All About Supermini Systems

The supermini segment continues to be the most active portion of the medium systems market, as well as the one with the most potential for confusion in system definition. At the low end, some microprocessor-based systems are quite powerful and fully capable of supporting large numbers of users, so they are something more than mere supermicros. At the high end, complex uniprocessor and multiprocessor architectures are pushing superminis toward the mainframe realm. Those impediments to smooth taxonomy notwithstanding, the market for superminis is booming, as users seek to take advantage of their power and configurability for both general-purpose and technical computing.

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 are increasingly installed everywhere, from the office to the data center, in both technical and commercial environments. This report presents the salient characteristics of 110 superminis from 29 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.
- A data path between the CPU and main memory that permits the transfer of at least 32 bits of data at a time.
- A main storage capacity between 1 megabyte (MB) and 32 megabytes. (Some superminis support more than 32MB.)
- Support for between 16 and 256 workstations.
- A purchase price of approximately $100,000 and up for a basic configuration, including peripherals and controllers. However, for the increasingly available office-installable, low-end superminis, the basic configuration price can be between $50,000 and $100,000.

The 32-bit word length has always been the lowest common denominator distinguishing superminis from more traditional (8- and 16-bit) minicomputers, and continues to be so. Most currently available superminis use a 32-bit word as their basic data unit. Some vendors, however, do offer supermini systems with longer basic words; Harris Corporation's H Series uses a 48-bit word, for example, while Elxsi's System 6400 employs a 64-bit word.

The foregoing definition is, admittedly, both restrictive and inclusive. Although it eliminates 16-bit systems, no matter how powerful, it is broad enough to accommodate a wide range of systems. For example, it permits inclusion of systems based on the new generation of full 32-bit merchant microprocessors—such as National Semiconductor's NS32032 and Motorola's MC68020—as well as those employing proprietary architectures based on Transistor to Transistor Logic (TTL) or Emitter Coupled Logic (ECL). ➢

Hewlett-Packard's HP 3000 Series 930 employs HP's Precision Architecture, based on Reduced Instruction Set Computer (RISC) principles. Supporting up to 400 users, the system is targeted for commercial applications from office automation to manufacturing.

All About Supermini Systems

Not every system that falls within the parameters of that definition is necessarily a supermini, however, for the denotation can be colored by considerations that vary from vendor to vendor. For example, Plexus Computers' P/75 superficially fits most of the criteria cited above. It employs a CPU based on Motorola's full 32-bit MC68020 microprocessor, supports from 1MB to 16MB of main memory, and allows attachment of 80 workstations; the base processor complex is priced at $36,000—well within the range for the processor complexes of most low-end superminis. However, Plexus markets the system as a supermicro, and it is compatible with the smaller members of the company's supermicro line. Thus, we consider the P/75 more supermicro than supermini.

Conversely, Digital Equipment Corporation's VAX 8650 supports up to 68MB of main memory and 512 terminals, approaching mainframe expandability. However, it is based on the VAX architecture and runs the VAX/VMS operating system—the same as other members of the VAX line. Because of this architectural and software compatibility across the line, we consider the VAX 8650 a supermini.

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 greater word length significantly 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 traditional 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 greater 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.

Regarding the second point, 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 perform in excess of 10 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 well 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 are capable of multiprogramming and 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.

All About Supermini Systems

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, most 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

In spite of the slump that has beset the data processing industry for the last year and a half, the supermini segment of the market continues to grow as vendors strive to satisfy users' desire for more computing power at lower prices at all levels, from the office to the data center. International Data Corporation (IDC), a DP industry consulting firm based in Framingham, Massachusetts, has estimated that U.S. shipments of medium-scale computer systems—a classification composed largely of superminis—will rise from about 40,000, with a value of $14.6 billion, in 1985, to 45,600, valued at $15.8 billion, in 1986. IDC projects an annual growth rate of 11 percent for unit shipments through the rest of this decade.

Most of the activity for superminis is concentrated at the low and high ends of the market. In the lower echelons, smaller 32-bit systems are being integrated 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 increasing numbers. In the past year, for example, several vendors, including Prime Computer (Models 2350 and 2450), Wang Laboratories (VS 6), and Data General (Eclipse MV/2000 DC) have introduced compact, low-end superminis designed for office and departmental computing.

The fiercest competition in the supermini area, however, continues to be 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. This activity is a continuation of the Great MIPS War that began in late 1984 between IBM and Digital Equipment Corporation (DEC) and soon involved other major vendors, such as Data General and Prime.

In the past year, IBM has replaced the 4381 Model Group 3 with the more powerful dual processor 4381 Model Group 14 (and has also added three other uniprocessor 4381s to replace Model Groups 1 and 2). Digital Equipment has added the VAX 8650 and VAX 8800—the latter a dual processor—at the top of the VAX line, capping the effective reconfiguration of the entire product line. Data General has added the Eclipse MV/20000, with two versions—the uniprocessor Model 1 and the dual processor Model 2. Prime has boosted the power of its 9955, replacing that high-end machine with the 9955 II. Harris has added the 1200 as the top-of-the-line machine in its H Series.

The competition among major vendors to deliver increasingly powerful superminis is certain to carry through the next year, for two principal reasons. First, the entrenched vendors must continue to respond to their major rivals' high-end maneuvers. Secondly, they must meet the challenge posed by smaller or newly entrant supermini vendors who have begun to employ innovative architectures that threaten to challenge and even surpass their machines in computational power.

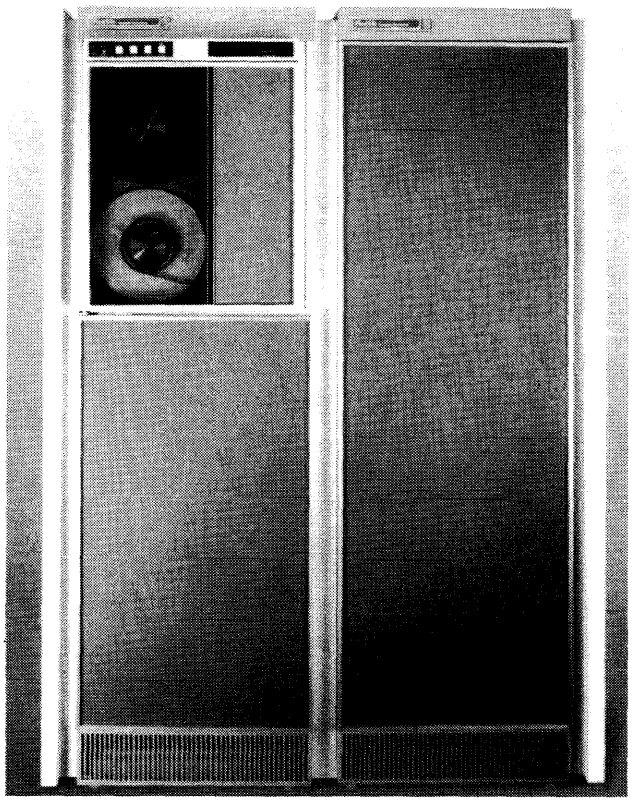
TRENDS

One architectural trend that has begun to spread is the use of RISC (Reduced Instruction Set Computer) technology. In RISC, the computational power of a CPU is enhanced by the implementation of only the simplest and most frequently used instructions in hardware. Complex and less frequently used instructions are programmed as system subroutines that can be executed in one machine cycle, without main memory's having to be accessed. Hewlett-Packard's new HP 3000 Series 930 and 950 employ the company's RISC-based Precision Architecture, and HP is reportedly committed to basing its future systems on that architecture. One vendor that has established its RISC-based systems as formidable competitors in the supermini market is Pyramid Technology, whose 90x systems have been challenging Digital Equipment for the last three years.

Parallel processing is another hot technology, and one particularly well suited for computation-intensive applications. In parallel processing, a multiprocessor technology, different parts of a single program are run on different processors, substantially reducing the time it takes for a complex job to execute. Parallel processing differs from conventional multiprocessing (implemented, for example, in Digital Equipment Corporation's VAXclusters), where multiple jobs are apportioned among multiple processors. A growing number of supermini vendors—including Concurrent Computer Corporation, Elxsi, Flexible Computer Corporation, International Parallel Machines, and Sequent Computer Systems—market parallel processing superminis. Some, like Concurrent Computer (formerly known as Perkin-Elmer Corporation's Data Systems Group), link conventional supermini processors; others, like Flexible Computer, use multiple 32-bit microprocessors (in Flexible's case, NS32032 or MC68020).

Although RISC and parallel processing are exciting and useful technologies, they are not panaceas, for they do have limitations. RISC systems perform best in CPU-intensive applications; in I/O bound environments, they can bog down, for the CPU must wait on the slower cycle times of I/O buses. Similarly, parallel processing requires that software be structured to permit parallel activity. If a user wants to parallelize existing applications and the vendor does not offer specialized conversion tools, the transformation can be a lengthy process.

All About Supermini Systems



Flexible Computer Corporation's Flex/32 multicomputer is a parallel processing system that allows configuration of up to 1,024 cabinets, each containing twenty 32-bit microprocessors. Memory can be local to a processor or shared; regardless, all memory can be accessed by all processors. The Flex/32 can run under Unix System V or under Flexible's MMOS (MultiComputing, MultiTasking Operating System) for realtime environments. A Concurrency Simulator software facility allows testing of parallel applications.

Ultimately, the user may find that his or her application requirements are met by more traditional architectures. One should at least be aware, however, of the variety of technologies available to the would-be or current supermini user.

The drift toward the Unix operating system continues to be an important trend in the supermini realm. Entrenched vendors such as Digital Equipment, Data General, and Prime, as well as newer ones like Elxsi and Flexible, offer it as an alternative to their proprietary operating systems. Concurrent Computer and Harris have separate product lines—one Unix-based and one running primarily under a proprietary system. Many of the more recent entrants in the market—such as AT&T, Computer Consoles, Pyramid, Sequent, and Sperry—offer a Unix-based system as the primary operating environment. Another new vendor, International Parallel Machines, employs a Unix look-alike system in its parallel processing systems.

Those vendors are obviously responding to the desires of users interested in the flexible development tools and the promise of intersystem software compatibility offered by Unix. Although it is doubtful that vendors with proprietary operating systems will abandon them in favor of Unix, the increased availability of Unix as either a primary or an alternative operating environment for superminis indicates that it continues to grow as a major force at the upper end of the medium systems market.

THE COMPARISON CHARTS

The key functional characteristics of 110 commercially available superminis from 29 manufacturers are presented in the accompanying comparison charts. 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 a company or a product from the comparison charts indicates: the company failed to respond to our repeated requests for information; the product is no longer actively being marketed; or the company is no longer in business.

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 (—) for an entry indicates that the information has not been obtained from the vendor.

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. All of the superminis currently on the market have at least 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 minicomputer 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) or billions of bytes (GB) 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.

All About Supermini Systems

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), simulation, and other computation-intensive applications.

CENTRAL PROCESSOR

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. Because those 8 bits permit direct addressing of only 256 distinct memory locations, it is clear that other 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.

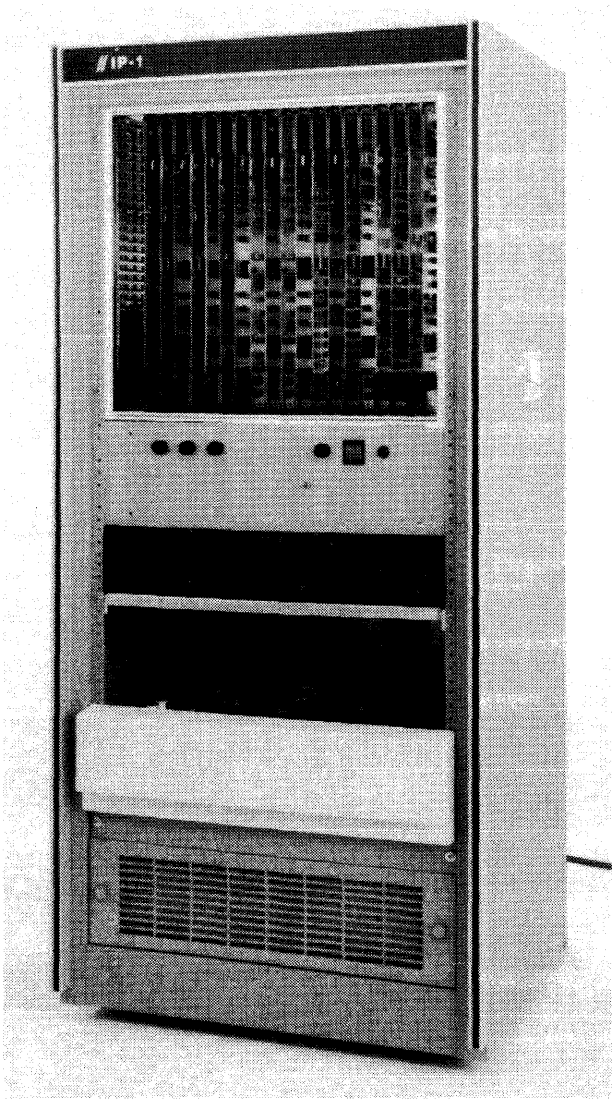
Virtual memory is a facility that simplifies programming by providing a large addressable space on a high-speed disk storage unit that appears to the user as real main storage, and from which instructions and data are transferred into real main storage locations as required. Specialized hardware or software 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.

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-

Digital Equipment Corporation's VAX 8500 is a mid-range system providing up to three times the power of the Digital's venerable VAX-11/780. Designed for both commercial and technical applications, the VAX 8500 occupies only 5.6 square feet of floor space—one third the footprint of its less powerful predecessor, the VAX-11/785.

All About Supermini Systems



The IP-1 comes from International Parallel Machines, a new entrant in the supermini market. The IP-1 is designed for high-intensity engineering/scientific applications, including printed circuit board design, signal and image processing, and matrix equation systems. The IP-1 runs under a Unix-like operating system. A 160-MFLOPS floating-point accelerator is available as an option.

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 relative to that of other systems; recently, however, it has come under attack as a valid yardstick of power. Its opponents claim, with much justification, that the number of instructions used in a single operation depends on various factors, including the architecture of the system, the amount of microcode in the system, and the nature of the application. For example, three machines with three different architectures could take one second to perform the same amount of work, although one could use two million instructions, one could use five million, and the other could use 10 million. The 10-MIPS system would not necessarily be the most powerful.

However, the MIPS measurement has some validity as a measure of relative performance among members of the same product family, particularly in the same application environments. For that reason, and because it so widely accepted as a measurement of relative power, we have included it here.

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 with the fastest cycle time will be the best overall performer

All About Supermini Systems

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 and printers, 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 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.

The H 1200, new top-of-the-line system in Harris Corporation's H Series, employs Emitter Coupled Logic (ECL) circuitry to achieve 5-MIPS CPU performance. The H 1200 is Intended for realtime, high-performance engineering/scientific and technical applications.

All About Supermini Systems

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 the 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 hard copy reports for far less money than the line-at-a-time printers generally 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.

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 available for each system. Typical entries include 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.

All About 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; more specialized languages, like Lisp, which is used for artificial intelligence applications; or proprietary languages 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. (An operating system name that ends in "x" or "ix" generally indicates a Unix-based system.)

Operating system type indicates the type of each operating system 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 modes of operation simultaneously.

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 solids modeling; 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 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

All About Supermini Systems

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 first quarter 1986.

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 29 vendors whose products are listed in the specification charts that follow.

AT&T Information Systems, 1 Speedwell Avenue, Morristown, NJ 07690. Telephone (201) 898-2000.

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

Canaan Computer Corporation, 39 Lindeman Drive, Trumbull, CT 06611. Telephone (203) 372-8100.

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

Celerity Computing, 9692 Via Excelencia, San Diego, CA 92126. Telephone (619) 271-9940.

Control Data Corporation, 8100 34th Avenue South, Minneapolis, MN 55440. Telephone (612) 853-5130.

Concurrent Computer Corporation (formerly Perkin-Elmer Corporation, Data Systems Group), 197 Hance Avenue, Tinton Falls, NJ 07724. Telephone (201) 758-7000.

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.

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

Flexible Computer Corporation, 1801 Royal Lane, Building 8, Dallas, TX 75229. Telephone (214) 869-1234.

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

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

Hewlett-Packard Company, 1820 Embarcadero Road, Palo Alto, CA 94303. Contact local sales office.

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

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

International Parallel Machines, Inc., 700 Pleasant Street, New Bedford, MA 02740. Telephone (617) 990-2977.

MAI Basic Four, Inc., 14101 Myford Road, Tustin, CA 92680. Telephone (714) 731-5100.

McDonnell Douglas Computer Systems Company (formerly Microdata Corporation), 17481 Redhill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone (714) 250-1000.

Modular Computer Systems, Inc. (Modcomp), 1650 W. McNab Road, Fort Lauderdale, FL 33310. Telephone (305) 974-1380.

NCR Corporation, 1700 South Patterson Boulevard, Dayton, OH 45479. Telephone (513) 445-4158.

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

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

Pyramid Technology Corporation, 1295 Charleston Road, P.O. Box 7295, Mountain View, CA 94039-7295. Telephone (415) 965-7200.

Sequent Computer Systems, Inc., 15450 SW Koll Parkway, Beaverton, OR 97006. Telephone (503) 626-5700.

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

Stratus Computer, Inc., 55 Fairbanks Boulevard, Marlboro, MA 01752. Telephone (617) 460-2000.

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. □

All About Supermini Systems

MANUFACTURER & MODEL	AT&T 3B5/101	AT&T 3B5/201	AT&T 3B5/301	AT&T 3B15/101
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-8MB	2MB-16MB	2MB-16MB	2MB-8MB
DISK STORAGE CAPACITY	40MB-1.1GB	40MB-2.2GB	134MB-2.2GB	40MB-1.1GB
NO. WORKSTATIONS SUPPORTED	128 (32 active)	128 (48 active)	128 (48 active)	128 (48 active)
PRICE RANGE	From $34,500	From $44,500	From $44,500	From $54,500
TARGET MARKET	General business	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	SP, DP, double extended	SP, DP, double extended	SP, DP, double extended	SP, DP, double extended
Battery backup	—	—	—	—
Real-time clock or timer	—	—	—	—
CPU cycle time, nanoseconds	—	—	—	—
MIPS	0.8-1.0	1.0	1.0	1.4
16-/32-bit compatibility	Does not apply	Does not apply	Does not apply	Does not apply
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	245	245	245	245
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 2M	1M, 2M	1M, 2M	2M
Cache memory, bytes	8K	8K	8K	16K
INPUT/OUTPUT CONTROL				
No. of I/O channels	16	16	16	16
Data transfer rate	—	—	—	—
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps
Asynchronous	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 19.2K bps
Protocols supported	Bisync, SNA, TTY, RJE	Bisync, SNA, TTY, RJE	Bisync, SNA, TTY, RJE	Bisync, SNA, TTY, RJE
Type of LAN supported	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN
RJE terminals emulated	IBM 360 HASP	IBM 360 HASP	IBM 360 HASP	IBM 360 HASP
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 134MB, 279MB; fixed/removable: 40MB	Fixed: 134MB, 279MB; fixed/removable: 40MB	Fixed: 134MB, 279MB	Fixed: 134MB, 279MB; fixed/removable: 40MB
Serial printers	120/200 cps	120/200 cps	120/200 cps	120/200 cps
Letter-quality printers	—	—	—	—
Line printers	600 lpm	600 lpm	600 lpm	—
Reel-to-reel tape drives	1600/6250 bpi, 25/75 ips	1600/6250 bpi, 25/75 ips	1600/6250 bpi, 25/75 ips	1600/6250 bpi, 75 ips
Streaming tape drives	Start/stop; 25/75 ips	Start/stop; 25/75 ips	Start/stop; 25/75 ips	Start/stop; 75 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Plotters	Plotters	Plotters	Plotters
SOFTWARE				
Assembler	—	—	—	—
Compilers	C, Basic, Pascal, RM/Cobol	C, Basic, Pascal, RM/Cobol	C, Basic, Pascal, RM/Cobol	C, Basic, Pascal, RM/Cobol
Operating system name	Unix System V, Rel. 2.0	Unix System V, Rel. 2.0	Unix System V, Rel. 2.0	Unix System V, Rel. 2.1
Operating system type	Timesharing	Timesharing	Timesharing	Timesharing
Operating sys. implemented in firmware	—	—	—	—
Database management system	dBase II, Ingres, Unify	dBase II, Ingres, Unify	dBase II, Ingres, Unify	dBase II, Ingres, Unify
Principal industry application	General business	General business	General business	General business
Other packages	OA, communications management control	OA, communications management control	OA, communications management control	OA, communications management control
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 2MB memory; 2 async controllers; 16 terminals; 40MB fixed/removable disk; two 134MB fixed disks; two 200 cps dot-matrix printers; Unix System V: $98,690	CPU; 2MB memory; 3 async controllers; 24 terminals; 40MB fixed/removable disk; two 134MB fixed disks; three 200-cps dot-matrix ptrs.; Unix System V: $128,785	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: $117,285	CPU; 2MB memory; 2 async controllers; 16 terminals; 40MB fixed/removable disk; two 134MB fixed disks; two 200 cps dot-matrix printers; Unix System V: $113,690
Monthly maintenance of typical configuration	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	October 1985	October 1985	October 1985	December 1985
Number installed to date	—	—	—	—
COMMENTS	Replaces 3B5/100	Replaces 3B5/200	Replaces 3B5/300	

All About Supermini Systems

MANUFACTURER & MODEL	AT&T 3B15/201	AT&T 3B15/301	AT&T 3B20S	AT&T 3B20A
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-16MB	2MB-16MB	2MB-16MB	2MB-16MB (per CPU)
DISK STORAGE CAPACITY	40MB-2.2GB	134MB-2.2GB	256MB-8.8GB	256MB-8.8GB
NO. WORKSTATIONS SUPPORTED	128 (60 active)	128 (60 active)	256 (100-150 active)	256 (100-150 active)
PRICE RANGE	From $64,500	From $64,500	From $139,000	From $194,000
TARGET MARKET	General business	General business	Custom applications	Custom applications
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	16M	16M
Virtual memory	4GB	4GB	—	—
Hardware floating point	SP, DP, double extended	SP, DP, double extended	SP, DP	SP, DP
Battery backup	—	—	Standard	Standard
Real-time clock or timer	—	—	—	—
CPU cycle time, nanoseconds	—	—	—	—
MIPS	1.4	1.4	1.0	1.5-1.8
16-/32-bit compatibility	Does not apply	Does not apply	Does not apply	Not applicable
MAIN STORAGE				
Bytes fetched per cycle	—	—	4	4
Cycle/access time, nanoseconds	245	245	400	400
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	2M	2M	1M, 2M	1M, 2M
Cache memory, bytes	16K	16K	16K	16K (per CPU)
INPUT/OUTPUT CONTROL				
No. of I/O channels	16	16	4	4
Data transfer rate	—	—	1MB-4MB/sec.	1MB-4MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps
Asynchronous	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 9600 bps	Opt.; 9600 bps
Protocols supported	Bisync, SNA, TTY, RJE	Bisync, SNA, TTY, RJE	X.25, HDLC, RJE, DDCMP, Hyperchannel	X.25, HDLC, RJE, DDCMP, Hyperchannel
Type of LAN supported	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN	Ethernet, 3BNet, ISN
RJE terminals emulated	IBM 360 HASP	IBM 360 HASP	Yes	Yes
IBM 3270 emulation	Yes	Yes	—	—
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 134MB, 279MB; fixed/removable: 40MB	Fixed: 134MB, 279MB	Winchester: 279MB, 550MB; removable: 256MB	Winchester: 279MB, 550MB; removable: 256MB
Serial printers	120/200 cps	120/200 cps	—	—
Letter-quality printers	—	—	—	—
Line printers	—	—	600/1000 lpm	600/1000 lpm
Reel-to-reel tape drives	1600/6250 bpi, 75 ips	1600/6250 bpi, 75 ips	1600-6250 bpi/25-125 ips	1600-6250 bpi/25-125 ips
Streaming tape drives	Start/stop; 75 ips	Start/stop; 75 ips	Start/stop; 75 ips	Start/stop; 75 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Plotters	Plotters	—	—
SOFTWARE				
Assembler	—	—	—	—
Compilers	C, Basic, Pascal, RM/Cobol	C, Basic, Pascal, RM/Cobol	C, Basic, Pascal, Cobol	C, Basic, Pascal, Cobol
Operating system name	Unix System V, Rel. 2.1	Unix System V, Rel. 2.1	Unix System V, Rel. 2.1	Unix System V, Rel. 2.1
Operating system type	Timesharing	Timesharing	Timesharing	Timesharing
Operating sys. implemented in firmware	—	—	—	—
Database management system	dBase II, Ingres, Unify	dBase II, Ingres, Unify	Ingres	Ingres
Principal industry application	General business	General business	—	—
Other packages	OA, communications management control	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; 1600 bpi tape drive & controller; one 279MB & one 134MB fixed disk; three 200 cps dot-matrix printers; Unix System V: $151,535	CPU; 4MB memory; 4 async controllers; 32 terminals; 1600 bpi tape drive & controller; one 279MB & one 134MB fixed disk; three 200 cps dot-matrix printers; Unix System V: $161,345	CPU; 4MB memory; console; 1600 bpi tape & contr.; two 550MB fixed disk drives; 5 async comm. controllers; 40 terminals; 1000 lpm band printer; Unix System V: $311,545	CPU; 8MB memory; console; 1600 bpi tape & contr.; two 550MB fixed disk drives; 5 async comm. controllers; 40 terminals; 1000 lpm band printer; Unix System V: $385,545
Monthly maintenance of typical configuration	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	December 1985	December 1985	March 1984	March 1984
Number installed to date	—	—	—	—
COMMENTS				Dual processor system based on 3B20S

All About Supermini Systems

MANUFACTURER & MODEL	AT&T 3B20D	BTI Computer Systems BTI 8000	Canaan Computer DCS 5100	Canaan Computer DCS 5400
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	5MB-16MB	2MB-24MB	1MB-8MB	1MB-8MB
DISK STORAGE CAPACITY	279MB-8.8GB	64MB-8GB	70MB-664MB	70MB-664MB
NO. WORKSTATIONS SUPPORTED	256 (100-150 active)	256	4	12
PRICE RANGE	From $340,000	$110,000-$700,000	$39,900-$90,000	$43,400-$90,000
TARGET MARKET	Commercial transaction processing	General business	Departmental DBMS, decision support	Departmental DBMS, decision support
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	500K	8M	8M
Virtual memory	—	500KB	16MB	16MB
Hardware floating point	SP, DP	DP	SP	SP
Battery backup	Optional	Standard	None	None
Real-time clock or timer	—	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	250	270	270
MIPS	0.9	—	0.2	0.2
16-/32-bit compatibility	Not applicable	Basic only	—	—
MAIN STORAGE				
Bytes fetched per cycle	4	—	0.5, 1, 2, 4	0.5, 1, 2, 4
Cycle/access time, nanoseconds	400 (with cache)	450	325	325
Storage protection	Standard	Standard	ECC	ECC
Increment size, bytes	1M	1M	1M	1M
Cache memory, bytes	16K (opt.)	None	None	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	2	32	—	—
Data transfer rate	1MB-4MB/sec.	67MB/sec.	—	—
COMMUNICATIONS				
Max. number of lines	—	256	8	12
Synchronous	Opt.; 56K bps	No	Std.; 72K bps	Std.; 72K bps
Asynchronous	Opt.; 9600 bps	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	X.25, HDLC, RJE, DDCMP, Hyperchannel	2780/3780	BSC, SNA	BSC, SNA
Type of LAN supported	Ethernet, ISN	Does not apply	Ethernet	Ethernet
RJE terminals emulated	Yes	Does not apply	—	—
IBM 3270 emulation	—	Does not apply	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Winchester: 279MB	Fixed & removable: 64MB-254MB	Fixed: 70MB-664MB	Fixed: 70MB-664MB
Serial printers	—	30/1200 cps	200/400 cps	200/400 cps
Letter-quality printers	—	Does not apply	—	—
Line printers	600/1000 lpm	300-1200 lpm	300/600/1000 lpm	300/600/1000 lpm
Reel-to-reel tape drives	1600 bpi, 25 ips	800/1600 bpi	1600/3200 bpi	1600/3200 bpi
Streaming tape drives	Start/stop; 25 ips	—	Start/stop; 75 ips	Start/stop; 75 ips
Cassette/cartridge tape drives	—	45 ips	None	None
Other peripherals supported	—	Does not apply	IBM 3178/3278, DEC VT220 terminals	IBM 3178/3278, DEC VT220 terminals
SOFTWARE				
Assembler	—	Relocatable assembler	Macro assembler	Macro assembler
Compilers	C, Basic, Pascal, Cobol	Cobol, Fortran, Pascal, Basic	Cobol, Fortran, PL1, Basic, C	Cobol, Fortran, PL1, Basic, C
Operating system name	Unix RTR, Rel. 1	—	Multos	Multos
Operating system type	Timesharing, realtime	Proprietary multitasking	Multitasking	Multitasking
Operating sys. implemented in firmware	—	Does not apply	Partially	Partially
Database management system	—	BTI/FMS	—	—
Principal industry application	—	General business	VM/CMS applications	VM/CMS applications
Other packages	—	Does not apply	PROFS, Focus, CICS, RAMIS, PC virtual disk	PROFS, Focus, CICS, RAMIS, PC virtual disk
PRICING & AVAILABILITY				
Typical system configuration and price	2 CPUs; 8MB memory; console; 9-track tape; three 279MB Winchester disk drives; 64 terminals; two 1000 lpm band printers: $481,870	CPU with 2MB main memory; 64MB mass storage unit; cartridge tape drive; 8 comm. lines: $110,000	CPU; 1MB memory; 70MB mass storage; 1600 bpi tape; 4 terminal connections; Multos operating system: $39,750	CPU; 1MB memory; 85MB mass storage; 1600 bpi tape; 8 terminal connections; Multos operating system: $49,100
Monthly maintenance of typical configuration	Contact vendor	$827	$301	$365
Date of first delivery	March 1984	2nd quarter 1982	1st quarter 1984	3rd quarter 1984
Number installed to date	—	70	100	100
COMMENTS		Multiprocessor system with up to 8 CPUs	Vendor claims that DCS 5000 is the only IBM VM/CMS-compatible departmental computer	Vendor claims that DCS 5000 is the only IBM VM/CMS-compatible l departmental computer

All About Supermini Systems

MANUFACTURER & MODEL	Canaan Computer DCS 5800	Celerity Computing C1200	Computer Consoles, Inc. Power 6/32	Computer Consoles, Inc. Power 6/32E
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-8MB	4MB-24MB	4MB-32MB	4MB-8MB
DISK STORAGE CAPACITY	70MB-664MB	11.2GB	160MB-8.2GB	160MB-3.4GB
NO. WORKSTATIONS SUPPORTED	36	64	240	64
PRICE RANGE	$49,400-$90,000	$38,000-$50,000	From $160,000	From $112,000
TARGET MARKET	Departmental DBMS, decision support	CAE, research	Gen. bus., government, engineering/scientific	Gen. bus., government, engineering/scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	8M	256M	4G	4G
Virtual memory	16MB	4GB	4GB	4GB
Hardware floating point	SP	64-bit (IEEE)	SP, DP, functions	—
Battery backup	None	Optional	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	90	125	100	100
MIPS	0.5	2.5	8	5
16-/32-bit compatibility	—	Does not apply	—	—
MAIN STORAGE				
Bytes fetched per cycle	0.5, 1, 2, 4	4 or 8	4	4
Cycle/access time, nanoseconds	325	—	100	100
Storage protection	ECC	Standard	Standard	Standard
Increment size, bytes	1M	1M, 4M	4M	4M
Cache memory, bytes	16K	160K	56K	56K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	1	25	7
Data transfer rate	—	6.47MB/sec.	11MB/second	11MB/second
COMMUNICATIONS				
Max. number of lines	36	64	240	64
Synchronous	Std.; 72K bps	64K bps	Opt.; 56K bps	Opt.; 56K bps
Asynchronous	Std.; 19.2K bps	38.4K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	BSC, SNA	BSC, Hasp, X.25	BSC, SNA, X.25	BSC, SNA, X.25
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	—	2780/3780	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 70MB-664MB	120MB; 337MB; 400MB; 689MB	Fixed & removable: 160/300/340/515MB	Fixed & removable: 160/300/340/515MB
Serial printers	200/400 cps	300/600 lpm	400 cps	400 cps
Letter-quality printers	—	35/55 cps	35/55 cps	35/55 cps
Line printers	300/600/1000 lpm	300/600 lpm	300/600/1000 lpm	300/600/1000 lpm
Reel-to-reel tape drives	1600/3200 bpi	1600/6250 bpi, 100 ips	—	—
Streaming tape drives	Start/stop; 75 ips	1600 bpi, 25 ips	1600/6250 bpi, 100 ips	1600/6250 bpi, 100 ips
Cassette/cartridge tape drives	None	90 ips	—	—
Other peripherals supported	IBM 3178/3278, DEC VT220 terminals	IEEE 488/DR11 and graphics	Laser printers, OCR	Laser printers, OCR
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Yes	Yes
Compilers	Cobol, Fortran, PL1, Basic, C	Fortran 77, Pascal, C, Lisp	C, Fortran, Cobol, Pascal, Ada	C, Fortran, Cobol, Pascal, Ada
Operating system name	Multos	Unix	Unix System V & 4.2 BSD	Unix System V & 4.2 BSD
Operating system type	Multitasking	Multitasking	Multitasking	Multitasking
Operating sys. implemented in firmware	Partially	Partially	—	—
Database management system	—	Informix	Ingres/Unify/BRS/Search	Ingres/Unify/BRS/Search
Principal industry application	VM/CMS applications	CAE, research, graphics	General business, engineering/scientific, legal	General business, engineering/scientific, legal
Other packages	PROFS, Focus, CICS, RAMIS, PC virtual disk	Image processing, finite element analysis	Office automation, third-party packages	Office automation, third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 1MB memory; 199MB mass storage; 1600 bpi tape; 12 terminal connections; Multos operating system: $58,600	CPU; 4MB main memory; 64X cache; 120MB disk; ¼-inch tape; serial ports; printer port; clock; Unix: $48,000	CPU; 8MB main memory; console; two 340MB disks; 1600 bpi tape drive; 600 lpm printer; 64 async ports; Unix license: $275,550	CPU; 4MB main memory; console; 340MB disk; 1600 bpi tape drive; 300 lpm printer; 32 async ports; Unix license: $151,245
Monthly maintenance of typical configuration	$468	—	$1,754	$1,266
Date of first delivery	1st quarter 1986	October 1984	3rd quarter 1984	January 1986
Number installed to date	Does not apply	75+	Over 300	—
COMMENTS	Vendor claims that DCS 5000 is the only IBM VM/CMS-compatible departmental computer			Field upgradable to Power 6/32

All About Supermini Systems

MANUFACTURER & MODEL	Concurrent Computer Corporation 3203	Concurrent Computer Corporation 3205	Concurrent Computer Corporation 3210	Concurrent Computer Corporation 3230
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	0.5MB-4MB	1MB-4MB	1MB-16MB	1MB-16MB
DISK STORAGE CAPACITY	51MB-170MB	51MB-1.2GB	51MB-7.2GB	51MB-144GB
NO. WORKSTATIONS SUPPORTED	16	16	64	128
PRICE RANGE	$16,600-$33,990	$12,950-$41,000	$32,000-$60,000	$74,150-$81,000
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	4M	4M	16M
Virtual memory	16MB	16MB	16MB	16MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	None	Optional	Optional	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	—	—
MIPS	0.7	0.5	1.0	2.0
16-/32-bit compatibility	32-bit only	32-bit only	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	4	4	4	16
Cycle/access time, nanoseconds	400	400	500	500
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	0.5M, 1M, 2M	1M	1M	1M, 2M
Cache memory, bytes	None	None	None	1K
INPUT/OUTPUT CONTROL				
No. of I/O channels	1	1	4	8
Data transfer rate	1.5MB/sec.	1.5MB/sec.	8MB/sec.	8MB/sec.
COMMUNICATIONS				
Max. number of lines	16	16	64	128
Synchronous	Std.; 19.2K bps	Std.; 19.2K 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, SNA, X.25, X.29	ADCCP, SDLC, HDLC, SNA, X.25, X.29	ADCCP, SDLC, HDLC, SNA, X.25, X.29	ADCCP, SDLC, HDLC, SNA, X.25, X.29
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: 51MB-85MB	Fixed & removable: 51MB-825MB	Fixed & removable: 51MB-825MB	Fixed & removable: 51MB-825MB
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	Does not apply	800/1600/6250 bpi	800/1600/6250 bpi	800/1600/6250 bpi
Streaming tape drives	90 ips	90 ips	90 ips	90 ips
Cassette/cartridge tape drives	Does not apply	Does not apply	Does not apply	Does not apply
Other peripherals supported	Does not apply	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 Plus	Reliance Plus	Reliance Plus	Reliance Plus
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; 8-line communications controller; two 51MB disks; streaming cartridge tape; console: $19,940	CPU; 1MB memory; loader; 8-line communications controller; floating point; 50MB (25MB fixed/ 25MB removable) disk; console Video Display Unit: $27,950	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
Monthly maintenance of typical configuration	$157	$295	$320	$360
Date of first delivery	February 1985	1983	1981	1981
Number installed to date	—	—	—	—
COMMENTS	Vendor says system designed for multiuser sites requiring ease of installation/operation	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

All About Supermini Systems

MANUFACTURER & MODEL	Concurrent Computer Corporation 3230XP	Concurrent Computer Corporation 3230MPS	Concurrent Computer Corporation 3250XP	Concurrent Computer Corporation 3260MPS
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-16MB	2MB-16MB	1MB-16MB	2MB-16MB
DISK STORAGE CAPACITY	51MB-288GB	51MB-288GB	51MB-576GB	51MB-576GB
NO. WORKSTATIONS SUPPORTED	128	128	256	256
PRICE RANGE	$85,000-$156,000	$125,000-$439,000	$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	16M	16M	16M	16M
Virtual memory	16MB	16MB	16MB	16MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Standard	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	—	—
MIPS	2.0	1.9-5.0	3.0	1.9-7.2
16-/32-bit compatibility	32-bit only	32-bit only	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	16	16	16	16
Cycle/access time, nanoseconds	500	500	500	500
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1/2/4/6/8/10/12M	2M, 4M, 8M	2M	2M
Cache memory, bytes	4K	4K	8K	12K
INPUT/OUTPUT CONTROL				
No. of I/O channels	8	8	32	32
Data transfer rate	8MB/sec.	8MB/sec.	40MB/sec.	40MB/sec.
COMMUNICATIONS				
Max. number of lines	128	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, SNA, X.25, X.29	ADCCP, SDLC, HDLC, SNA, X.25, X.29	ADCCP, SDLC, HDLC, SNA, X.25, X.29	ADCCP, SDLC, HDLC, SNA, X.25, X.29
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: 51MB-825MB	Fixed & removable: 51MB-825MB	Fixed & removable: 51MB-825MB	Fixed & removable: 51MB-825MB
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	90 ips	90 ips	90 ips	90 ips
Cassette/cartridge tape drives	Does not apply	Does not apply	Does not apply	Does not apply
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 Plus	Reliance Plus	Reliance Plus	Reliance Plus
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; 8-line communications controller; battery backup; 80MB disk; console Video Display Unit: $109,000	CPU; 2MB memory; Auxiliary Processing Unit (APU); floating-point processor; writable control store; loader; console Video Display Unit; 8-line communications controller; 80MB disk: $147,000	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	$585	$1,193	$763	$1,240
Date of first delivery	July 1985	July 1985	1983	1983
Number installed to date	—	—	—	—
COMMENTS	Can be used in fault tolerant, dual processor configuration	Supports up to 5 APUs; can also 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	Concurrent Computer Corporation 3280MPS	Concurrent Computer Corporation XF/400	Concurrent Computer Corporation XF/600	Concurrent Computer Corporation XF/610
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-16MB	0.5MB-4MB	2MB-16MB	4MB-16MB
DISK STORAGE CAPACITY	51MB-576GB	51MB-170MB	51MB-2.4GB	51MB-2.4GB
NO. WORKSTATIONS SUPPORTED	512	16	64	64
PRICE RANGE	$287,100-$1,061,400	$21,995-$32,095	$27,000-$61,000	$45,000-$79,000
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	16M	4M	4M	4M
Virtual memory	16MB	16MB	16MB	16MB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Standard	None	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	—	—
MIPS	6.14-33.8	0.7	1.0	1.0
16-/32-bit compatibility	32-bit only	32-bit only	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	16	4	4	4
Cycle/access time, nanoseconds	500	400	500	500
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	2M	2M	2M	1M, 2M, 4M, 8M
Cache memory, bytes	16K	None	1K (opt.)	1K
INPUT/OUTPUT CONTROL				
No. of I/O channels	32	1	1	4
Data transfer rate	10MB/sec.	1.5MB/sec.	8MB/sec.	8MB/sec.
COMMUNICATIONS				
Max. number of lines	512	16	64	64
Synchronous	Std.; 19.2K bps	Does not apply	Does not apply	Does not apply
Asynchronous	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	ADCCP, SDLC, HDLC, SNA, X.25, X.29	SNA	SNA	SNA
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: 51MB-825MB	Fixed: 51MB-85MB	Fixed & removable: 51MB-825MB	Fixed & removable: 51MB-825MB
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	None	800/1600/6250 bpi	800/1600/6250 bpi
Streaming tape drives	90 ips	90 ips	90 ips	90 ips
Cassette/cartridge tape drives	Does not apply	Does not apply	Does not apply	Does not apply
Other peripherals supported	Card reader	—	—	Card reader
SOFTWARE				
Assembler	Cal, Cal Macro	Assembler Language	Assembler Language	Assembler Language
Compilers	Cobol, Fortran, Basic, Pascal, RPG II, C	Cobol, C; Fortran; Unibol	Cobol; C; Fortran; Unibol	Cobol; C; Fortran; Unibol
Operating system name	OS/32; Xelos	Xelos	Xelos	Xelos
Operating system type	Realtime; multitasking	Realtime, multitasking	Realtime, multitasking	Realtime, timesharing
Operating sys. implemented in firmware	—	—	—	—
Database management system	Reliance Plus	Unify	Unify	Unify
Principal industry application	Simulation/scientific computing	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; 2MB memory; 80MB disk; 8-line comm. controller; Auxiliary Processing Unit (APU); writable control store; loader; console Video Display Unit; floating-point processor: $386,150	CPU; 1MB memory; loader; 8-line communications controller; two 51MB disks; streaming cartridge tape; console: Xelos software: $22,945	CPU; 2MB memory; loader; 8-line communications controller; 51MB disk; streaming cartridge tape; console; Xelos software: $37,250	CPU; 4MB memory; loader; 8-line communications controller; 51MB disk; streaming cartridge tape; console: $57,290
Monthly maintenance of typical configuration	$1,970	$170	$345	$393
Date of first delivery	November 1985	September 1985	September 1985	September 1985
Number installed to date	—	—	—	—
COMMENTS	Supports up to 5 APUs; can also be used in fault tolerant, dual processor configuration	Supports up to 16 user connections; for commercial, technical, and industrial applications	Supports up to 64 user connections in a multitasking environment	Supports up to 64 user connections in a timesharing environment

All About Supermini Systems

MANUFACTURER & MODEL	Control Data Corporation Cyber 180 Model 810	Data General Corp. Eclipse MV/2000 DC	Data General Corp. Eclipse MV/4000 DC	Data General Corp. Eclipse MV/4000
WORD LENGTH	64 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-32MB	2MB-5MB	2MB-8MB	1MB-8MB
DISK STORAGE CAPACITY	256MB-41.6GB	38MB-240MB	70MB-240MB	50MB-9.4GB
NO. WORKSTATIONS SUPPORTED	See Comments	24	32	64
PRICE RANGE	$125,000-$315,000	From $17,500	From $38,800	From $30,000
TARGET MARKET	General, engineering/ scientific	General business d.p., office automation	General business d.p., office automation	General business d.p., office automation
CENTRAL PROCESSOR				
No. of directly addressable bytes	32M	—	—	—
Virtual memory	2GB	4GB	4GB	4GB
Hardware floating point	DP (128-bit)	Std.; SP, DP	Opt.; SP, DP	Opt.; SP, DP
Battery backup	Optional	None	None	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	50	160	200	200
MIPS	0.8	1	0.6	0.6
16-/32-bit compatibility	Does not apply	Direct	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	8	—	—	—
*Cycle/access time, nanoseconds	400	—	—	—
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	2M, 4M, 16M	1M, 2M, 3M	1M, 2M, 4M, 8M	1M, 2M, 4M, 8M
Cache memory, bytes	None	None	None	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	8, 12, or 16	—	—	—
Data transfer rate	3MB/sec. per channel	8MB/sec.	3MB/sec.	5MB/sec.
COMMUNICATIONS				
Max. number of lines	2,032	24 async	—	—
Synchronous	Std.; 56K bps	Opt.; 300-56K bps	Opt.; 56K bps	Opt.; 888KB/sec.
Asynchronous	Std.; 38.4K bps	Opt.; 300-38.4K bps	Std.; 38.4K bps	Optional
Protocols supported	Hasp, 2780/3780, 3270 BSC, X.25 PAD & PACKET	X.25, SDLC, Hasp II, SNA, TCP/IP	X.25, SDLC, Hasp II, SNA, TCP/IP	X.25, SDLC, Hasp II, SNA, TCP/IP
Type of LAN supported	Ethernet	Xodiac, IEEE802	Xodiac, IEEE802	Xodiac, IEEE802
RJE terminals emulated	2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	No	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 200MB-1.2GB	Winchester: 38MB, 70MB, 120MB	Winchester: 70MB, 120MB	Fixed: 73MB-5.3GB; removable: 192MB, 277MB
Serial printers	Does not apply	—	—	—
Letter-quality printers	Does not apply	35/40 cps	35/40 cps	35/40 cps
Line printers	300/600/1200/2000 lpm	—	—	230-1200 lpm
Reel-to-reel tape drives	1600/3250 bpi	—	—	800-6250 bpi, 50-75 ips
Streaming tape drives	Start/stop; 75 ips	—	—	Start/stop; 30 ips
Cassette/cartridge tape drives	Does not apply	22MB cartridge	15MB cartridge	—
Other peripherals supported	Card rdrs., laser ptr., mass storage subsystem	737KB diskette	737KB diskette	Laser printers (12 ppm)
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Cobol, Fortran, Basic, Pascal, C, Lisp, Prolog	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada
Operating system name	NOS & NOS/VE	See Comments	See Comments	See Comments
Operating system type	Multitasking	Multiprog. or timeshare	Multiprog. or timeshare	Multiprog. or timeshare
Operating sys. implemented in firmware	No	—	—	—
Database management system	IM/DM	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
Other packages	—	Third-party packages	Third-party packages	Third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 8MB memory; 8 channels; 1.6GB mass storage; tape unit; 600 lpm printer; connection for 7 work-stations: $273,780	Contact vendor	Contact vendor	Contact vendor
Monthly maintenance of typical configuration	$1,726	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	3rd quarter 1984	1st quarter 1986	1985	December 1982
Number installed to date		—	—	—
COMMENTS	Workstations supported via front end processor	Supports AOS/VS, AOS/DVS, DG/UX, and MV/UX operating systems	Supports AOS/VS, AOS/DVS, DG/UX, and MV/UX operating systems	Supports AOS/VS, AOS/DVS, AOS/RT32, DG/UX, and MV/UX operating systems

All About Supermini Systems

MANUFACTURER & MODEL	Data General Corp. Eclipse MV/8000 II	Data General Corp. Eclipse MV/10000	Data General Corp. Eclipse MV/10000 SX	Data General Corp. Eclipse MV/20000 Model 1
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-8MB	4MB-32MB	4MB-32MB	4MB-64MB
DISK STORAGE CAPACITY	50MB-14.2GB	50MB-27GB	50MB-27GB	50MB-27GB
NO. WORKSTATIONS SUPPORTED	128	192	192	1,008
PRICE RANGE	From $87,100	From $137,100	From $162,100	From $234,000
TARGET MARKET	General business d.p., office automation	General business d.p., office automation	General business d.p., office automation	General business d.p., office automation
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	Opt.; SP, DP	Opt.; SP, DP	Std.; SP, DP	Opt.; SP, DP
Battery backup	Optional	Optional	Optional	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	220	140	140	85
MIPS	1.2	2.5	3.7	5.5
16-/32-bit compatibility	Direct	Direct	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	—	—	—	—
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 2M	1M, 2M, 4M, 8M	1M, 2M, 4M, 8M	4M, 8M
Cache memory, bytes	16K	16K	16K	16K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	—	—	—
Data transfer rate	18.2MB/sec.	28MB/sec.	28MB/sec.	32MB/sec.
COMMUNICATIONS				
Max. number of lines	—	200	200	1,040
Synchronous	Opt.; 888KB/sec.	Opt.; 888KB/sec.	Opt.; 888KB/sec.	Opt.; 888KB/sec.
Asynchronous	Optional	Optional	Optional	Optional
Protocols supported	X.25, SDLC, Hasp II, SNA, TCP/IP	X.25, SDLC, Hasp II, SNA, TCP/IP	X.25, SDLC, Hasp II, SNA, TCP/IP	X.25, SDLC, Hasp II, SNA, TCP/IP
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	Fixed: 73MB-5.3GB; removable: 192MB, 277MB	Fixed: 73MB-5.3GB; removable: 192MB, 277MB	Fixed: 73MB-5.3GB; removable: 192MB, 277MB	Fixed: 73MB-5.3GB; removable: 192MB, 277MB
Serial printers	—	—	—	—
Letter-quality printers	35/40 cps	35/40 cps	35/40 cps	35/40 cps
Line printers	230-1200 lpm	230-1200 lpm	230-1200 lpm	230-1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 50-75 ips	800-6250 bpi, 50-75 ips	800-6250 bpi, 50-75 ips	800-6250 bpi, 50-75 ips
Streaming tape drives	Start/stop; 30 ips	Start/stop; 30 ips	Start/stop; 30 ips	Start/stop; 30 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Laser printers (12 ppm)	Laser printers (12 ppm)	Laser printers (12 ppm)	Laser printers (12 ppm)
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada
Operating system name	See Comments	See Comments	See Comments	See Comments
Operating system type	Multiprog. or timeshare	Multiprog. or timeshare	Multiprog. or timeshare	Multiprog. or 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	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Monthly maintenance of typical configuration	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	August 1983	May 1983	May 1985	1st quarter 1986
Number installed to date	—	—	—	—
COMMENTS	Supports AOS/VS, AOS/DVS, AOS/RT32, DG/UX, and MV/UX operating systems	Supports AOS/VS, AOS/DVS, AOS/RT32, DG/UX, and MV/UX operating systems	Supports AOS/VS, AOS/DVS, AOS/RT32, DG/UX, and MV/UX operating systems	Supports AOS/VS, AOS/DVS, AOS/RT32, DG/UX, and MV/UX operating systems

All About Supermini Systems

MANUFACTURER & MODEL	Data General Corp. Eclipse MV/20000 Model 2	Digital Equipment Corporation (DEC) VAX-11/750	Digital Equipment Corporation (DEC) VAX-11/780	Digital Equipment Corporation (DEC) VAX-11/785
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	4MB-64MB	2MB-8MB	2MB-64MB	2MB-64MB
DISK STORAGE CAPACITY	50MB-27GB	121MB-19GB	121MB-30GB	121MB-30GB
NO. WORKSTATIONS SUPPORTED	1,008	128	384	384
PRICE RANGE	From $337,000	From $54,000	From $105,000	From $200,000
TARGET MARKET	General business d.p., office automation	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	Opt.; SP, DP	SP, DP	SP, DP, QP	SP, DP, QP
Battery backup	Standard	Optional	Optional	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	85	320	200	133
MIPS	10	0.72	1.06	1.5 (approx.)
16-/32-bit compatibility	Direct	Via mode bit	Via mode bit	Via mode bit
MAIN STORAGE				
Bytes fetched per cycle	—	8	8	8
Cycle/access time, nanoseconds	—	400 (cache enabled)	290 (cache enabled)	166 (cache enabled)
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	4M, 8M	1M	8M	8M
Cache memory, bytes	32K	4K	8K	32K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	1-5	1-8	1-8
Data transfer rate	32MB/sec.	5MB/sec.	13.3MB/sec.	13.3MB.sec.
COMMUNICATIONS				
Max. number of lines	1,040	—	—	—
Synchronous	Opt.; 888KB/sec.	Opt.; 1MB/sec.	Opt.; 1MB/sec.	Opt.; 1MB/sec.
Asynchronous	Optional	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 19.2K bps
Protocols supported	X.25, SDLC, Hasp II, SNA, TCP/IP	SDLC, HDLC, X.25, SNA, DNA, TCP/IP, LU6.2	SDLC, HDLC, X.25, SNA, DNA, TCP/IP, LU6.2	SDLC, HDLC, X.25, SNA, DNA, TCP/IP, LU6.2
Type of LAN supported	Xodiac, IEEE802	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: 73MB-5.3GB; removable: 192MB, 277MB	Fixed: 121MB/456MB; rem.: 10.4MB/205MB	Fixed: 121MB/456MB; rem.: 10.4MB/205MB	Fixed: 121MB/456MB; rem.: 10.4MB/205MB
Serial printers	—	50-240 cps	50-240 cps	50-240 cps
Letter-quality printers	35/40 cps	25-50 cps	25-50 cps	25-50 cps
Line printers	230-1200 lpm	215-1200 lpm	215-1200 lpm	215-1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 50-75 ips	800-6250 bpi, 25-125 ips	800-6250 bpi, 25-125 ips	800-6250 bpi, 25-125 ips
Streaming tape drives	Start/stop; 30 ips	Start/stop; 25-100 ips	Start/stop; 25-100 ips	Start/stop; 25-100 ips
Cassette/cartridge tape drives	—	—	—	—
Other peripherals supported	Laser printers (12 ppm)	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	Cobol, Fortran 77, PL/1, Basic, C, Pascal, DG/L, APL, RPG II, Lisp, Ada	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	See Comments	VAX/VMS; Ultrix-32	VAX/VMS; Ultrix-32	VAX/VMS; Ultrix-32
Operating system type	Multiprog. or timeshare	Batch, r.-t.; timeshare	Batch, r.-t.; timeshare	Batch, r.-t.; timeshare
Operating sys. implemented in firmware	—	No	No	No
Database management system	DG/DBMS, DG/SQL	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb
Principal industry application	CEO (Comprehensive Electronic Office), CFO	General business, engineering/scientific	General business, engineering/scientific	General business, engineering/scientific
Other packages	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	Contact vendor	CPU; 3MB memory; 2 mag. tapes; 121MB fixed disk & contr.; 205MB rem. disk; async. interface; hard-copy console; 20 terminals; two 600 lpm printers; VAX/VMS lic. & warranty: $174,635	CPU; 4MB memory; four 456MB disks & contr.; 4 mag. tapes; 2 async. interfaces; 40 terminals; 1200/800 lpm ptr.; 12 ppm laser ptr.; VAX/VMS lic. & warranty: $410,260	CPU; 8MB memory; four 456MB disks & contr.; 4 mag. tapes; 2 async. interfaces; 40 terminals; console; 1200/800 lpm ptr.; 12 ppm laser ptr.; VAX/VMS license & warranty: $476,360
Monthly maintenance of typical configuration	Contact vendor	$1,290	$2,741	$2,770
Date of first delivery	2nd quarter 1986	November 1980	January 1978	June 1984
Number installed to date	—	—	—	—
COMMENTS	Supports AOS/VS, AOS/DVS, AOS/RT32, DG/UX, and MV/UX operating systems	Can be configured in VAXcluster with 15 other processors and storage controllers	Can be configured in VAXcluster with 15 other processors and storage controllers	Can be configured in VAXcluster with 15 other processors and storage controllers

All About Supermini Systems

MANUFACTURER & MODEL	Digital Equipment Corporation (DEC) VAX 8200	Digital Equipment Corporation (DEC) VAX 8300	Digital Equipment Corporation (DEC) VAX 8500	Digital Equipment Corporation (DEC) VAX 8600
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	4MB-16MB	4MB-14MB	20MB	4MB-68MB
DISK STORAGE CAPACITY	—	—	5.4GB	164GB (VAXcluster)
NO. WORKSTATIONS SUPPORTED	100 (16-64 typical)	100 (16-64 typical)	300 (32-200 typical)	400 (56-256 typical)
PRICE RANGE	From $79,000	From $122,000	From $260,000	From $350,000
TARGET MARKET	General business, engineering/scientific	Engineering/scientific (computation-intensive)	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, QP	SP, DP, QP	SP, DP, QP	SP, DP, QP
Battery backup	—	—	—	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	200	200	45	80
MIPS	1.06 (approx.)	2.0 (approx.)	3.18 (approx.)	4.45 (approx.)
16-/32-bit compatibility	Via mode bit	Via mode bit	Via mode bit	Via mode bit
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	8
Cycle/access time, nanoseconds	600-1600	600-1600	136-1260	560
Storage protection	—	—	—	Standard
Increment size, bytes	2M	2M	Does not apply	4M, 16M
Cache memory, bytes	8K	8K per CPU	64K	16K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	—	—	1-11
Data transfer rate	13.3MB/sec.	13.3MB/sec.	16MB/sec.	20MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	512
Synchronous	—	—	—	Opt.; 1MB/sec.
Asynchronous	—	—	—	Opt.; 19.2K bps
Protocols supported	SDLC, HDLC, X.25, SNA, DNA, TCP/IP, LU6.2	SDLC, HDLC, X.25, SNA, DNA, LU6.2	SDLC, HDLC, X.25, SNA, DNA, LU6.2	SDLC, HDLC, X.25, SNA, DNA, TCP/IP, LU6.2
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: 121MB/456MB; rem.: 10.4MB/205MB	Fixed: 121MB/456MB; rem.: 10.4MB/205MB	Fixed: 456MB; rem.: 205MB	Fixed: 121MB/456MB; rem.: 10.4MB/205MB
Serial printers	50-240 cps	50-240 cps	—	50-240 cps
Letter-quality printers	25-50 cps	25-50 cps	—	25-50 cps
Line printers	215-1200 lpm	215-1200 lpm	—	215-1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 25-125 ips	800-6250 bpi, 25-125 ips	1600/6250 bpi	800-6250 bpi, 25-125 ips
Streaming tape drives	Start/stop; 25-100 ips	Start/stop; 25-100 ips	75 ips	Start/stop; 25-100 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.
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	VAX/VMS	VAX/VMS; Ultrix-32
Operating system type	Batch, r.-t.; timeshare	Batch, realtime	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	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; 8MB memory; hot floating point; disk & comm. controllers; Ethernet interface; console; 456MB disk; mag. tape drive; hardware warranties; 1-yr. VAX/VMS & DECnet licenses: $139,000	CPU; 12MB memory; hot floating point; Ethernet interface; disk controller; 1-yr. hardware warranty; 1-yr. VAX/VMS & DECnet licenses: $122,000	CPU; 20MB memory; 456MB disk & contr.; mag. tape drive; Ethernet port; comm. contr.; 1-yr. hardware warranty; VAX/VMS & DECnet monthly licenses: $299,000	CPU; 16MB memory; Ethernet interf.; four 456MB disks; 4 mag. tapes; console; 4 async. interfaces; 64 term.; 10 terminal ptrs.; 1200/800 lpm ptr.; 12 ppm laser ptr.; VAX/VMS & DECnet lic.: $784,890
Monthly maintenance of typical configuration	$777	$603	Contact vendor	$3,918
Date of first delivery	First quarter 1986	Second quarter 1986	Second quarter 1986	April 1985
Number installed to date	—	—	—	—
COMMENTS	Can be configured in VAXcluster with 15 other processors and storage controllers	Dual processor system; configurable in VAXcluster with 15 other proc. and storage controllers	Can be configured in VAXcluster with 15 other processors and storage controllers	Can be configured in VAXcluster with 15 other processors and storage controllers

All About Supermini Systems

MANUFACTURER & MODEL	Digital Equipment Corporation (DEC) VAX 8650	Digital Equipment Corporation (DEC) VAX 8800	Elxsi System 6400	Flexible Computer Corporation Flex/32 Series 600
WORD LENGTH	32 bits	32 bits	64 bits	32 bits
MAIN MEMORY	16MB-68MB	32MB	8MB-768MB	2MB-24MB
DISK STORAGE CAPACITY	164GB (VAXcluster)	—	Up to 100GB	80MB-20GB
NO. WORKSTATIONS SUPPORTED	500 (72-320 typical)	500 (72-320 typical)	1,000	80
PRICE RANGE	From $400,000	From $650,000	$350,000-$3,000,000	$68,000-$150,000
TARGET MARKET	General business, engineering/scientific	Engineering/scientific (computation-intensive)	Scientific/engineering, CAD/CAM/CAE	Realtime, eng./sci., AI, aerospace, simulation
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	2G	4G
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	SP, DP, QP	SP, DP, QP	SP, DP, double extended	SP, DP
Battery backup	—	—	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	55	45	50	75
MIPS	6.4 (approx.)	12.7 (approx.)	6-72	10 (2.5 per CPU)
16-/32-bit compatibility	Via mode bit	Via mode bit	Does not apply	Yes
MAIN STORAGE				
Bytes fetched per cycle	—	—	16	32
Cycle/access time, nanoseconds	384	135-1260	400	75
Storage protection	—	—	Standard	Standard
Increment size, bytes	4M, 16M	Does not apply	8M	1M, 2M, 4M, 8M
Cache memory, bytes	16K	64K per processor	16K-192K	Does not apply
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	—	8	4
Data transfer rate	20MB/sec.	Over 30MB/sec.	64MB/sec.	24MB/sec.
COMMUNICATIONS				
Max. number of lines	512	—	Over 1,000	80
Synchronous	—	—	Optional	Opt.; 300K bps
Asynchronous	—	—	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	SDLC, HDLC, X.25, SNA, DNA, TCP/IP, LU6.2	SDLC, HDLC, X.25, SNA, DNA, LU6.2	X.25, Bisync	SDLC, TCP/IP
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	Hasp, 2780/3780, 3770	Opt. (types unspec'd)
IBM 3270 emulation	Yes	Yes	No	Opt. (types unspec'd)
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 121MB/456MB; rem.: 10.4MB/205MB	Fixed: 121MB/456MB; rem.: 10.4MB/205MB	Fixed & removable: 300MB-474MB	Winchester: 80MB, 337MB, 474MB
Serial printers	50-240 cps	50-240 cps	Does not apply	600 lpm
Letter-quality printers	25-50 cps	25-50 cps	55 cps	Does not apply
Line printers	215-1200 lpm	215-1200 lpm	600/1200 lpm	300, 600 lpm
Reel-to-reel tape drives	800-6250 bpi, 25-125 ips	800-6250 bpi, 25-125 ips	800-6250 bpi, 50-125 ips	800-6250 bpi, 45-75 ips
Streaming tape drives	Start/stop; 25-100 ips	Start/stop; 25-100 ips	Does not apply	Optional (type unspec'd)
Cassette/cartridge tape drives	—	—	Does not apply	67MB cartridge
Other peripherals supported	Laser printers, voice synthesis, graphics dev.	Laser printers, voice synthesis, graphics dev.	Graphics devices, array processor	Graphics displays, optical disk storage
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Assembler	Yes
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	Cobol, Fortran, Pascal, C, Basic, Mainsail, Ada	Ada, C, Fortran 77, Concurrent C, Concurrent Fortran, Pascal
Operating system name	VAX/VMS; Ultrix-32	VAX/VMS	Embos; Elxsi Unix	Unix Sys. V; MMOS
Operating system type	Batch, r.-t.; timeshare	Batch, realtime	Interact., batch, r.-t.	Tmshr., multitsk.; r.-t.
Operating sys. implemented in firmware	No	No	Partially	Partially
Database management system	VAX DBMS, VAX Rdb	VAX DBMS, VAX Rdb	EDMS, Oracle, Ingres	Opt. (package unspec'd)
Principal industry application	General business, engineering scientific	General business, engineering scientific	CAD/CAM/CAE, seismic, semiconductor, aerospace, univ. research	Concurrent software development tools
Other packages	Office automation, numerous third-party packages	Office automation, numerous third-party packages	Numerous third-party packages	Expert systems, SPAR
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 8MB memory; disk/tape contr.; four 456MB disks; 4 mag. tapes; console; 5 async. interfaces; 80 terminals; 1200/800 lpm ptr.; 12 ppm laser ptr.; VAX/VMS license & warranty: $816,600	CPU; 32MB memory; hot floating point; VAX cluster port; Ethernet interface; console; two I/O channels; 1-yr. hardware warranty; 1-yr. VAX/VMS & DECnet licenses: $650,000	CPU; 8MB main memory; disk drive; tape drive; line printer; communications lines; terminals: $475,000	2 CPUs; 2MB main memory; 80MB disk; 67MB cartridge; 8 user connections: $75,000
Monthly maintenance of typical configuration	$4,273	Contact vendor	$2,500	$750
Date of first delivery	1986	Second quarter 1986	1983	November 1985
Number installed to date	—	—	—	3 systems
COMMENTS	Can be configured in VAXcluster with 15 other processors and storage controllers	Dual processor system; configurable in VAXcluster with 15 other proc. and storage controllers	Expandable to 12 CPUs for linear performance growth without changing hardware/user software	Parallel proc. sys.; can be rack-mounted in embedded applications or desk-high cabinetry

All About Supermini Systems

MANUFACTURER & MODEL	Flexible Computer Corporation Flex/32 Series 1200	Flexible Computer Corporation Flex/32 Series 2000	Flexible Computer Corporation Flex/32 Series 3000	Flexible Computer Corporation Flex/32 Series 6000
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-56MB	4MB-64MB	6MB-136MB	30MB-200MB
DISK STORAGE CAPACITY	80MB-20GB	80MB-20GB	80MB-20GB	80MB-20GB
NO. WORKSTATIONS SUPPORTED	160	200	400	800
PRICE RANGE	$68,000-$250,000	$150,000-$450,000	$200,000-$900,000	$900,000-$1,800,000
TARGET MARKET	Realtime, eng./sci., AI, aerospace, simulation	Realtime, eng./sci., AI, aerospace, simulation	Realtime, eng./sci., AI, aerospace, simulation	Realtime, eng./sci., AI, aerospace, simulation
CENTRAL PROCESSOR				
No. of directly addressable bytes	4G	4G	4G	4G
Virtual memory	4GB	4GB	4GB	4GB
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Optional	Optional	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	75	75	75	75
MIPS	20 (2.5 per CPU)	25 (2.5 per CPU)	50 (2.5 per CPU)	100 (2.5 per CPU)
16-/32-bit compatibility	Yes	Yes	Yes	Yes
MAIN STORAGE				
Bytes fetched per cycle	32	32	32	32
Cycle/access time, nanoseconds	75	75	75	75
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 2M, 4M, 8M	1M, 2M, 4M, 8M	1M, 2M, 4M, 8M	1M, 2M, 4M, 8M
Cache memory, bytes	Does not apply	Does not apply	Does not apply	Does not apply
INPUT/OUTPUT CONTROL				
No. of I/O channels	8	10	20	40
Data transfer rate	48MB/sec.	60MB/sec.	120MB/sec.	240MB/sec.
COMMUNICATIONS				
Max. number of lines	160	200	300	600
Synchronous	Opt.; 300K bps	Opt.; 300K bps	Opt.; 300K bps	Opt.; 300K bps
Asynchronous	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	SDLC, TCP/IP	SDLC, TCP/IP	SDLC, TCP/IP	SDLC, TCP/IP
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	Opt. (types unspec'd)	Opt. (types unspec'd)	Opt. (types unspec'd)	Opt. (types unspec'd)
IBM 3270 emulation	Opt. (types unspec'd)	Opt. (types unspec'd)	Opt. (types unspec'd)	Opt. (types unspec'd)
PERIPHERAL EQUIPMENT				
Disks supported	Winchester: 80MB, 337MB, 474MB	Winchester: 80MB, 337MB, 474MB	Winchester: 80MB, 337MB, 474MB	Winchester: 80MB, 337MB, 474MB
Serial printers	600 lpm	600 lpm	600 lpm	600 lpm
Letter-quality printers	Does not apply	Does not apply	Does not apply	Does not apply
Line printers	300, 600 lpm	300, 600 lpm	300, 600 lpm	300, 600 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-75 ips	800-6250 bpi, 45-75 ips	800-6250 bpi, 45-75 ips	800-6250 bpi, 45-75 ips
Streaming tape drives	Opt. (type unspec'd)	Opt. (type unspec'd)	Opt. (type unspec'd)	Opt. (type unspec'd)
Cassette/cartridge tape drives	67MB cartridge	67MB cartridge	67MB cartridge	67MB cartridge
Other peripherals supported	Graphics displays, optical disk storage	Graphics displays, optical disk storage	Graphics displays, optical disk storage	Graphics displays, optical disk storage
SOFTWARE				
Assembler	Yes	Yes	Yes	Yes
Compilers	Ada, C, Fortran 77, Concurrent C, Concurrent Fortran, Pascal	Ada, C, Fortran 77, Concurrent C, Concurrent Fortran, Pascal	Ada, C, Fortran 77, Concurrent C, Concurrent Fortran, Pascal	Ada, C, Fortran 77, Concurrent C, Concurrent Fortran, Pascal
Operating system name	Unix Sys. V; MMOS	Unix Sys. V; MMOS	Unix Sys. V; MMOS	Unix Sys. V; MMOS
Operating system type	Tmshr., multitsk.; r.-t.	Tmshr., multitsk.; r.-t.	Tmshr., multitsk.; r.-t.	Tmshr., multitsk.; r.-t.
Operating sys. implemented in firmware	Partially	Partially	Partially	Partially
Database management system	Opt. (package unspec'd)	Opt. (package unspec'd)	Opt. (package unspec'd)	Opt. (package unspec'd)
Principal industry application	Concurrent software development tools	Concurrent software development tools	Concurrent software development tools	Concurrent software development tools
Other packages	Expert systems, SPAR	Expert systems, SPAR	Expert systems, SPAR	Expert systems, SPAR
PRICING & AVAILABILITY				
Typical system configuration and price	4 CPUs; 4.5MB main memory; 80MB disk; 67MB cartridge; 8 user connections: $120,000	6 CPUs; 6.5MB main memory; 80MB disk; 67MB cartridge; 8 user connections: $170,000	10 CPUs; 11MB main memory; 337MB disk; 45 ips tape; 8 user connections: $265,000	30 CPUs; 35MB main memory: $980,000
Monthly maintenance of typical configuration	$1,200	$1,700	$2,650	$9,800
Date of first delivery	November 1985	January 1985	January 1985	January 1985
Number installed to date	3 systems	30 CPUs; 5 systems	20 CPUs; 1 system	None
COMMENTS	Parallel proc. sys.; can be rack-mounted in embedded applications or desk-high cabinetry	Parallel proc. sys.; all Flex/32s use multiple bus arch. & shared/local memory scheme	Parallel proc. sys.; all Flex/32s use multiple bus arch. & shared/local memory scheme	Parallel proc. sys.; all Flex/32s use multiple bus arch. & shared/local memory scheme

All About Supermini Systems

MANUFACTURER & MODEL	Formation, Inc. F4000 Information System	Formation, Inc. F4000-AP Information System	Harris Corporation H60	Harris Corporation H700
WORD LENGTH	32 bits	32 bits	48 bits	48 bits
MAIN MEMORY	256KB-8MB	256KB-8MB	768KB-12MB	384KB-12MB
DISK STORAGE CAPACITY	70MB-5GB	70MB-5GB	80MB-1.6GB	80MB-22.7GB
NO. WORKSTATIONS SUPPORTED	46	—	32	128
PRICE RANGE	$75,000-$300,000	$100,000-$300,000	$69,900-$120,000	$49,900-$62,000
TARGET MARKET	OEM, software development	OEM, software development	Engineering/scientific	Engineering/scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	16M	12M	12M
Virtual memory	16MB	16MB	48MB	48MB
Hardware floating point	DP	DP	SP, DP	SP, DP
Battery backup	None	None	None	None
Real-time clock or timer	Standard	Standard	Optional	Optional
CPU cycle time, nanoseconds	200	200	300	300
MIPS	0.225	0.4	0.88 (single precision)	0.88 (single precision)
16-/32-bit compatibility	32-bit only	32-bit only	Does not apply	Does not apply
MAIN STORAGE				
Bytes fetched per cycle	4	4	—	—
Cycle/access time, nanoseconds	800/200	800/200	335	335
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	256KB or 1MB	256KB or 1MB	1.5M	1.5M
Cache memory, bytes	None	None	6K	6K
INPUT/OUTPUT CONTROL				
No. of I/O channels	4	4	5	24
Data transfer rate	5MB/sec.	5MB/sec.	19MB/sec.	19MB/sec.
COMMUNICATIONS				
Max. number of lines	100	100	32	224
Synchronous	Opt.; 19.2K bps	Opt.; 19.2K bps	Standard	Standard
Asynchronous	Opt.; 9600 bps	Opt.; 9600 bps	Standard	Standard
Protocols supported	SDLC, BSC, ASCII	SDLC, BSC, ASCII	X.25, sync, async, isochronous	X.25, sync, async, isochronous
Type of LAN supported	SNA	SNA	Ethernet	Ethernet
RJE terminals emulated	Hasp	Hasp	See Comments	See Comments
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 100/135/635MB	Fixed: 100/135/635MB	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB
Serial printers	180 cps	180 cps	—	—
Letter-quality printers	None	None	200 cps	200 cps
Line printers	300/600/1000 lpm	300/600/1000 lpm	730/1000/1200 lpm	730/1000/1200 lpm
Reel-to-reel tape drives	72/200KB	72/200KB	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips
Streaming tape drives	None	None	25 ips	25 ips
Cassette/cartridge tape drives	None	None	—	—
Other peripherals supported	Card reader, byte multiplexer	Card reader, byte multiplexer	Card readers	Card readers
SOFTWARE				
Assembler	Assembler	Assembler	Macro assembler	Macro assembler
Compilers	Cobol, Fortran, Basic, RPG II, PL/1	Cobol, Fortran, Basic, PL/1	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo
Operating system name	DOS/VSE; VM/SP; OS/VS1	DOS/VSE, VM/SP, OS/VS1	VOS	VOS
Operating system type	Batch, r.-t., timeshare	Batch, r.-t., timeshare	Batch, multitask, r.-t.	Batch, multitask, r.-t.
Operating sys. implemented in firmware	Partially	Partially	No	No
Database management system	TMS; any 370-compatible	TMS; any 370-compatible	Oracle, Info	Oracle, Info
Principal industry application	Program development, general business	Program development, general business	Engineering administration	Engineering administration
Other packages	IBM 370-compatible packages	IBM 370-compatible packages	Numerous	Numerous
PRICING & AVAILABILITY				
Typical system configuration and price	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	Contact vendor	Contact vendor
Monthly maintenance of typical configuration	$852	$852	Contact vendor	Contact vendor
Date of first delivery	3rd quarter 1981	1982	June 1984	May 1983
Number installed to date	70	70	—	—
COMMENTS	Optional fault tolerant configuration. Software-compatible with IBM 370. Also supports MVS o.s.	Optional fault tolerant configuration. Software-compatible with IBM 370. Also supports MVS o.s.	Uses office power. Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.	Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.

All About Supermini Systems

MANUFACTURER & MODEL	Harris Corporation H800	Harris Corporation H1000	Harris Corporation H1200	Harris Corporation HCX-7
WORD LENGTH	48 bits	48 bits	48 bits	32 bits
MAIN MEMORY	768KB-12MB	1.5MB-12MB	1.5MB-12MB	4MB-32MB
DISK STORAGE CAPACITY	80MB-22.7GB	80MB-22.7GB	80MB-25GB	8GB
NO. WORKSTATIONS SUPPORTED	128	192	224	235
PRICE RANGE	$139,000-$170,000	$250,000-$291,000	$294,000-$400,000	$275,000-$350,000
TARGET MARKET	Engineering/scientific	Engineering/scientific	Engineering/scientific	Engineering/scientific, software development
CENTRAL PROCESSOR				
No. of directly addressable bytes	12M	12M	12M	4G
Virtual memory	48MB	48MB	192MB	4GB
Hardware floating point	SP, DP	SP, DP	SP, DP, TP, QP	DP
Battery backup	None	None	Optional	Standard
Real-time clock or timer	Optional	Optional	Optional	Standard
CPU cycle time, nanoseconds	180	75	75	100
MIPS	1.6 (single precision)	4.8 (single precision)	5	7.1
16-/32-bit compatibility	Does not apply	Does not apply	Proprietary	Does not apply
MAIN STORAGE				
Bytes fetched per cycle	—	—	6	4
Cycle/access time, nanoseconds	335	335	150	400
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1.5M	1.5M	1.5M	4M
Cache memory, bytes	6K	6K	288K	44K
INPUT/OUTPUT CONTROL				
No. of I/O channels	31	31	31	25
Data transfer rate	19MB/sec.	19MB/sec.	19MB/sec.	11MB/sec.
COMMUNICATIONS				
Max. number of lines	224	224	224	235
Synchronous	Standard	Standard	19.2K bps std./56K opt.	Opt.; 9600 baud
Asynchronous	Standard	Standard	19.2K bps std./38.4K op.	Std.; 38K baud
Protocols supported	X.25, sync, async, isochronous	X.25, sync, async, isochronous	X.25, HDLC, BSC, NTR	3270, 2780/3780
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	See Comments	See Comments	See Comments	3270, 2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB	Fixed & removable: 80MB-675MB	Fixed & removable: 160MB-474MB
Serial printers	—	—	80/280 cps	80-240 cps
Letter-quality printers	200 cps	200 cps	55/80 cps	55/80 cps
Line printers	730/1000/1200 lpm	730/1000/1200 lpm	300/600/1200 lpm	600-800 lpm
Reel-to-reel tape drives	800-6250 bpi, 45-125 ips	800-6250 bpi, 45-125 ips	800-6250 bpi, 25-125 ips	1600 bpi, 25 ips
Streaming tape drives	25 ips	25 ips	1600 bpi, 25/100 ips	25 ips
Cassette/cartridge tape drives	—	—	30 ips	None
Other peripherals supported	Card readers	Card readers	300/600 cpm card readers	Laser printer, graphics terminal
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	AS
Compilers	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo	Fortran, Basic, Cobol, C, Ada, Pascal, APL, RPG, Snobol, Forgo	Fortran, Cobol, C, RPG II, Basic	Fortran 77, Pascal
Operating system name	VOS	VOS	Harris VOS; Unix	HCX/UX
Operating system type	Batch, multitask, r.-t.	Batch, multitask, r.-t.	Multitask, r.-t.	Multiprogramming
Operating sys. implemented in firmware	No	No	No	Partially
Database management system	Oracle, Info	Oracle, Info	Oracle, Info, Total	Oracle
Principal industry application	Engineering administration	Engineering administration	Engineering/scientific	Engineering, scientific research
Other packages	Numerous	Numerous	—	—
PRICING & AVAILABILITY				
Typical system configuration and price	Contact vendor	Contact vendor	CPU; 1.5MB memory; CNP; console terminal; operating system: $294,000	CPU; 8MB memory; 474MB disk; tape unit; 27 ports: $350,000
Monthly maintenance of typical configuration	Contact vendor	Contact vendor	$1,300	$1,200
Date of first delivery	June 1979	July 1984	4th quarter 1985	June 1985
Number installed to date	—	—	—	20
COMMENTS	Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.	ECL-based system. Terminals emulated include 2780/3780, U1004, UNTR, GRTS, CDC200UT.	Terminals emulated include 2780/3780, U1004, Hasp, GRTS, CDC200UT.	

All About Supermini Systems

MANUFACTURER & MODEL	Hewlett-Packard Company HP 3000 Series 930	Hewlett-Packard Company HP 3000 Series 950	Honeywell Information Systems, Inc. DPS 6/85	Honeywell Information Systems, Inc. DPS 6/95
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	16MB-24MB	To 64MB	2MB-4MB	2MB-16MB
DISK STORAGE CAPACITY	9.7GB	—	To 3.3GB	67MB-4GB
NO. WORKSTATIONS SUPPORTED	400	—	64	128
PRICE RANGE	From $225,000	From $300,000	From $106,900	From $105,000
TARGET MARKET	General business, distributed d.p.	General business, distributed d.p.	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	128M	—	16M	16M
Virtual memory	256 trillion bytes	—	Does not apply	Does not apply
Hardware floating point	SP, DP	—	SP, DP	SP, DP
Battery backup	Standard	—	Optional	Optional
Real-time clock or timer	Standard	—	Standard	Standard
CPU cycle time, nanoseconds	125	—	125	125
MIPS	4.5	6.7	—	—
16-/32-bit compatibility	Via mode bit	Via mode bit	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	4	—	4	4
Cycle/access time, nanoseconds	—	—	300	500
Storage protection	Standard	—	Standard	Standard
Increment size, bytes	8M	—	2M	4M
Cache memory, bytes	128K	128K	8K	8K
INPUT/OUTPUT CONTROL				
No. of I/O channels	10	—	24	24
Data transfer rate	10MB/sec. (aggregate)	—	16MB/sec.	16MB/sec.
COMMUNICATIONS				
Max. number of lines	48	—	64	128
Synchronous	—	—	Optional	92 opt.; 19.2K bps
Asynchronous	—	—	Standard	4 std./92 opt.; 9600 bps
Protocols supported	HP Advancenet, X.25, SNA through HP 3000 FEP	HP Advancenet, X.25, SNA through HP 3000 FEP	SDLC, HDLC, SNA, DSA, BSC	SDLC, HDLC, SNA, DSA, BSC
Type of LAN supported	IEEE 802.3	IEEE 802.3	Ethernet	Ethernet
RJE terminals emulated	Through HP 3000 FEP	Through HP 3000 FEP	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	Through HP 3000 FEP	Through HP 3000 FEP	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 404MB; removable: 404MB	—	Fixed: 132/413MB; rem.: 67/256MB; cart.: 40MB	Fixed: 132/413MB; rem.: 67/80/256MB; cart.: 40MB
Serial printers	200 cps	—	100/400 cps	100/400 cps
Letter-quality printers	—	—	35/55 cps	35/55 cps
Line printers	600/900 lpm	—	300/600/900/1200 lpm	300/600/900/1200 lpm
Reel-to-reel tape drives	800-6250 bpi, 75-100 ips	—	800/1600/6250 bpi	800/1600/6250 bpi
Streaming tape drives	75 ips	—	55 ips	55 ips
Cassette/cartridge tape drives	—	—	55 ips	55 ips
Other peripherals supported	Laser printers, 12/45 ppm	—	650KB diskette; card readers; doc. handlers	650KB diskette; card readers; doc. handlers
SOFTWARE				
Assembler	None	—	Assembler	Assembler
Compilers	Cobol II, Fortran 77, Pascal, Basic, SPL, RPG	Cobol II, Fortran 77, Pascal, Basic, SPL, RPG	Cobol, Fortran, Basic, Pascal, RPG, Ada, C	Cobol, Fortran, Basic, Pascal, RPG, Ada, C
Operating system name	MPE XL	MPE XL	GCOS 6 Mod 400	GCOS 6 Mod 400
Operating system type	Multiprogramming	Multiprogramming	Realtime	Realtime
Operating sys. implemented in firmware	—	—	No	No
Database management system	HP Allbase/XL	HP Allbase/XL	DM6, Oracle	DM6
Principal industry application	Mfr., OA, wholesale, retail, finance, legal, insurance	Mfr., OA, wholesale, retail, finance, legal, insurance	Manufacturing, distribution, pharmacy, medical records	Manufacturing, distribution, pharmacy, medical records
Other packages	Third-party packages	Third-party packages	Office automation, accounting	Office automation, accounting
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 16MB main memory; 404MB fixed disk; 6250 bpi tape drive; console; 2 I/O channels; LAN channel; operating system software: $284,500	Contact vendor	CPU with 2MB main memory; 413MB disk; cache mgt. unit; Multiple Device Contr./650KB diskette; Commercial Instruction Processor; Sci. Instr. Processor; GCR tape; 4 workstation ports: $106,900	CPU with 2MB main memory; 413MB disk; printer port; console; Multiple Device Controller; Commercial Instruction Processor; Sci. Instr. Processor; GCR tape; 4 workstation ports: $129,900
Monthly maintenance of typical configuration	$475 (hardware)	Contact vendor	$654	$767
Date of first delivery	Late 1986	2nd half 1987	2nd quarter 1985	November 1983
Number installed to date	Does not apply	Does not apply	—	—
COMMENTS	Uses RISC-based Precision Architecture	Uses RISC-based Precision Architecture		

All About Supermini Systems

MANUFACTURER & MODEL	IBM 4361 Model Group 3	IBM 4361 Model Group 4	IBM 4361 Model Group 5	IBM 4381 Model Group 11
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-4MB	2MB-16MB	2MB-16MB	4MB-16MB
DISK STORAGE CAPACITY	262GB	645GB	645GB	1290GB
NO. WORKSTATIONS SUPPORTED	1024	1024	1024	1024
PRICE RANGE	From $56,500	From $126,900	From $169,200	From $185,000
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	—	—	—	Standard
Real-time clock or timer	Standard	Standard	Standard	—
CPU cycle time, nanoseconds	—	—	—	68
MIPS	0.38 (approx.)	0.79	1.14	—
16-/32-bit compatibility	—	—	—	—
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	—	—	—	—
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	—	—	—	—
Cache memory, bytes	8K	8K	16K	4K
INPUT/OUTPUT CONTROL				
No. of I/O channels	3	6	6	12
Data transfer rate	17KB-1.86MB/sec.	17KB-3MB/sec.	17KB-3MB/sec.	22MB/sec.
COMMUNICATIONS				
Max. number of lines	—	—	—	—
Synchronous	Opt.; to 64K bps	Opt.; to 64K bps	Opt.; to 64K bps	—
Asynchronous	—	—	—	—
Protocols supported	Bisync, SDLC, X.25, SNA, DIA/DCA	Bisync, SDLC, X.25, SNA, DIA/DCA	Bisync, SDLC, X.25, SNA, DIA/DCA	Bisync, SDLC, X.25, SNA, DIA/DCA
Type of LAN supported	—	—	—	—
RJE terminals emulated	—	—	—	—
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 64.5MB-819.7MB	Fixed: 64.5MB-5.04GB	Fixed: 64.5MB-5.04GB	Fixed: 317.5MB-5.04GB
Serial printers	80-340 cps	80-340 cps	80-340 cps	80-340 cps
Letter-quality printers	—	—	—	—
Line printers	325-3600 lpm	325-3600 lpm	325-3600 lpm	1200-3600 lpm
Reel-to-reel tape drives	To 6250 bpi; to 125 ips	To 6250 bpi; to 125 ips	To 6250 bpi; to 125 ips	To 6250 bpi; to 125 ips
Streaming tape drives	Start/stop; 100 ips	Start/stop; 100 ips	Start/stop; 100 ips	Start/stop; 79 ips
Cassette/cartridge tape drives	Cart.; 75-200 ips	Cart.; 75-200 ips	Cart.; 75-200 ips	Cart.; 75-200 ips
Other peripherals supported	Laser printers (12/20 ppm), doc. rdrs/hndlrs	Laser printers (12/20 ppm), doc. rdrs/hndlrs	Laser printers (12/20 ppm), doc. rdrs/hndlrs	Laser printers (12/20 ppm), doc. rdrs/hndlrs
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, IMS/VS	DL/1, SQL/DS, IMS/VS	DL/1, SQL/DS, IMS/VS	DL/1, SQL/DS, IMS/VS
Principal industry application	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific
Other packages	Office automation; third-party packages	Office automation; third-party packages	Office automation; third-party packages	Office automation; third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 2MB memory; console; 129MB disk storage; tape unit; 650 lpm ptr.; Work Station Adapter; 16 terminals: $131,635	CPU; 2MB memory; console; 193.5MB disk storage; tape unit; two 650 lpm printers; Work Station Adapter; 16 terminals: $222,585	CPU; 4MB memory; console; 258MB disk storage; two tape units; two 650 lpm ptrs.; Work Station Adapter; 16 terminals: $296,455	CPU; 4MB memory; console; 635MB disk storage & contr.; 2 tape units; 1200 lpm ptr.; comm. contr.; 32 terminals: $474,285
Monthly maintenance of typical configuration	$784.50	$1,265	$1,569	$2,182.75
Date of first delivery	December 1984	2nd quarter 1984	1st quarter 1984	May 1986
Number installed to date	—	—	—	—
COMMENTS	Runs DOS/VSE, SSX/VSE, VM/SP, VM/370, OS/VS1, IX/370	Runs DOS/VSE, SSX/VSE, VM/370, VM/SP, OS/VS1, IX/370	Runs DOS/VSE, SSX/VSE, VM/370, VM/SP, MVS/370, OS/VS1, IX/370; can also use DB2 as DBMS	Runs DOS/VSE, OS/VS1, VM/SP, VM/XA, MVS/SP, MVS/XA, IX/370; can also use DB2 as DBMS

All About Supermini Systems

MANUFACTURER & MODEL	IBM 4381 Model Group 12	IBM 4381 Model Group 13	IBM 4381 Model Group 14	IBM System/88 Model 4575-20B
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	8MB-32MB	8MB-32MB	16MB-32MB	4MB-8MB (duplexed)
DISK STORAGE CAPACITY	1935GB	2903GB	5160GB	7GB (duplexed)
NO. WORKSTATIONS SUPPORTED	1024	1024	1024	128
PRICE RANGE	From $330,000	From $440,000	From $735,000	From $51,700
TARGET MARKET	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Online transaction processing
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	16MB	16MB	16MB	—
Hardware floating point	SP, DP, extended	SP, DP, extended	SP, DP, extended	None
Battery backup	—	—	—	—
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	56	—
MIPS	—	—	—	0.90
16-/32-bit compatibility	—	—	—	Does not apply
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	68	56	—	125 (per 2 bytes)
Storage protection	Standard	Standard	Standard	—
Increment size, bytes	—	—	—	2M, 4M
Cache memory, bytes	32K	64K	64K per processor	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	12	12	18	—
Data transfer rate	24MB/sec.	30MB/sec.	48MB/sec.	—
COMMUNICATIONS				
Max. number of lines	—	—	—	32
Synchronous	—	—	—	Std.; 19.2K bps
Asynchronous	—	—	—	Std.; 19.2K bps
Protocols supported	Bisync, SDLC, X.25, SNA, DIA/DCA	Bisync, SDLC, X.25, SNA, DIA/DCA	Bisync, SDLC, X.25, SNA, DIA/DCA	SNA, SDLC, X.25, X.29, Bisync, RJE
Type of LAN supported	—	—	—	—
RJE terminals emulated	—	—	—	—
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 317.5MB-5.04GB	Fixed: 317.5MB-5.04GB	Fixed: 317.5MB-5.04GB	Removable: 142MB/448MB
Serial printers	80-340 cps	80-340 cps	80-340 cps	40-160 cps
Letter-quality printers	—	—	—	—
Line printers	1200-3600 lpm	1200-3600 lpm	1200-3600 lpm	650 lpm
Reel-to-reel tape drives	To 6250 bpi; to 125 ips	To 6250 bpi; to 125 ips	To 6250 bpi; to 125 ips	—
Streaming tape drives	Start/stop; 79 ips	Start/stop; 79 ips	Start/stop; 79 ips	Start/stop; 25-100 ips
Cassette/cartridge tape drives	Cart.; 75-200 ips	Cart.; 75-200 ips	Cart.; 75-200 ips	None
Other peripherals supported	Laser printers 12/20 ppm), doc. rdrs/hndlrs	Laser printers (12/20 ppm), doc. rdrs/hndlrs	Laser printers (12/20 ppm), doc. rdrs/hndlrs	—
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	Cobol, PL/1, Fortran, Basic, Pascal
Operating system name	See Comments	See Comments	See Comments	VOS
Operating system type	—	—	—	Realtime
Operating sys. implemented in firmware	—	—	—	—
Database management system	DL/1, SQL/DS, IMS/VS	DL/1, SQL/DS, IMS/VS	SQL/DS, IMS/VS, DB2	Oracle
Principal industry application	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Commercial, engineering/ scientific	Transaction proc.: ATM, POS, shop floor, cust. svc.; bank/fin. switch
Other packages	Office automation; third-party packages	Office automation; third-party packages	Office automation; third-party packages	—
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 8MB memory; console; 2.52GB disk storage & contr.; 4 tape units & contr.; two 1200 lpm ptrs.; comm. contr.; 48 terminals: $978,385	CPU; 16MB memory; console; 7.5GB disk storage & contr.; 6 tape units & contr.; two 2200 lpm ptrs.; comm. contr.; 64 terminals: $1,505,585	CPU; 25MB memory; console; 10GB disk storage & contr.; 8 tape units & contr.; two 2200 lpm ptrs.; 20 ppm laser ptr.; comm. contr.; 80 terminals: $2,070,295	2 CPUs, paired; 2MB duplexed memory; 2 DASD controllers; two 142MB disk drives; tape contr. & unit; 2 comm. contrs.; 3 line adapters; printer and printer adapter; 6 workstations: $221,850
Monthly maintenance of typical configuration	$3,678.75	$6,104.75	$7,084.75	$1,424
Date of first delivery	April 1986	April 1986	April 1986	February 1986
Number installed to date	—	—	—	—
COMMENTS	Runs DOS/VSE, OS/VS1, VM/SP, VM/XA, MVS/SP, MVS/XA, IX/370; can also use DB2 as DBMS	Runs DOS/VSE, OS/VS1, VM/SP, VM/XA, MVS/SP, MVS/XA, IX/370; can also use DB2 as DBMS	Runs VM/SP, VM/XA, MVS/SP, MVS/XA, IX/370; dual processor system	Most components, incl. proc. & mem. boards, disk drives, & comm. contr. are duplexed

All About Supermini Systems

MANUFACTURER & MODEL	IBM System/88 Models 4576-40/-60	International Parallel Machines, Inc. IP-1	MAI/Basic Four Model 7010	MAI/Basic Four Model 7020
WORD LENGTH	32 bits	16/32/64 bits	32 bits	32 bits
MAIN MEMORY	4MB-16MB (duplexed)	0.5MB-40MB	2MB-4MB	2MB-6MB
DISK STORAGE CAPACITY	7GB (duplexed)	150MB-6GB	126MB-2.2GB	126MB-2.2GB
NO. WORKSTATIONS SUPPORTED	256	8	20	52
PRICE RANGE	From $92,100/$132,900	$50,000-$400,000	$44,000-$200,000	$68,000-$300,000
TARGET MARKET	Online transaction processing	Engineering/scientific	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	4G	16M	16M
Virtual memory	—	4GB	1GB	1GB
Hardware floating point	DP (4576-60 only)	32/64 bits	SP	SP
Battery backup	—	Optional	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	100	160	160
MIPS	2.79/7.38	4-40	0.4	0.8
16-/32-bit compatibility	Does not apply	Standard	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	—	4	4	4
Cycle/access time, nanoseconds	125 (per 2 bytes)	300	160	160
Storage protection	—	Optional	Standard	Standard
Increment size, bytes	2M, 4M	4M	0.5M, 1M, 2M	1M, 2M, 4M
Cache memory, bytes	48K (4575-60 only)	2K	Does not apply	Does not apply
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	50	2	2
Data transfer rate	—	40MB/sec.	100MB/sec.	100MB/sec.
COMMUNICATIONS				
Max. number of lines	—	8	20	52
Synchronous	—	Opt.; 10M bps	Standard	Standard
Asynchronous	—	Std.; 10M bps	Standard	Standard
Protocols supported	SNA, SDLC, X.25, X.29, Bisync, RJE	SDLC, SNA, BSC	IBM 3270, 2780/3780	IBM 3270, 2780/3780
Type of LAN supported	—	Ethernet	None	None
RJE terminals emulated	—	Opt. (types unspec'd)	2780/3780	2780/3780
IBM 3270 emulation	Yes	Opt. (types unspec'd)	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Removable: 142MB/448MB	Winchester: 150MB-6GB	Fixed: 126MB; removable: 75MB, 285MB	Fixed: 126MB; removable: 75MB, 285MB
Serial printers	40-160 cps	100/400 cps	120/160 cps	120/160 cps
Letter-quality printers	—	45/120 cps	45 cps	45 cps
Line printers	650 lpm	160/1200 lpm	80/200/300/600/1000 lpm	80/200/300/600/1000 lpm
Reel-to-reel tape drives	—	800/1600/3200/6250 bpi	175/800/1600 bpi	800/1600 bpi, 175 ips
Streaming tape drives	Start/stop; 25-100 ips	Start/stop; 25 ips	Start/stop; 100/180 ips	Start/stop; 100/180 ips
Cassette/cartridge tape drives	—	Does not apply	90 ips	90 ips
Other peripherals supported	—	Graphics devices, plotters, sticks, mice	High-speed data, RS-232-C I/O	High-speed data, RS-232-C I/O
SOFTWARE				
Assembler	—	Yes	—	—
Compilers	Cobol, PL/1, Fortran, Basic, Pascal	C, Fortran, Ada	Basic, Cobol	Basic, Cobol
Operating system name	VOS	Ipos	Boss/VS	Boss/VS
Operating system type	Realtime	Unix-like	Multitasking, realtime	Multitasking, realtime
Operating sys. implemented in firmware	—	Partially	Partially	Partially
Database management system	Oracle	DBMS	Origin	Origin
Principal industry application	Transaction proc.: ATM, POS, shop floor, cust. svc.; bank/fin. switch	—	General-purpose interactive business	General-purpose interactive business
Other packages	—	Signal/image processing, matrix equations, CAD (PCB)	OA, pharmacy, manufacturing, construction, property management	OA, pharmacy, manufacturing, construction, property management
PRICING & AVAILABILITY				
Typical system configuration and price	4576-40: 2 CPUs, paired; 4MB duplexed memory; 2 DASD contr.; two 448MB disk dr.; tape contr. & unit; 2 comm. contr. & 4 adapters; ptr. adapter, tabletop ptr. & line ptr.; 10 workstations: $379,665	9-CPU parallel processing system; 10MB main memory; 150MB disk; 9-track tape; 160MFlops floating-point accelerator: $200,000 (approx.)	1 CPU; 2.5MB memory; 126MB fixed disk; 5 terminals; 80/200 lpm printer; MCS; Boss/VS o.s.: $57,720	2 CPUs; 4.5MB memory; two 126MB fixed disks; 25 4312 terminals; 120 cps, 300 lpm, and 600 lpm printers; MCS; Boss/VS o.s.: $161,135
Monthly maintenance of typical configuration	$1,148	$3,000	$368	$1,185
Date of first delivery	February 1986	3rd quarter 1985	October 1985	October 1985
Number installed to date	—	3 in 1985	—	—
COMMENTS	Most components, incl. proc. & mem. boards, disk drives, & comm. contr. are duplexed	Parallel processing superminicomputer		

All About Supermini Systems

MANUFACTURER & MODEL	MAI/Basic Four Model 8010	MAI/Basic Four Model 8020	MAI/Basic Four Model 8030	McDonnell Douglas Computer Systems Co. M9050
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-4MB	2MB-6MB	4MB-8MB	1MB-4MB
DISK STORAGE CAPACITY	144MB-2.2GB	144MB-2.2GB	144MB-2.2GB	260MB-1GB
NO. WORKSTATIONS SUPPORTED	20	52	116	128
PRICE RANGE	$49,000-$200,000	$78,000-$300,000	$119,000-$500,000	From $130,000
TARGET MARKET	General business	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	16M	16M	4M
Virtual memory	3.76GB	3.76GB	3.76GB	2GB
Hardware floating point	SP	SP	SP	Does not apply
Battery backup	Standard	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	160	160	160	150
MIPS	0.4	0.8	1.2	—
16-/32-bit compatibility	32-bit only	32-bit only	32-bit only	Yes
MAIN STORAGE				
Bytes fetched per cycle	4	4	4	4
Cycle/access time, nanoseconds	160	160	160	600
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	0.5M, 1M, 2M	0.5M, 1M, 2M, 4M	0.5M, 1M, 2M, 4M	1M-4M
Cache memory, bytes	Does not apply	Does not apply	Does not apply	Does not apply
INPUT/OUTPUT CONTROL				
No. of I/O channels	2	2	2	16 DMA
Data transfer rate	100MB/sec.	100MB/sec.	100MB/sec.	840KB/sec.
COMMUNICATIONS				
Max. number of lines	20	52	116	128
Synchronous	Standard	Standard	Standard	9600 bps
Asynchronous	Standard	Standard	Standard	9600 bps
Protocols supported	2770/3770, 2780/3780	2770/3770, 2780/3780	2770/3770, 2780/3780	2780/3780, SDLC, SNA
Type of LAN supported	None	None	None	None
RJE terminals emulated	2770/3770, 2780/3780	2770/3770, 2780/3780	2770/3770, 2780/3780	2780/3780
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 144/207/314MB; removable: 75MB, 285MB	Fixed: 144/207/314MB; removable: 75MB, 285MB	Fixed: 144/207/314MB; removable: 75MB, 285MB	Fixed: 260MB
Serial printers	120/160 cps	120/160 cps	120/160 cps	120/180/300/400 cps
Letter-quality printers	45 cps	45 cps	45 cps	33 cps
Line printers	80/200/300/600/1000 lpm	80/200/300/600/1000 lpm	80/200/300/600/1000 lpm	150/300/600/1200 lpm
Reel-to-reel tape drives	800/1600 bpi, 175 ips	800/1600 bpi, 175 ips	800/1600 bpi, 175 ips	Does not apply
Streaming tape drives	Start/stop; 100/180 ips	Start/stop; 100/180 ips	Start/stop; 100/180 ips	Start/stop; 25-100 ips
Cassette/cartridge tape drives	90 ips	90 ips	90 ips	Does not apply
Other peripherals supported	High-speed data, RS-232-C I/O	High-speed data, RS-232-C I/O	High-speed data, RS-232-C I/O	Does not apply
SOFTWARE				
Assembler	—	—	—	Yes
Compilers	Basic, Cobol	Basic, Cobol	Basic, Cobol	Basic, English, All, Natural Language
Operating system name	Boss/VS	Boss/VS	Boss/VS	Reality
Operating system type	Multitasking, realtime	Multitasking, realtime	Multitasking, realtime	Multitasking
Operating sys. implemented in firmware	Partially	Partially	Partially	Partially
Database management system	Origin	Origin	Origin	Reality
Principal industry application	General-purpose interactive business	General-purpose interactive business	General-purpose interactive business	General business
Other packages	OA, pharmacy, manufacturing, construction, property management	OA, pharmacy, manufacturing, construction, property management	OA, pharmacy, manufacturing, construction, property management	Office automation
PRICING & AVAILABILITY				
Typical system configuration and price	1 CPU; 2.5MB memory; 144MB fixed disk; five 4312 terminals; 80/200 lpm printer; MCS; Boss/VS o.s.: $77,005	2 CPUs; 4.5MB memory; two 285MB removable disks; 25 4312 terminals; 120 cps, 300 lpm, and 600 lpm printers; Boss/VS o.s.: $180,820	3 CPUs; 7MB memory; two 285MB removable disks; 52 4312 terminals; three 160 cps printers; 600 lpm ptr.; 1000 lpm ptr.; Boss/VS o.s.: $286,350	CPU; 1MB memory; 260MB fixed disk; ½-inch streaming tape drive; 600 lpm printer; 32 ports: $160,000
Monthly maintenance of typical configuration	$404	$1,179	$1,920	—
Date of first delivery	October 1983	October 1983	October 1983	4th quarter 1984
Number installed to date	1,700+	1,700+	1,700+	—
COMMENTS				

All About Supermini Systems

MANUFACTURER & MODEL	McDonnell Douglas Computer Systems Co. M9208	McDonnell Douglas Computer Systems Co. M9250	Modcomp Classic 32/85	NCR Corporation 9300
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-6MB	2MB-6MB	2MB-64MB	1MB-4MB
DISK STORAGE CAPACITY	260MB-2GB	260MB-2GB	13MB-1GB	40MB-4.2GB
NO. WORKSTATIONS SUPPORTED	208	208	256+	210
PRICE RANGE	From $176,000	From $212,000	$148,500-$395,500	$60,000-$190,000
TARGET MARKET	General business	General business	Realtime applics., eng./ sci., process control	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	8M	8M	64M	4M
Virtual memory	4GB	2GB	64MB	128MB
Hardware floating point	Does not apply	Does not apply	SP, DP, TP	DP
Battery backup	Standard	Standard	Optional	None
Real-time clock or timer	Standard	Standard	Standard	—
CPU cycle time, nanoseconds	150	135	100	150
MIPS	—	—	2.4	0.37
16-/32-bit compatibility	Yes	Yes	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	4	4	4	4
Cycle/access time, nanoseconds	600	540	400	450
Storage protection	Standard	Standard	Std.; 7-bit ECC	Standard
Increment size, bytes	1M-4M	1M-4M	2M	1M
Cache memory, bytes	Does not apply	Does not apply	64K	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	16 DMA	16 DMA	64	8
Data transfer rate	840KB/sec.	840KB/sec.	8MB/sec.	2MB/sec.
COMMUNICATIONS				
Max. number of lines	208	208	64	210
Synchronous	9600 bps	9600 bps	Optional	Std.; 9600 bps
Asynchronous	9600 bps	9600 bps	Opt.; 110-19.2K bps	Std.; 19.2K bps
Protocols supported	2780/3780, SDLC, SNA	2780/3780, SDLC, SNA	X.25, 2780/3780	Async, bisync, X.25, 2780/3780, 3270, SNA
Type of LAN supported	None	None	None	SNA
RJE terminals emulated	2780/3780	2780/3780	2780/3780	IBM 2780/3780
IBM 3270 emulation	Yes	Yes	No	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed: 260MB	Fixed: 130MB	Winchester, cart., f/r: 13.5MB-264MB	Fixed & removable: 40/81/135/279MB
Serial printers	120/180/300/400 cps	120/180/300/400 cps	64-440 lpm	80-325 cps; 360-720 lpm
Letter-quality printers	33 cps	33 cps	None	33 cps
Line printers	150/300/600/1200 lpm	150/300/600/1200 lpm	300/600/1000 lpm	300-2000 lpm
Reel-to-reel tape drives	Does not apply	Does not apply	800/1600 bpi, 75 ips	800/1600/GCR, 45/200 ips
Streaming tape drives	Start/stop; 25-100 ips	Start/stop; 25-100 ips	Start/stop, 25 ips	Start/stop; 25/100 ips
Cassette/cartridge tape drives	Does not apply	Does not apply	None	15/90 ips
Other peripherals supported	Does not apply	Does not apply	Data capture terminals	Card readers, sorters, ATMs
SOFTWARE				
Assembler	Yes	Yes	Assembler/macro assemb.	Macro assembler
Compilers	Basic, English, All, Natural Language	Basic, English, All, Natural Language	Fortran, Cobol, Pascal, Coral 66	Cobol, Basic, Pascal
Operating system name	Reality	Reality	Max IV; Max 32	ITX
Operating system type	Multitasking	Multitasking	Realtime	Multitasking
Operating sys. implemented in firmware	Partially	Partially	Partially	Partially
Database management system	Reality	Reality	Infinity	ITX/DBS
Principal industry application	General business	General business	Factory automation	Commercial, retail, financial, industrial, government, education
Other packages	Office automation	Office automation	None	Numerous third-party applications
PRICING & AVAILABILITY				
Typical system configuration and price	CPU; 2MB memory; 260MB fixed disk; ½-inch streaming tape drive; 600 lpm printer; 48 ports: $208,000	CPU; 2MB memory; 260MB fixed disk storage; ½-inch streaming tape drive; 600 lpm printer; 32 ports: $212,000	CPU, 4MB memory; 256MB disk & controller; magnetic tape unit; 2 async terminal controllers; 10 CRTs; 2 matrix printers; 1 line printer: $248,400	CPU, 1MB memory; 195MB/20MB fixed/removable disk; 300 lpm printer; 12 CRTs; ITX operating system; ITX Cobol: $82,515
Monthly maintenance of typical configuration	—	—	$2,400	$432
Date of first delivery	4th quarter 1984	4th quarter 1985	June 1984	June 1983
Number installed to date	—	Does not apply	20+	—
COMMENTS	Special hardware/microcode implementation increases performance two times			Employs VLSI technology, Small Computer System Interface (SCSI) peripherals

All About Supermini Systems

MANUFACTURER & MODEL	NCR Corporation 9300IP	NCR Corporation 9400	NCR Corporation 9400IP	NCR Corporation 9500
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1MB-4MB	1MB-4MB	2MB-4MB	2MB-16MB
DISK STORAGE CAPACITY	72MB-20GB	40MB-4.2GB	72MB-20GB	40MB-40GB
NO. WORKSTATIONS SUPPORTED	216	210	216	432
PRICE RANGE	$58,000-$210,000	$90,000-$300,000	$95,000-$350,000	$185,000-$1,200,000
TARGET MARKET	General business	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	4M	4M	4M	16M
Virtual memory	128MB	128MB	128MB	256MB
Hardware floating point	DP	DP	DP	DP
Battery backup	None	None	None	None
Real-time clock or timer	—	—	—	—
CPU cycle time, nanoseconds	150	150	150	150
MIPS	0.37	0.67	0.67	1.1
16-/32-bit compatibility	Direct	Direct	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	4	4	4	8
Cycle/access time, nanoseconds	450	450	450	450
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M	1M	1M	2M
Cache memory, bytes	None	None	None	None
INPUT/OUTPUT CONTROL				
No. of I/O channels	14	8	14	14
Data transfer rate	2MB/sec.	2MB/sec.	2MB/sec.	2MB/sec.
COMMUNICATIONS				
Max. number of lines	216	210	216	432
Synchronous	Std.; 9600 bps	Std.; 9600 bps	Std.; 9600 bps	Std.; 9600 bps
Asynchronous	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	Async, bisync, X.25, 2780/3780, 3270, SNA	Async, bisync, X.25, 2780/3780, 3270, SNA	Async, bisync, X.25, 2780/3780, 3270, SNA	Async, bisync, X.25, 2780/3780, 3270, SNA
Type of LAN supported	SNA	SNA	SNA	SNA
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 & removable: 40/72/135/279/415MB	Fixed & removable: 40/81/135/279MB	Fixed & removable: 40/72/135/279/415MB	Fixed & removable: 40/81/135/200/279/415MB
Serial printers	80-325 cps; 360-720 lpm	80-320 cps; 360-720 lpm	80-320 cps; 360-720 lpm	80-320 cps; 360-720 lpm
Letter-quality printers	33 cps	33 cps	33 cps	33 cps
Line printers	360-2000 lpm	300-2000 lpm	360-2000 lpm	360-2000 lpm
Reel-to-reel tape drives	1600/GCR, 100 ips	800/1600/GCR, 45/200 ips	1600/GCR, 100 ips	800/1600/GCR, 45/200 ips
Streaming tape drives	Start/stop; 25/100 ips	Start/stop; 25/100 ips	Start/stop; 25-100 ips	Start/stop; 25-100 ips
Cassette/cartridge tape drives	15/90 ips	15/90 ips	15/90 ips	15/90 ips
Other peripherals supported	Card readers, sorters, ATMs	Card readers, sorters, ATMs	Card readers, sorters, ATMs	Card readers, sorters, ATMs
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Cobol, Basic, Pascal	Cobol, Basic, Pascal	Cobol, Basic, Pascal	Cobol, Basic, Pascal
Operating system name	ITX	ITX	ITX	ITX
Operating system type	Multitasking	Multitasking	Multitasking	Multitasking
Operating sys. implemented in firmware	Partially	Partially	Partially	Partially
Database management system	ITX/DBS	ITX/DBS	ITX/DBS	ITX/DBS
Principal industry application	Commercial, retail, financial, industrial, government, education	Commercial, retail, financial, industrial, government, education	Commercial, retail, financial, industrial, government, education	Commercial, retail, financial, industrial, government, education
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; 207MB disk storage; 300 lpm printer; 45MB streaming tape; 12 CRTs; ITX operating system; ITX Cobol: $77,254	CPU, 3MB memory; 579MB/20MB fixed/removable disk; 600 lpm printer; 30 CRTs; ITX operating system; ITX Cobol: $163,483	CPU, 3MB memory; 554MB disk storage; 600 lpm printer; 320 bpi streaming tape drive; 30 CRTs; ITX operating system; ITX Cobol: $167,773	CPU, 4MB memory; 815MB disk storage; two 600 lpm printers; 3250 bpi streaming tape drive; 64 CRTs; ITX operating system; ITX Cobol: $329,460
Monthly maintenance of typical configuration	$406	$1,015	$950	$2,081
Date of first delivery	February 1986	May 1985	May 1986	May 1986
Number installed to date	Does not apply	—	—	Does not apply
COMMENTS	Employs VLSI technology, Small Computer System Interface (SCSI) peripherals, Intel Multibus	Employs VLSI technology, Small Computer System Interface (SCSI) peripherals	Employs VLSI technology, Small Computer System Interface (SCSI) peripherals, Intel Multibus	Dyadic processor; uses VLSI, Small Computer System Interface (SCSI) periphs., Intel Multibus

All About Supermini Systems

MANUFACTURER & MODEL	Norsk Data N.A., Inc. ND-530/ND-550	Norsk Data N.A., Inc. ND-560/ND-570	Prime Computer, Inc. 2350	Prime Computer, Inc. 2450
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	1.25MB-72MB	2.25MB-72MB	2MB-8MB	2MB-8MB
DISK STORAGE CAPACITY	70MB-7.2GB	70MB-7.2GB	240MB	240MB
NO. WORKSTATIONS SUPPORTED	128	128	16	24
PRICE RANGE	See Comments	See Comments	$29,900-$36,900	$47,900-$53,900
TARGET MARKET	Technical/scientific	Technical/scientific	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	4.2G	4.2G	—	—
Virtual memory	8.4GB	8.4GB	512MB per user	512MB per user
Hardware floating point	SP, DP	SP, DP	SP, DP	SP, DP
Battery backup	Auto restart	Auto restart	None	None
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	120	120	160	160
MIPS	1.2 (530)/2.7 (550)	4.3 (560)/6.8 (570)	0.85	1.3
16-/32-bit compatibility	Via multiport memory	Via multiport memory	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	4	4 (ND-560)/8 (ND-570)	—	—
Cycle/access time, nanoseconds	400	400	180	132
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	1M, 4M	1M, 4M	2M, 4M	2M, 4M
Cache memory, bytes	None	16K (560)/64K (570)	16K	16K
INPUT/OUTPUT CONTROL				
No. of I/O channels	3	3	—	—
Data transfer rate	2.1MB/sec.	2.1MB/sec.	5MB/sec.	5MB/sec.
COMMUNICATIONS				
Max. number of lines	64	64	20 (16 async, 4 sync)	28 (24 async, 4 sync)
Synchronous	Opt.; 307.1K bps	Opt.; 307.1K bps	1.2K-65K bps	1.2K-65K bps
Asynchronous	Std.; 9600 bps	Std.; 9600 bps	50-19.2K bps	50-19.2K bps
Protocols supported	SDLC, Hasp, SNA, BSC, IBM 2780/3780	SDLC, Hasp, SNA, BSC, IBM 2780/3780	Hasp, HDLC X.25, SNA, Primenet, bisync, others	Hasp, HDLC X.25, SNA, Primenet, bisync, others
Type of LAN supported	Ethernet, HDLC	Ethernet, HDLC	Ringnet	Ringnet
RJE terminals emulated	IBM 2780/3780, Hasp	IBM 2780/3780, Hasp	2780/3780/3270	2780/3780/3270
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 70/140/288/450MB	Fixed & removable: 70/140/288/450MB	Winchester: 60MB, 120MB	Winchester: 60MB, 120MB
Serial printers	80/300 cps	80/300 cps	30-200 cps	30-200 cps
Letter-quality printers	38/55 cps	38/55 cps	55 cps	55 cps
Line printers	600/1000 lpm	600/1000 lpm	300-1000 lpm	300-1000 lpm
Reel-to-reel tape drives	1600/6250 bpi, 125 ips	1600/6250 bpi, 125 ips	6250 bpi, 50 ips	6250 bpi, 50 ips
Streaming tape drives	Start/stop; 90 ips	Start/stop; 90 ips	25/50/100 ips	25/50/100 ips
Cassette/cartridge tape drives	90 ips	90 ips	¼-inch cartridge	¼-inch cartridge
Other peripherals supported	Card reader	Card reader	Video & hardcopy terminals; matrix plotters	Video & hardcopy terminals; matrix plotters
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Cobol, Fortran, Ada, Pascal, APL, C, Simula	Cobol, Fortran, Ada, Pascal, APL, C, Simula	Cobol, Fortran, Pascal, Basic, RPG II, C, PL/1	Cobol, Fortran, Pascal, Basic, RPG II, C, PL/1
Operating system name	Sintran	Sintran	Primos; Primix	Primos; Primix
Operating system type	R.-t., batch, timeshare	R.-t., batch, timeshare	Realtime; Unix System V	Realtime; Unix System V
Operating sys. implemented in firmware	Partially	Partially	Fully	Fully
Database management system	Sibas (Codasyl)	Sibas (Codasyl)	DBMS, Oracle	DBMS, Oracle
Principal industry application	Simulation/scientific computing	Simulation/scientific computing	CAD/CAM, engineering/ scientific, interactive business data proc.	CAD/CAM, engineering/ scientific, interactive business data proc.
Other packages	Office automation	Office automation	Office automation	Office automation
PRICING & AVAILABILITY				
Typical system configuration and price	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: $275,000 (ND-530) or $315,000 (ND-550)	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: $370,000 (ND-560)/ $450,000 (ND-570)	CPU with 4MB memory; 120MB Winchester disk; 60MB cartridge tape unit; disk/tape controller; 16 async lines; PT200 system console; Primos o.s.: $36,900	CPU with 4MB memory; 120MB Winchester disk; 60MB cartridge tape unit; disk/tape controller; 16 async lines; PT200 system console; Primos o. s.: $53,900
Monthly maintenance of typical configuration	$2600 (530)/$3000 (550)	$3500 (560)/$4400 (570)	$516	$606
Date of first delivery	—	—	1st quarter 1986	1st quarter 1986
Number installed to date	—	—	—	—
COMMENTS	ND-530 is priced from $102,000, ND-550 from $146,000. MIPS rates are for optimized Fortran.	ND-560 is priced from $195,000, ND-570 from $288,000. MIPS rates are for optimized Fortran.	Replaces Prime 2250	

All About Supermini Systems

MANUFACTURER & MODEL	Prime Computer, Inc. 2655	Prime Computer, Inc. 9655	Prime Computer, Inc. 9755	Prime Computer, Inc. 9955 II
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	4MB-8MB	2MB-8MB	8MB-16MB	16MB-32MB
DISK STORAGE CAPACITY	3.8GB	10GB	10GB	10GB
NO. WORKSTATIONS SUPPORTED	64	128	192	254
PRICE RANGE	$91,200-$133,080	$126,700-$158,000	$236,100-$261,500	$354,400-$428,700
TARGET MARKET	General business	General business	General business	General business
CENTRAL PROCESSOR				
No. of directly addressable bytes	—	—	—	—
Virtual memory	512MB per user	512MB per user	512MB per user	512MB per user
Hardware floating point	SP, DP	SP, DP	SP, DP, QP	SP, DP, QP
Battery backup	None	None	None	None
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	160	80	64
MIPS	1.3	1.3	3.4	5.0
16-/32-bit compatibility	32-bit only	32-bit only	32-bit only	32-bit only
MAIN STORAGE				
Bytes fetched per cycle	—	—	—	—
Cycle/access time, nanoseconds	132	132	84	46
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	—	—	2M, 4M, 8M	4M, 8M
Cache memory, bytes	16K	16K	16K	64K
INPUT/OUTPUT CONTROL				
No. of I/O channels	—	—	—	32
Data transfer rate	5MB/sec.	5MB/sec.	9MB/sec.	9.5MB/sec.
COMMUNICATIONS				
Max. number of lines	4 sync	4 sync	8 sync	8 sync
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	Hasp, HDLC X.25, SNA, Primenet, bisync, others	Hasp, HDLC X.25, SNA, Primenet, bisync, others	Hasp, HDLC X.25, SNA, Primenet, bisync, others	Hasp, HDLC X.25, SNA, Primenet, bisync, others
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	Winchester: 315MB-675MB; removable	Winchester: 315MB-675MB; removable	Winchester: 315MB-675MB; removable	Winchester: 315MB-675MB; 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	300-1000 lpm	300-1000 lpm	300-1000 lpm	300-1000 lpm
Reel-to-reel tape drives	6250 bpi, 50 ips	6250 bpi, 50 ips	6250 bpi, 50 ips	6250 bpi, 50 ips
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	Video & hardcopy terminals; matrix plotters	Video & hardcopy terminals; matrix plotters	Video & hardcopy terminals; matrix plotters	Video & hardcopy terminals; matrix plotters
SOFTWARE				
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler
Compilers	Cobol, Fortran, Pascal, Basic, RPG II, C, PL/1	Cobol, Fortran, Pascal, Basic, RPG II, C, PL/1	Cobol, Fortran, Pascal, Basic, RPG II, C, PL/1	Cobol, Fortran, Pascal, Basic, RPG II, C, PL/1
Operating system name	Primos; Primix	Primos; Primix	Primos; Primix	Primos; Primix
Operating system type	Realtime; Unix System V	Realtime; Unix System V	Realtime; Unix System V	Realtime; Unix System V
Operating sys. implemented in firmware	Fully	Fully	Fully	Fully
Database management system	DBMS, Oracle	DBMS, Oracle	DBMS, Oracle	DBMS, Oracle
Principal industry application	CAD/CAM, engineering/ scientific, interactive business data proc.	CAD/CAM, engineering/ scientific, interactive business data proc.	CAD/CAM, engineering/ scientific, interactive business data proc.	CAD/CAM, engineering/ scientific, interactive business data proc.
Other packages	Office automation	Office automation	Office automation	Office automation
PRICING & AVAILABILITY				
Typical system configuration and price	CPU with Diagnostic Processor, cabinet, chassis, and modem; 4MB memory; 315MB fixed disk; streaming tape subsystem; office peripheral cabinet; Primos operating system: $99,200	CPU with Diagnostic Processor, cabinet, chassis, and modem; 4MB memory; 315MB fixed disk; streaming tape subsystem; ICS2 w/32 async lines; peripheral cab.; Primos operating system: $142,100	CPU with Diagnostic Processor, cabinet, chassis, and modem; 8MB memory; two 496MB fixed disks with controller; streaming tape subsystem; peripheral cabinet; console; Primos o.s.: : $258,600	CPU with Diagnostic Processor, cabinet, chassis, and modem; 16MB memory; two 496MB fixed disks with controller; 800/1600/6250 bpi, 50 ips tape subsystem; peripheral cabinet; color console: $392,600
Monthly maintenance of typical configuration	$705	No charge	$1,787	$2,380
Date of first delivery	1985	1985	2nd quarter 1986	2nd quarter 1986
Number installed to date	—	—	—	—
COMMENTS	Replaces Prime 2550	Replaces Prime 9650	Replaces Prime 9750	Replaces Prime 9955

All About Supermini Systems

MANUFACTURER & MODEL	Pyramid Technology Corporation Pyramid 90x	Pyramid Technology Corporation Pyramid 98x	Sequent Computer Systems Balance 8000	Sperry Corporation 7000/40
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	2MB-16MB	4MB-32MB	2MB-28MB	4MB-32MB
DISK STORAGE CAPACITY	150MB-13.2GB	150MB-13.2GB	72MB-64GB	160MB-8.24GB
NO. WORKSTATIONS SUPPORTED	128	256	192	240
PRICE RANGE	$100,000-$150,000	$200,000-$300,000	$50,000-$250,000	From $180,000
TARGET MARKET	General business, engineering/scientific	General business, engineering/scientific	Software devel., govt., CAD/CAE, technical OEM	General business, govt., engineering/scientific
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	32M	32M	32M
Virtual memory	4GB	4GB	16MB	4GB
Hardware floating point	DP	DP	SP, DP	Opt.; SP, DP
Battery backup	None	None	None	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	125	100	100	100
MIPS	Does not apply	Does not apply	1.4 to 8.4	7.7
16-/32-bit compatibility	32-bit only	32-bit only	Does not apply	—
MAIN STORAGE				
Bytes fetched per cycle	32	32	8	4
Cycle/access time, nanoseconds	725	700	300	100
Storage protection	—	—	Standard	Standard
Increment size, bytes	4M	4M	2M	4M, 16M
Cache memory, bytes	4K	4K	8K per CPU	56K
INPUT/OUTPUT CONTROL				
No. of I/O channels	4	4	8	25
Data transfer rate	2MB/sec.	11MB/sec.	11.2MB/sec. (cumulative)	11.2MB/sec.
COMMUNICATIONS				
Max. number of lines	128	256	192	—
Synchronous	Opt.; 56K bps	Opt.; 56K bps	None	Opt.; 307K bps
Asynchronous	Opt.; 19.2K bps	Opt.; 19.2K bps	Std.; 19.2K bps	Std.; 19.2K bps
Protocols supported	Hasp, X.25	Hasp, X.25	TCP/IP	SNA, BSC, IBM 2780/3780
Type of LAN supported	Ethernet	Ethernet	Ethernet	Ethernet
RJE terminals emulated	Hasp	Hasp	None	IBM 2780/3780, 3770
IBM 3270 emulation	No	No	No	Yes
PERIPHERAL EQUIPMENT				F
Disks supported	Fixed & removable: 150MB-13.2GB	Fixed & removable: 150MB-13.2GB	72MB, 396MB	Fixed: 160/340/515MB; removable: 300MB
Serial printers	—	—	19.2K baud	160/400 cps
Letter-quality printers	—	—	30 cps	50 cps
Line printers	600/1000/1500 lpm	600/1000/1500 lpm	300 lpm	600 lpm
Reel-to-reel tape drives	1600/6250 bpi, 75 ips	1600/6250 bpi, 75 ips	—	6250 bpi, 70 ips
Streaming tape drives	Start/stop; 25/45 ips	Start/stop; 25/45 ips	1600/6250 bpi, 100 ips	Start/stop; 100/50 ips
Cassette/cartridge tape drives	—	—	¼-in. cart., 45 or 60MB	None
Other peripherals supported	—	—	—	Laser ptr. (20 ppm), color graphics station
SOFTWARE				
Assembler	Standard	Standard	Macro assembler	Macro assembler
Compilers	Optimizing Fortran, Pascal, Franz Lisp, C	Optimizing Fortran, Pascal, Franz Lisp, C	C, Fortran, Pascal, Ada, Cobol	RM/Cobol, Fortran, C
Operating system name	OSx	OSx	Dynix	BSD 4.2/AT&T Sys. V Unix
Operating system type	Multitask., multiproc.	Multitask., multiproc.	Multiuser Unix	Multitasking
Operating sys. implemented in firmware	Partially	Partially	Partially	Partially
Database management system	See Comments	See Comments	Unify	Oracle
Principal industry application	Various	Various	—	General business, engineering/scientific
Other packages	Through Pyramid's PRISM third-party software program	Through Pyramid's PRISM third-party software program	—	Office automation, education, third-party packages
PRICING & AVAILABILITY				
Typical system configuration and price	Contact vendor	Contact vendor	32-user system: 4 CPUs (2 boards); 4MB RAM; SCSI, Ethernet, Multibus interfaces; ¼-inch cartridge tape; 400MB disk; ½-inch 1600 bpi tape; 32 lines; manuals; software license: $118,000	CPU; 8MB main memory; four 340MB fixed disk drives; 1 disk & 2 tape controllers; 4 async I/O controllers; 16 workstations; 600 lpm line printer; 50 cps letter quality printer: $310,000
Monthly maintenance of typical configuration	Contact vendor	Contact vendor	Contact vendor	$2,076
Date of first delivery	October 1983	July 1985	December 1984	1st quarter 1985
Number installed to date	260 (approx.)	200 (approx.)	45	—
COMMENTS	Can use Oracle, Unify, Ingres, Mistress 32, or Britton-Lee DBMS	Isoprocessor system containing two symmetric processors; can use same DBMS as 90x	Parallel computer; 2-12 NS32032 CPUs in tightly coupled arch. under multiprocessing Unix	

All About Supermini Systems

MANUFACTURER & MODEL	Stratus Computer, Inc. FT250	Stratus Computer, Inc. XA440/XA600	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-8MB	4MB-16MB	8MB-32MB	64MB-256MB
DISK STORAGE CAPACITY	143MB-21GB	143MB-21GB	8GB+	64GB+
NO. WORKSTATIONS SUPPORTED	128	256	No set limit	No set limit
PRICE RANGE	From $115,000	To $700,000	From $293,775	From $1,700,000
TARGET MARKET	Manufacturing, financial, brokerage	Manufacturing, financial, brokerage	Online transact. proc., networking, distr. sys.	Online transact. proc., networking, distr. sys.
CENTRAL PROCESSOR				
No. of directly addressable bytes	8M	16M	32M	256M
Virtual memory	16MB	16MB	2GB	16GB
Hardware floating point	Does not apply	Does not apply	SP, DP	SP, DP
Battery backup	Standard	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard
CPU cycle time, nanoseconds	—	—	83.3	83.3
MIPS	0.7	2/3	4	32
16-/32-bit compatibility	32-bit only	32-bit only	Direct	Direct
MAIN STORAGE				
Bytes fetched per cycle	—	—	8 (per processor)	8 (per processor)
Cycle/access time, nanoseconds	—	—	116	116
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	2M	2M	2M	2M
Cache memory, bytes	None	8K	128K	1M
INPUT/OUTPUT CONTROL				
No. of I/O channels	1	1	2	16
Data transfer rate	16MB/sec.	16MB/sec.	5MB/sec.	5MB/sec.
COMMUNICATIONS				
Max. number of lines	128	256	252	1792
Synchronous	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps
Asynchronous	Std.; 9600 bps	Std.; 9600 bps	Opt.; 19.2K bps	Opt.; 19.2K bps
Protocols supported	SDLC, SNA, BSC, X.25, X.29, MAP, NASDAQ, other	SDLC, SNA, BSC, X.25, X.29, MAP, NASDAQ, other	ADCCP, HDLC, SDLC, SNA, X.25, MAP, LU6.2	ADCCP, HDLC, SDLC, SNA, X.25, MAP, LU6.2
Type of LAN supported	MAP	MAP	Hyperchannel, Ethernet	Hyperchannel, Ethernet
RJE terminals emulated	2780/3780, Hasp	2780/3780, Hasp	IBM 2780/3780, 3777	IBM 2780/3780, 3777
IBM 3270 emulation	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT				
Disks supported	Fixed & removable: 143MB-448MB	Fixed & removable: 143MB-448MB	Winchester: 128MB-4.2GB; removable: 240MB	Winchester: 128MB-4.2GB; removable: 240MB
Serial printers	None	None	340 cps	340 cps
Letter-quality printers	55 cps	55 cps	55 cps	55 cps
Line printers	300/600/900 lpm	300/600/900 lpm	300/600/900/1300 lpm	300/600/900/1300 lpm
Reel-to-reel tape drives	—	1600/6250 bpi, 100 ips	1600/6250 bpi, 200 ips	1600/6250 bpi, 200 ips
Streaming tape drives	Start/stop; 25 ips	—	None	None
Cassette/cartridge tape drives	—	—	None	None
Other peripherals supported	—	—	Fax, OCR, mag. stripe card & bar code readers	Fax, OCR, mag. stripe card & bar code readers
SOFTWARE				
Assembler	Yes	Yes	None	None
Compilers	Cobol, Fortran, Basic, PL/1, C, Pascal	Cobol, Fortran, Basic, PL/1, C, Pascal	Basic, TAL, Cobol 74, Cobol 85, Fortran, Mumps, Pascal, C	Basic, TAL, Cobol 74, Cobol 85, Fortran, Mumps, Pascal, C
Operating system name	VOS	VOS	Guardian 90	Guardian 90
Operating system type	Multitasking	Multitasking	Multiproc./message-based	Multiproc./message-based
Operating sys. implemented in firmware	Does not apply	Does not apply	Partially	Partially
Database management system	Oracle	Oracle	Encompass	Encompass
Principal industry application	Mfrg. process control, ATM/POS networks, cash mgt., brokerage sys.	Mfrg. process control, ATM/POS networks, cash mgt., brokerage sys.	Reservations, banking, brokerage, telecomm., POS, manufacturing	Reservations, banking, brokerage, telecomm., POS, manufacturing
Other packages	—	—	Transaction proc.; time-staged delivery sys.; elect. mail; networking	Transaction proc.; time-staged delivery sys.; elect. mail; networking
PRICING & AVAILABILITY				
Typical system configuration and price	4MB duplexed processing module; 20 slots; 16MB DMA bus; battery backup; 2 memory controllers; 2 disk controllers; two 143MB Winchester disk drives; 2 comm. controllers; VOS, TPF, FMS, and 1 language: $115,000	8MB duplexed processing module; 40 slots; 16MB DMA bus; battery backup; 2 memory controllers; two C200 comm. controllers; comm. panel; tape unit and controller; VOS operating system: $274,300	2 processing modules; 8MB memory; 45 ips tape drive and controller; operations and service processor: $293,775	Contact vendor
Monthly maintenance of typical configuration	$952	Contact vendor	$1,515	Contact vendor
Date of first delivery	1982	1984	November 1983	November 1983
Number installed to date	—	—	—	—
COMMENTS			Can be interconnected into worldwide, 4,080-processor network through Expand software	Same networking potential as 2-processor NonStop TXP

All About Supermini Systems

MANUFACTURER & MODEL	Tandem Computers, Inc. NonStop VLX	Wang Laboratories, Inc. VS 6	Wang Laboratories, Inc. VS 65	Wang Laboratories, Inc. VS 85
WORD LENGTH	32 bits	32 bits	32 bits	32 bits
MAIN MEMORY	32MB-256MB	1MB-4MB	1MB-4MB	2MB-8MB
DISK STORAGE CAPACITY	2.7GB-2150GB	2.62GB (w/external dr.)	2.62GB	4.96GB
NO. WORKSTATIONS SUPPORTED	No set limit	16	40	80
PRICE RANGE	From $995,275	$19,950-$42,950 (CPU)	$19,950-$48,600	$67,700-$115,700
TARGET MARKET	Online transact. proc., networking, distr. sys.	General business, MIS, office automation	General business, MIS, office automation	General business, MIS, office automation
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M per CPU	—	16M	16M
Virtual memory	1GB per CPU	Standard	Standard	Standard
Hardware floating point	Optional	—	SP, DP	SP, DP
Battery backup	Standard	—	—	—
Real-time clock or timer	Standard, plus a backup	Standard	Standard	Standard
CPU cycle time, nanoseconds	83.3	200	200	160
MIPS	12-48	—	—	—
16-/32-bit compatibility	Direct	Direct	Yes	Yes
MAIN STORAGE				
Bytes fetched per cycle	32 (8 per processor)	—	8	8
Cycle/access time, nanoseconds	98	400	480	480
Storage protection	Standard	Standard	Standard	Standard
Increment size, bytes	8M	1M, 2M, 4M	1M, 2M	2M, 4M
Cache memory, bytes	64K per CPU	16K	16K	32K
INPUT/OUTPUT CONTROL				
No. of I/O channels	4-16	3	6	6
Data transfer rate	5MB/sec. per channel	5MB/sec.	5MB/sec.	4.2MB/sec.
COMMUNICATIONS				
Max. number of lines	Up to 1,792	4	4+	6+
Synchronous	Opt.; 56K bps	—	Std.; to 56K bps	Std.; to 56K bps
Asynchronous	Opt.; 19.2K bps	Standard	Std.; to 19.2K bps	Std.; to 19.2K bps
Protocols supported	ADCCP, HDLC, SDLC, SNA, X.25, MAP, LU6.2	SNA, WSN, X.25, 3270, 2780/3780, VT100, TTY	SNA, WSN, X.25, 3270, 2780/3780, VT100, TTY	SNA, WSN, X.25, 3270, 2780/3780, VT100, TTY
Type of LAN supported	Hyperchannel, Ethernet	WangNet	WangNet	WangNet
RJE terminals emulated	IBM 2780/3780, 3777	IBM 2780/3780/3777/Hasp	IBM 2780/3780/3777/Hasp	IBM 2780/3780/3777/Hasp
IBM 3270 emulation	Yes	Yes; bisync & SNA	Yes; bisync & SNA	Yes; bisync & SNA
PERIPHERAL EQUIPMENT				
Disks supported	Winchester: 128MB-4.2GB	Winchester: 67MB-620MB; removable: 75MB-288MB	Winchester: 76MB-620MB; removable: 75MB-288MB	Winchester: 76MB-620MB; removable: 75MB-288MB
Serial printers	340 cps	180/200 cps	180 cps	180 cps
Letter-quality printers	55 cps	20/40/55 cps	20/55 cps	20/55 cps
Line printers	300/600/900/1300 lpm	250/600/1100 lpm	250/600/1100 lpm	250/600/1100 lpm
Reel-to-reel tape drives	1600/6250 bpi, 200 ips	1600 bpi	1600 bpi	800/1600/6250 bpi
Streaming tape drives	None	—	—	—
Cassette/cartridge tape drives	None	¼-inch, 14MB cartridge	Optional	Optional
Other peripherals supported	Fax, OCR, mag. stripe card & bar code readers	Laser printers (8/12/24 ppm)	Laser printers (8/12/24 ppm)	Laser printers (8/12/24 ppm)
SOFTWARE				
Assembler		Macro assembler	Macro assembler	Macro assembler
Compilers	Basic, TAL, Cobol 74, Cobol 85, Fortran, Mumps, Pascal, C	Cobol, Basic, PL/1, RPG, Fortran	Cobol, Basic, PL/1, RPG, Fortran	Cobol, Basic, PL/1, RPG, Fortran
Operating system name	Guardian 90XF	VS-OS; Unix	VS-OS; Unix	VS-OS; Unix
Operating system type	Multiproc./message-based	Interactive	Interactive	Interactive
Operating sys. implemented in firmware	Partially	No	No	No
Database management system	Encompass	Pace/Total	Pace/Total	Pace/Total
Principal industry application	Reservations, banking, brokerage, telecomm., POS, manufacturing	Commercial d.p., MIS	Commercial d.p., MIS	Commercial d.p., MIS
Other packages	Transaction proc.; time-staged delivery sys.; elect. mail; networking	Wang Office; WP Plus; graphics	Wang Office; WP Plus; graphics	Wang Office; WP Plus; graphics
PRICING & AVAILABILITY				
Typical system configuration and price	4 processing modules; 32MB main memory; 2.7GB of disk storage (8 drives & 4 controllers); 200 ips tape subsystem; console: $995,275	Packaged configurations available; contact vendor	Packaged configurations available; contact vendor	Packaged configurations available; contact vendor
Monthly maintenance of typical configuration	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Date of first delivery	April 1986	April 1986	February 1985	August 1983
Number installed to date		—	2,500 (worldwide)	2,510 (worldwide)
COMMENTS	Supports up to 16 CPUs; can be networked world-wide through Expand, like NonStop TXP	Gateways to IBM's DISOSS and PROFS avail. through Wang Office	Gateways to IBM's DISOSS and PROFS avail. through Wang Office	Gateways to IBM's DISOSS and PROFS avail. through Wang Office

All About Supermini Systems

MANUFACTURER & MODEL	Wang Laboratories, Inc. VS 100	Wang Laboratories, Inc. VS 300		
WORD LENGTH	32 bits	32 bits		
MAIN MEMORY	2MB-16MB	4MB-16MB		
DISK STORAGE CAPACITY	9.92GB	19.84GB		
NO. WORKSTATIONS SUPPORTED	128	192		
PRICE RANGE	$99,750-$211,750	$178,500-$279,300		
TARGET MARKET	General business, MIS, office automation	General business, MIS, office automation		
CENTRAL PROCESSOR				
No. of directly addressable bytes	16M	16M		
Virtual memory	Standard	Standard		
Hardware floating point	SP, DP	SP, DP; accelerator opt.		
Battery backup	—	Optional		
Real-time clock or timer	Standard	Standard		
CPU cycle time, nanoseconds	160	120		
MIPS	—	—		
16-/32-bit compatibility	Yes	Yes		
MAIN STORAGE				
Bytes fetched per cycle	8	8/16/32 read; 8 write		
Cycle/access time, nanoseconds	480	480/540/900 rd.; 180 wr.		
Storage protection	Standard	Standard		
Increment size, bytes	2M, 4M	4M		
Cache memory, bytes	32K	32K		
INPUT/OUTPUT CONTROL				
No. of I/O channels	16	15		
Data transfer rate	8.3MB/sec.	16.6MB/sec.		
COMMUNICATIONS				
Max. number of lines	15+	32+		
Synchronous	Std.; to 56K bps	Std.; to 56K bps		
Asynchronous	Std.; to 19.2K bps	Std.; to 19.2K bps		
Protocols supported	SNA, WSN, X.25, 3270, 2780/3780, VT100, TTY	SNA, WSN, X.25, 3270, 2780/3780, VT100, TTY		
Type of LAN supported	WangNet	WangNet		
RJE terminals emulated	IBM 2780/3780/3777/Hasp	IBM 2780/3780/3777/Hasp		
IBM 3270 emulation	Yes; bisync & SNA	Yes; bisync & SNA		
PERIPHERAL EQUIPMENT				
Disks supported	Winchester: 76MB-620MB; removable: 75MB-288MB	Winchester: 76MB-620MB; removable: 75MB-288MB		
Serial printers	180 cps	180 cps		
Letter-quality printers	20/55 cps	20/55 cps		
Line printers	250/600/1100 lpm	250/600/1100 lpm		
Reel-to-reel tape drives	800/1600/6250 bpi	800/1600/6250 bpi		
Streaming tape drives	—	—		
Cassette/cartridge tape drives	Optional	Optional		
Other peripherals supported	Laser printers (8/12/24 ppm)	Laser printers (8/12/24 ppm)		
SOFTWARE				
Assembler	Macro assembler	Macro assembler		
Compilers	Cobol, Basic, PL/1, RPG, Fortran	Cobol, Basic, PL/1, RPG, Fortran		
Operating system name	VS-OS; Unix	VS-OS; Unix		
Operating system type	Interactive	Interactive		
Operating sys. implemented in firmware	No	No		
Database management system	Pace/Total	Pace/Total		
Principal industry application	Commercial d.p., MIS	Commercial d.p., MIS		
Other packages	Wang Office; WP Plus; graphics	Wang Office; WP Plus; graphics		
PRICING & AVAILABILITY				
Typical system configuration and price	Packaged configurations available; contact vendor	Packaged configurations available; contact vendor		
Monthly maintenance of typical configuration	Contact vendor	Contact vendor		
Date of first delivery	January 1981	March 1985		
Number installed to date	2,925 (worldwide)	170 (worldwide)		
COMMENTS	Gateways to IBM's DISOSS and PROFS avail. through Wang Office	Gateways to IBM's DISOSS and PROFS avail. through Wang Office		