync, Hasp, HDLC X.25	Async, sync, bisync, Hasp, HDLC X.25
Type of LAN supported	Ringnet	Ringnet	Ringnet	Ringnet
RJE terminals emulated	2780/3780/3270	2780/3780/3270	2780/3780/3270	2780/3780/3270
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable	Fixed & removable	Fixed & removable	Fixed & removable
Serial printers	30-200 cps	30-200 cps	30-200 cps	30-200 cps
Letter-quality printers	55 cps	55 cps	55 cps	55 cps
Line printers	300 lpm	300 lpm	300 lpm	300 lpm
Reel-to-reel tape drives	—	—	—	—
Streaming tape drives	25/50/100 ips	25/50/100 ips	25/50/100 ips	25/50/100 ips
Cassette/cartridge tape drives	6400 bpi, 30 ips	6400 bpi, 30 ips	6400 bpi, 30 ips	6400 bpi, 30 ips
Other peripherals supported	Card readers, chain printers	Card readers, chain printers	Card readers, chain printers	Card readers, chain printers
SOFTWARE				
Assembler	—	—	—	—
Compilers	Cobol, Fortran, Pascal, Basic/VM, RPG II, C	Cobol, Fortran, Pascal, Basic/VM, RPG II, C	Cobol, Fortran, Pascal, Basic/VM, RPG II, C	Cobol, Fortran, Pascal, Basic/VM, RPG II, C
Operating system name	Primos	Primos	Primos	Primos
Operating system type	Realtime	Realtime	Realtime	Realtime
Operating sys. implemented in firmware	Fully	Fully	Fully	Fully
Database management system	DBMS	DBMS	DBMS	DBMS
Principal industry application	Commercial DDP, CAD/CAM, engineering/scientific	Commercial DDP, CAD/CAM, engineering/scientific	CAD/CAM, engineering/ scientific, commercial DDP	CAD/CAM, engineering/ scientific, commercial DDP
Other packages	—	—	—	—
PRICING & AVAILABILITY				
Typical system configuration and price	CPU with Diagnostic Processor, cabinet, chassis, and modem; 0.5MB memory; 68MB disk; 15MB cartridge tape subsystem; Primos operating system: $29,900	CPU with Diagnostic Processor, cabinet, chassis, and modem; 2MB memory; 315MB fixed disk; streaming tape subsystem; office peripheral cabinet; Primos operating system: $98,500	CPU with Diagnostic Processor, cabinet, chassis, and modem; 2MB memory; two 315MB fixed disks with 1 controller; streaming tape subsystem; peripheral cabinet; Primos operating system: $145,500	CPU with Diagnostic Processor, cabinet, chassis, and modem; 4MB memory; two 315MB fixed disks with 1 controller; streaming tape subsystem; peripheral cabinet; Primos operating system: $250,500
Monthly maintenance of typical configuration	$515	$782	$1,137	$1,697
Date of first delivery	1982	1984	July 1984	July 1984
Number installed to date	—	—	—	—
COMMENTS				

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MANUFACTURER & MODEL	Prime Computer, Inc. 9955	Sperry Corporation 7000/40	Tandem Computers, Inc. NonStop TXP (2-processor system)	Tandem Computers, Inc. NonStop TXP (16-processor system)
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	4MB-16MB	4MB-8MB	4MB-16MB	32MB-128MB
DISK STORAGE CAPACITY	10GB	160MB-4.08GB	8GB+	64GB+
NO. WORKSTATIONS SUPPORTED	254	128	No set limit	No set limit
PRICE RANGE	$351,500-$375,000	From $132,440	From $283,775	From $1,700,000
TARGET MARKET	General business	General business, govt., engineering/scientific	High-volume online transaction processing	High-volume online transaction processing
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	32M	256M
Virtual memory	512MB	Yes	2GB	16GB
Hardware floating point	QP	Opt.; SP, DP	SP, DP	SP, DP
Battery backup	None	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	80	—	83.3	83.3
MIPS	4.0	7.7	4	32
16-/32-bit compatibility	Not applicable	Yes	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	—	—	8 (per processor)	8 (per processor)
Cycle/access time, nanoseconds	58 (cache enabled)	1000	116	116
Storage protection	Standard	—	Standard	Standard
Increment size, bytes	2M	4M	2M	2M
Cache memory, bytes	64K	44K	128K	1G
INPUT/OUTPUT CONTROL				
No. of I/O channels	32	—	2	16
Data transfer rate	9MB/sec.	—	5MB/sec.	5MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	252	1792
Synchronous	1.2K-65K bps	Optional	Opt.; 56K bps	Opt.; 56K bps
Asynchronous	50-19.2K bps	Optional	Opt.; 19.2K bps	Opt.; 19.2K bps
Protocols supported	Bisync/Hasp, HDLC/X.25, SNA, CDC200UT, Univ.1004	SNA	ADCCP, HDLC, SDLC, 2780/3780, 3270, SNA	ADCCP, HDLC, SDLC, 2780/3780, 3270, SNA
Type of LAN supported	Ringnet	Ethernet	Hyperchannel, Fox	Hyperchannel, Fox
RJE terminals emulated	2780/3780/3270	IBM 2780/3780, 3770	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT		F		
Disks supported	Fixed & removable	Fixed: 160MB, 340MB; removable: 300MB	Winchester: 128MB-540MB; Removable: 240MB	Winchester: 128MB-540MB; Removable: 240MB
Serial printers	30-200 cps	160/400 cps	340 cps	340 cps
Letter-quality printers	55 cps	55 cps	55 cps	55 cps
Line printers	1000 lpm	600 lpm	600/900/1300 lpm	600/900/1300 lpm
Reel-to-reel tape drives	6250 bpi, 75 ips	—	6250 bpi	6250 bpi
Streaming tape drives	25/50/100 ips	Start/stop; 100 ips	None	None
Cassette/cartridge tape drives	—	Not applicable	None	None
Other peripherals supported	Card readers, chain printers	Laser printers, color graphics terminals	Fax, OCR, mag. stripe card & bar code readers	Fax, OCR, mag. stripe card & bar code readers
SOFTWARE				
Assembler	Macro assembler	—	None	None
Compilers	Cobol, Fortran, Pascal, Basic/VM, RPG II, C, PL/1	RM/Cobol, Fortran, C	Basic, TAL, Cobol, Fortran, Mumps	Basic, TAL, Cobol, Fortran, Mumps
Operating system name	Primos	Series 7000 Op. System	Guardian	Guardian
Operating system type	Realtime	Timesharing	Multiproc./message-based	Multiproc./message-based
Operating sys. implemented in firmware	Fully	—	Partially	Partially
Database management system	DBMS	—	Encompass	Encompass
Principal industry application	CAD/CAM, engineering/ scientific, commercial DDP	General business, govt., engineering/scientific	Reservations, banking, brokerage, telecommunications, manufacturing	Reservations, banking, brokerage, telecommunications, manufacturing
Other packages	—	Third-party packages	Info. delivery/presentation, transaction monitoring, OA, 3rd-party	Info. delivery/presentation, transaction monitoring, OA, 3rd-party
PRICING & AVAILABILITY				
Typical system configuration and price	CPU with Diagnostic Processor, cabinet, chassis, and modem; 4MB memory; two 315MB fixed disks with 1 controller; streaming tape subsystem; peripheral cabinet; Primos operating system: $370,500	CPU; 4MB memory; two 340MB fixed disk drives & controller; streaming tape & controller; two async I/O controllers/ adapters; 32 terminals; two 600 lpm band printers: $277,902	2 processing modules; 8MB memory; 45 ips tape drive and controller; operations and service processor: $283,775	Contact vendor
Monthly maintenance of typical configuration	$1,897	$1,887	$1,515	Contact vendor
Date of first delivery	January 1985	1st quarter 1985	November 1983	November 1983
Number installed to date	—	Not applicable	—	—
COMMENTS	Replaces Prime 9950		Can be interconnected into worldwide, 4,080-processor network through Expand software	Same networking potential as 2-processor NonStop TXP

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MANUFACTURER & MODEL	Wang Laboratories, Inc. VS65	Wang Laboratories, Inc. VS85	Wang Laboratories, Inc. VS90	Wang Laboratories, Inc. VS100
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-4MB	1MB-4MB	1MB-4MB	1MB-8MB
DISK STORAGE CAPACITY	76MB-2.6GB	5.1GB	5.1GB	10.2GB
NO. WORKSTATIONS SUPPORTED	20 (32 in June 1985)	64	48	128
PRICE RANGE	$19,000-$50,000	$64,000-$92,000	$76,000-$104,000	—
TARGET MARKET	General business	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	—	—	—	—
Hardware floating point	—	—	—	—
Battery backup	—	—	—	—
Real-time clock or timer	—	—	—	—
CPU cycle time, nanoseconds	200	480	480	480
MIPS	—	—	—	—
16-/32-bit compatibility	32-bit only	—	—	—
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	—	—	—	—
Storage protection	—	—	—	—
Increment size, bytes	1M, 2M, 3M	—	—	—
Cache memory, bytes	16K	32K (opt.)	None	32K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	—	—	—
Data transfer rate	—	—	—	—
COMMUNICATIONS				
Max. number of lines	4	6	—	18
Synchronous	—	—	—	—
Asynchronous	—	—	—	—
Protocols supported	SDLC, 3777, BSC, Hasp, VT100, WSN, X.25, TTY	SDLC, 3777, BSC, Hasp, VT100, WSN, X.25, TTY	SDLC, 3777, BSC, Hasp, VT100, WSN, X.25, TTY	SDLC, 3777, BSC, Hasp, VT100, WSN, X.25, TTY
Type of LAN supported	Wangnet	Wangnet	Wangnet	Wangnet
RJE terminals emulated	IBM 2780/3780, Hasp	IBM 2780/3780, Hasp	IBM 2780/3780, Hasp	IBM 2780/3780, Hasp
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 76MB-2.6GB	Fixed & removable: 75MB-640MB	Fixed & removable: 75MB-640MB	Fixed & removable: 75MB-640MB
Serial printers	20-55 cps	35-192 cps	35-192 cps	35-192 cps
Letter-quality printers	35-55 cps	35-55 cps	35-55 cps	35-55 cps
Line printers	250-1100 lpm	250/600/1100 lpm	250/600/1100 lpm	250/600/1100 lpm
Reel-to-reel tape drives	1600 bpi	800-6800 bpi, 75 ips	800-6250 bpi, 75 ips	800-6250 bpi, 75 ips
Streaming tape drives	—	—	—	—
Cassette/cartridge tape drives	6400 bpi	75 ips	75 ips	75 ips
Other peripherals supported	Laser printer	Laser printer	Laser printer	Laser printer
SOFTWARE				
Assembler	Assembler	Assembler	Assembler	Assembler
Compilers	Cobol, Fortran 77, Basic, RPG II, PL/1	Cobol, Fortran 77, Basic, RPG II, PL/1	Cobol, Fortran 77, Basic, RPG II, PL/1	Cobol, Fortran 77, Basic, RPG II, PL/1
Operating system name	VS-OS	VS-OS	VS-OS	VS-OS
Operating system type	—	—	—	—
Operating sys. implemented in firmware	—	—	—	—
Database management system	—	—	—	—
Principal industry application	Office automation (Wang Office)	Office automation (Wang Office)	Office automation (Wang Office)	Office automation (Wang Office)
Other packages	Charter, VSGF	Graphics, WP+, Pace, Total, Mantis	Graphics, WP+, Pace, Total, Mantis	Graphics, WP+, Pace, Total, Mantis
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 1MB memory; 147MB fixed, 2-port disk; data storage cabinet w/ 76MB removable & 147MB fixed disk & cable; 4 workstations; printer: $59,300	Packaged configurations available; contact vendor	Packaged configurations available; contact vendor	Packaged configurations available; contact vendor
Monthly maintenance of typical configuration	$448	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	February 1985	—	—	—
Number installed to date	Not applicable	—	—	—
COMMENTS				

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MANUFACTURER & MODEL	Wang Laboratories, Inc. VS300			
WORD LENGTH	32 bits			
MAIN MEMORY	4MB-16MB			
DISK STORAGE CAPACITY	20.4GB			
NO. WORKSTATIONS SUPPORTED	192			
PRICE RANGE	—			
TARGET MARKET	General business			
CENTRAL PROCESSOR				
No. of directly addressable bytes	—			
Virtual memory	—			
Hardware floating point	—			
Battery backup	Optional			
Real-time clock or timer	—			
CPU cycle time, nanoseconds	480			
MIPS	—			
16-/32-bit compatibility	—			
MAIN STORAGE				
Bytes fetched per cycle	—			
Cycle/access time, nanoseconds	—			
Storage protection	—			
Increment size, bytes	—			
Cache memory, bytes	32K			
INPUT/OUTPUT CONTROL				
No. of I/O channels	—			
Data transfer rate	—			
COMMUNICATIONS				
Max. number of lines	32			
Synchronous	—			
Asynchronous	—			
Protocols supported	SDLC, 3777, BSC, Hasp, VT100, WSN, X.25, TTY			
Type of LAN supported	Wangnet			
RJE terminals emulated	IBM 2780/3780, Hasp			
IBM 3270 emulation	Yes			
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 75MB-640MB			
Serial printers	35-192 cps			
Letter-quality printers	35-55 cps			
Line printers	250/600/1100 lpm			
Reel-to-reel tape drives	800-6250 bpi, 75 ips			
Streaming tape drives	—			
Cassette/cartridge tape drives	75 ips			
Other peripherals supported	Laser printer			
SOFTWARE				
Assembler	Assembler			
Compilers	Cobol, Fortran 77, Basic, RPG II, PL/1			
Operating system name	VS-OS			
Operating system type	—			
Operating sys. implemented in firmware	—			
Database management system	—			
Principal industry application	Office automation (Wang Office)			
Other packages	Graphics, WP+, Pace, Total, Mantis			
PRICING & AVAILABILITY				
Typical system configuration and price	Packaged configurations available; contact vendor			
Monthly maintenance of typical configuration	Contact vendor			
Date of first delivery	—			
Number installed to date	—			
COMMENTS				