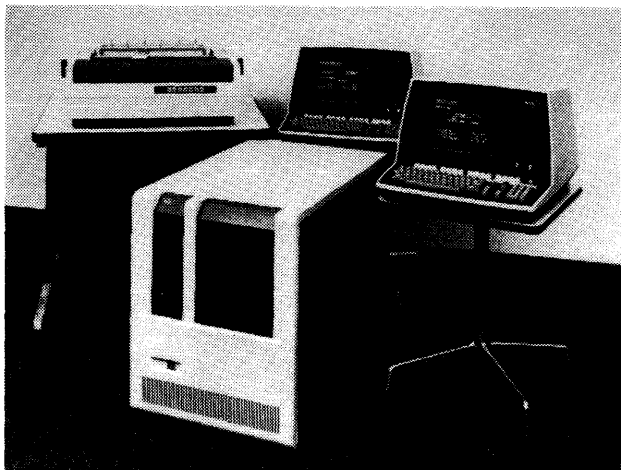


All About Minicomputers



The Wang 2200 LVP multi-terminal computer system is the newest addition to the company's 2200 Series. The 2200 LVP provides one megabyte of diskette storage, two to eight megabytes of fixed disk storage, and 32K to 128K bytes of main memory. Pricing for this system ranges from \$15,000 to \$35,000.

What's available today in the fast-moving minicomputer marketplace? What are the significant features of these machines? How can you tell whether a minicomputer will fit into your own data processing plans? And, if so, which of the many available models represents the best overall choice for you? This report is designed to answer these questions and bring you up to date on the rapidly advancing state of the art in minicomputers.

Dynamism and proliferation continue in the world of the minicomputer. We hear daily of a continual stream of new products entering the marketplace, with hardware and software that take on many names. We hear of minicomputers, microcomputers, programmable controllers, microprogrammable data entry units, intelligent terminals, accounting machines, large-scale programmable calculators, etc. We also regularly hear of old-line peripheral device and terminal manufacturers announcing their entry into the "minicomputer business" as they add programmable logic and memory to their formerly unintelligent, hard-wired devices.

The net result of all these happenings is, more often than not, confusion—at least when one tries to grasp the meaning or direction of the industry in any overall sense. The confusion may well be compounded when one sets out to satisfy a known in-house need and wonders where to begin looking for a specific minicomputer that will satisfy that need at the best available price.

This report on All About Minicomputers can cut through a lot of this confusion by providing a convenient way to scan quickly a comprehensive list of available minicomputers, together with their primary specifications and prices.

This report presents the salient characteristics of 262 minicomputers from 63 vendors. Prices and capabilities of these machines span a wide range, so prospective users should carefully check the details of this report and the accompanying comparison charts.

The comparison charts that follow can be effectively used to complete a comprehensive, first-level search of the minicomputer universe in just a few minutes. For example, if you want a minicomputer but know you can't pay more than \$5,000 for the basic CPU and memory, then you can quickly scan across the charts noting the entry "Price of CPU, power supply, front panel, and minimum memory in chassis" and jotting down the name and model number of each minicomputer that applies. Or, your requirements may be for a minicomputer that has a BASIC programming language in addition to removable disk pack storage. A similar quick scan across the entries called "Disk pack/cartridge drives" and "Compilers" will produce a complete list of those minicomputers that satisfy both requirements.

PLEASE NOTE that a similar presentation of the characteristics of minicomputers with a strong orientation toward business data processing applications is contained in the report called "All About Small Business Computers" (70C-010-30). Thus, to assure that your search will be complete, we suggest that you also scan that report because, as you know, categorical descriptions and definitions in the area of minicomputers can be difficult. What you may consider to be a small business computer, someone else may call a minicomputer, pure and simple. To be sure, therefore, we suggest you quickly scan both sets of charts.

Once your search has been narrowed in the manner described above, your task may be completed, or you may then want to know the full details about the minicomputers whose names you've extracted. If the latter is the case, then simply turn to the Index of this service and locate the detailed system report, which contains price data (down to the feature and option level), complete hardware and software descriptions, and our independent analysis of where each minicomputer really fits in the marketplace.

Whenever you seek more information on a minicomputer system that is not yet covered in the full report format in the Computers section of this service, such as might happen if the minicomputer were just announced, please contact us directly via the Inquiry Service and get the facts you need by telephone or mail. This service is fully described behind the Inquiry Service index tab.

A significant aspect of any evaluation and procurement cycle is to gather information about how well the product ▷

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▷ has worked out for other customers. True, you are not likely to find someone with exactly your processing requirements or company/information set-up, but there will be similar elements. An important first step in gathering this information is presented in Report 70C-010-50, *User Ratings of Computer Systems*. This summary of the experience of hundreds of users with their minicomputers and small business computers will not replace the need for you to talk with existing users, but it will provide you with important insights about the strengths and weaknesses of the popular systems.

THE COMPARISON CHARTS

The key functional characteristics of 262 commercially available minicomputers from 63 manufacturers are presented in the accompanying comparison charts. Nearly all of the information in the charts was supplied and/or verified by the manufacturers during the months of December 1980 and January 1981; their close cooperation with the Datapro Research staff in the preparation of these charts is greatly appreciated.

The chart entries and their significance to potential minicomputer users are explained in the following paragraphs, together with some useful guidelines for selecting the most suitable minicomputer for your application.

Word Length

Probably the single most important distinguishing characteristic of a minicomputer is its *word length, bits*; i.e., 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 length, the greater the efficiency and accuracy of a computer's internal operations—and the higher its price tag. Most of the minicomputers currently on the market have a 16-bit word length; this size neatly accommodates two 8-bit bytes (characters) and has been shown to yield an attractive balance between economy and performance for many applications. Other widely used models have word lengths of 8, 12, 18, 24, or 32 bits. (Systems providing word length architectures of more than 16 bits (generally 32 bits) are featured in Datapro's newest report entitled *All About Superminis* (70C-010-40). This report includes an introduction to "superminicomputers," as well as comparison columns describing the specifications of the superminis currently available.) The 8-bit minicomputers are suitable for many functions where low cost is more important than high precision or sophisticated instruction repertoires—and they can be particularly effective when extensive manipulation of 8-bit bytes must be performed. Entries also indicate parity and error correction bits when applicable.

Number of Workstations Supported

A very important consideration for many users who are considering the acquisition of a minicomputer is the

number of workstations it can support. Workstations, in this case, can mean most any type of device which can input and/or receive data from the minicomputer. When the minicomputer is used in a business environment, for instance, the workstation would normally be a data processing device or terminal, but in a manufacturing or distribution environment the workstation could be a sensor or transmission unit that simply transmits signals back to the minicomputer for processing.

Main Storage

The *storage type* generally falls into one of two basic categories, magnetic core or semiconductor memory. Magnetic core storage has been widely used for more than a decade, and has proved to be fast, flexible, and reliable. Semiconductor memories began to appear in commercially available minicomputers late in 1970, and most minicomputer makers are now using semiconductor memory in their new products. It is clear that the demand for higher performance at lower cost, together with continuing improvements in semiconductor technology, have accelerated the trend toward the use of semiconductor memories.

Two types of semiconductor memories appear in the charts, MOS (metal oxide semiconductor) and bipolar (bipolar transistor). MOS is decidedly more popular because of its compactness and price. However, bipolar technology, a type of transistor-transistor logic, offers a classic trade-off—higher speed at the expense of more space and greater power consumed, as well as greater cost.

The *cycle time, microseconds/word* for a storage device is the 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, it is definitely *not* safe to assume that the computer with the fastest cycle time will be the best overall performer in a particular application. Other parameters that have an important effect on a minicomputer's performance include the flexibility and power of its instruction repertoire, the number of storage cycles it requires to execute each instruction, its input/output capabilities, etc.

Access time, microseconds/word is the actual elapsed time between the CPU's request for data and the time when that data is received (read). In core memory, the access time is usually one-half the cycle time; semiconductor memories do not display a similar relationship.

Our comparison charts show the amount of main storage available for each computer in terms of the *minimum capacity* and *maximum capacity*, expressed in words. In the great majority of cases, storage is available in all the usual binary increments of capacity. Thus, if a computer has minimum and maximum storage capabilities of 4,096 and 32,768 words, respectively, it's safe to assume that capacities of 8,192 and 16,384 words are also available. ▷

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▷ It is important to choose the right storage capacity; for nonmultiprogramming systems, that usually means enough storage to hold your largest program and all associated subroutines and data, but not too much more than that. It's also wise to make sure that your computer's main storage capacity can be expanded if necessary, preferably by simply plugging in an additional storage module.

Parity checking is a standard feature of some minicomputers and an extra-cost option for others. In still other cases, the manufacturers maintain—with some justification—that the reliability of modern magnetic core and semiconductor memories is so high that parity checking is an unnecessary luxury unless absolute accuracy is a must. Parity checking requires the addition of one more bit to each main storage location. This added bit is set to the appropriate value (0 to 1) whenever a word is written into main storage and checked each time the word is read out; the technique permits detection of most, though not all, read and write errors.

Error correction is a rather new feature which is beginning to appear in some of the recent minicomputer offerings. This feature involves appending five or six check bits to each word of memory. The check bits, called a Hamming code, and special algorithms allow a system to detect and correct single-bit errors, and also to detect a fair proportion of the multiple-bit errors that occur.

Storage protection is a feature that prevents unauthorized writing in certain areas of main storage. The protection can be accomplished by hardware means, software means, 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.

Central Processor

Although there are many variations in their internal architecture, the great majority of currently available minicomputers are parallel, binary processors with single-address instructions and fixed word lengths of 8, 12, 16, 18, 24, or 32 bits.

The *number of directly addressable words* of main storage is an important characteristic that may require some explanation if you're investigating minicomputers for the first time. The problem is that the short word lengths impose serious limitations upon the number of bits that can be assigned to hold the address part of each instruction. A typical 16-bit minicomputer instruction might consist of three parts: operation code, address mode field, and the address itself. If 6 bits are assigned to hold the operation code (permitting up to 64 distinct operations) and 2 bits are used to designate the addressing mode (permitting specification of indexing and/or indirect addressing), then only 8 bits are left to hold the address field. Since these 8 bits permit direct addressing of only 256 distinct memory locations, it is clear that other means will



The line of 16-bit computers marketed by the Point 4 Data Corporation provides 32K to 64K bytes of main memory and accommodates 4 to 128 communications lines. A variety of peripheral equipment is supported by the line of Point 4 computers, but is not supplied by the company.

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 multi-word instructions, indexing, and/or indirect addressing.

Since indirect addressing is so prominent, it deserves a short explanation. Indirect addressing is an address modification technique in which the address part of an instruction specifies a storage location that contains another address rather than the desired operand itself. This second address may in turn be either the address of the desired operand or another indirect address; the latter case is called multi-level indirect addressing. Indirect addressing permits the use of an entire word to hold an operand address. It can also simplify programming and speed up execution times in some applications by making it possible to change the effective address of numerous instructions by altering the indirect address in a single storage location. Each level of indirect addressing, however, usually requires one additional storage cycle of execution time.

Control storage is an indication of the microprogrammability of the minicomputer. Microprogrammability is a trait that enables the vendor and/or the user to tailor a minicomputer's internal processing capabilities to suit his particular needs. In place of conventional hard-wired logic, a microprogrammed computer uses sequences of microinstructions, usually stored in a special read-only memory (ROM), programmable read-only memory (PROM), or bipolar read-only memory (BROM) unit, to define the effects of each instruction in its repertoire. In some cases the microprograms can be altered by the user himself, while in others they are accessible only to the vendor. Microprogrammability can greatly increase the flexibility of a minicomputer, but its presence may involve a trade-off in terms of reduced performance or increased price. Entries here indicate both the type and the size of central storage. ▷

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▷ Although it is undeniably dangerous to make inferences about a computer's overall performance capability on the basis of instruction execution times, our charts show the basic *add time, microseconds* to give a first-level indication of fixed-point arithmetic speeds. In general, the indicated add times are the times required to retrieve a one-word operand from main storage and add it to another operand already contained in an accumulator, with no indexing or indirect addressing. Comparisons based on add times can easily be misleading, however, because of differences in word lengths and instruction repertoires.

Hardware multiply/divide facilities are standard in some minicomputers and optional in others. When no hardware facilities are present, multiplication and division must be performed by means of programmed subroutines at a significant reduction in execution speeds. Many minicomputer applications, however, impose little or no need for multiplication or division operations, and in these cases the hardware facilities would be superfluous.

Hardware floating-point facilities are not included in the standard instruction repertoires of most of the currently available minicomputers, despite the fact that floating-point arithmetic is highly desirable, if not essential, in many scientific applications. Where available, these facilities can dramatically reduce the execution times for certain programs by eliminating the need for time-consuming floating-point subroutines.

Hardware byte manipulation is the ability to conveniently process information expressed in the 8-bit character codes which are rapidly becoming an industry standard. Obviously, most of the 8-bit minicomputers are effective byte manipulators, and many of the 16-bit machines offer special instructions that permit either half of a word to be addressed and processed as an 8-bit byte.

Battery backup is a feature unique to minicomputers with semiconductor memory, which is volatile and requires refreshing at regular intervals to retain the data that has been written into it. In the event of a power failure, the contents of memory would be lost if the regulator power supply were not backed up by the battery pack.

An interesting solution to this problem with semiconductor memories is furnished by Computer Talk, Inc., whose battery backup feature causes the contents of memory to be recorded on the system disk if a power failure occurs. When power is restored, memory can be recreated by copying from the disk.

A *real-time clock or timer* is another essential element in most "time-conscious" systems. A real-time 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.

Input/Output Control

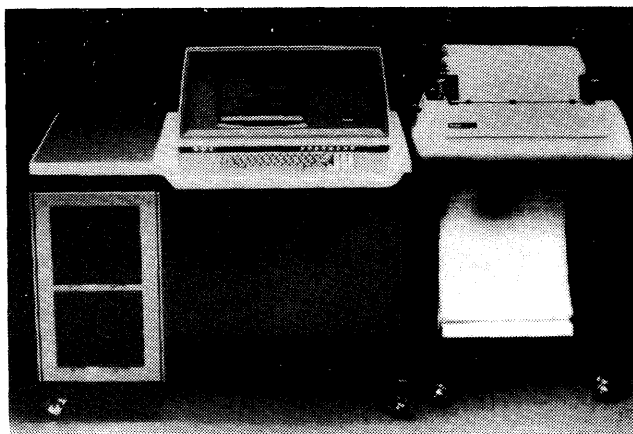
A *direct memory access channel* (DMA) permits direct transfer of I/O data between main storage and a peripheral controller. When a DMA channel is used, the I/O data bypasses the computer's main hardware registers, and the I/O operation proceeds independently of program control once it has been initiated by the program. In minicomputers that lack a DMA channel, I/O data transfers are generally carried out under direct program control, with each word being transferred by way of the processor's registers. Generally speaking, the DMA channel has two significant advantages over program-controlled I/O: it can accommodate higher I/O data rates, and it causes far less interference with internal processing operations. Regardless of the type of I/O control they employ, most minicomputers can accommodate multiple I/O devices and include appropriate facilities for addressing the desired device.

Maximum I/O rate, words/sec is a measure of each computer's potential ability to transfer data to and from peripheral devices or other external sources. In machines equipped with a DMA channel, the maximum I/O rate frequently equals the cycling rate of the main storage unit. These maximum I/O rates, however, can be quite deceptive in the case of minicomputers. In general, their storage capacities are limited, their capabilities for simultaneous input/output operations are restricted, and fairly complex programming is associated with I/O operations. For all these reasons, I/O data rates approaching the indicated maximum rates can usually be handled only in short bursts, if at all.

An effective *program interrupt* facility is a requirement for virtually all applications of a real-time nature. An interrupt is a signal that causes temporary suspension of normal program execution so that the particular condition that caused the interrupt can be dealt with. Interrupts fall into two basic categories: internal and external. Internal interrupts are usually triggered by conditions such as a memory parity error, an illegal instruction, or a power failure. External interrupts usually indicate that a particular peripheral device requires attention or has completed an I/O operation. An interrupt usually results in automatic storage of the current contents of the instruction counter, followed by a transfer of control to a software routine that determines the cause of the interrupt and initiates the appropriate action.

The *number of external interrupt levels* provides a reasonable indication of the power of a minicomputer's interrupt system. It shows the number of different external devices whose interrupt signals can be identified by the processor—though it should be noted that this identification process may require a fairly complex and time-consuming sequence of instructions. Many of the minicomputers offer additional external interrupt levels as extra-cost options, and in these cases our charts show the available range, from minimum to maximum. ▷

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The Xerox Diablo 3200 provides 24K to 64K bytes of main memory and supports up to 9 workstations. The Diablo 3200, available for \$18,950 (with printer), also supports compilers for Business BASIC, DACL and ABL. DACL and ABI. are high-level English-like language source statement compilers.

▷ Communications Capabilities

Communications capabilities enable some of the small business computers to function as “intelligent terminals” in data communications networks. An interface equips the small computer to send and receive data over a common-carrier communications link, usually to a larger central computer installation. The small computer’s internal processing and storage capabilities enable it to do some data processing locally and to handle a variety of code translation, editing, and control functions in connection with the data communications activities.

Maximum no. of lines indicates how many communications lines can be handled by a particular system. The types of lines are specified in the next two entries.

Synchronous and *asynchronous* have entries of standard, optional, or no, indicating their availability, and also a notation as to the speed of each line in bits per second (bps). Most entries will be of the type “to 4800 bps,” indicating one or more transmission speeds up to a maximum of 4800 bps.

Protocols supported indicates the type of communication protocols accommodated by hardware and software for the model.

Peripheral Equipment

The comparison charts summarize the standard peripheral devices that are available for each minicomputer. (Full details on the specifications and prices of more than 900 peripheral and memory products can be found in the Peripherals section of *DATAPRO REPORTS ON MINICOMPUTERS*. In addition, the individual minicomputer system reports in the Computers section include coverage of all the important peripheral devices offered with each minicomputer.)

Users who are accustomed to larger general-purpose computer systems will find that the term “standard peripheral device” often has a somewhat different meaning when used by a minicomputer manufacturer. Since comparatively few of the minicomputer makers produce their own peripheral equipment, the indicated availability of a given type of device may simply mean that an appropriate interface is available to couple the computer with a peripheral unit supplied by some other manufacturer. In many instances the minicomputer manufacturer buys the peripheral device from the peripheral manufacturer and supplies an appropriate interface for his minicomputer. Datapro has made every effort to include *only* the peripheral devices that are physically supplied by the minicomputer vendors; therefore, prospective buyers should ask these questions about each item of peripheral equipment they will need:

- Has it actually been installed and used with the computer of interest?
- If so, what has the users’ experience been?
- What software support is available?
- Who will provide service for the device, and under what conditions?

The inclusion of mass storage devices (magnetic disk units) can greatly increase the data storage and processing capabilities of a minicomputer system. Disk units enable millions of characters of information to be constantly accessible to the computer. Moreover, any desired record can be retrieved, updated, and re-recorded on the disk, usually within a fraction of a second.

By replacing or augmenting slower, less flexible file storage media such as punched cards, paper tape, or magnetic ledger cards, disk units can enable small computers to handle applications and processing volumes that would otherwise be impossible. The principal disadvantages of disk units are their comparatively high costs and the software complexities that are encountered by users who attempt to harness their full potential. One or both of these considerations will make disk units impractical for many small computer buyers, despite the obvious appeal of disk-oriented data processing.

The diskette, or “floppy disk,” is an innovation that can significantly reduce the cost of disk-oriented data processing. The diskette itself consists of a flexible Mylar disk, about 8 inches in diameter, that is permanently housed in a plastic envelope. It can serve as an input/output and/or random-access storage medium that is considerably smaller in capability and slower in performance than conventional disk units—but also far lower in cost. Introduced by IBM in 1972, diskettes and diskette drive units are now being produced by dozens of vendors and are finding their way into numerous small computer systems, such as the IBM System/32 and Burroughs B 80. Recent enhancements to the floppy disk concept include more concentrated data storage and

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▷ “flippies” (floppy disks that utilize both sides of the diskette), allowing more data to be stored on-line.

The other, more conventional types of mass storage devices, cartridge and disk pack drives, provide access to far more data and at significantly faster rates. Unfortunately, they also carry price tags several times higher than their floppy counterparts. Most of these units employ cartridges or disk packs that can easily be removed from the drive units and interchanged in much the same manner as magnetic tape reels.

Some cartridge-type units either use nonremovable media or use two cartridges, one fixed and the other removable. Nonremovable disks impose two important limitations. First, the system's file storage capacity is effectively limited to the amount of information that can be stored on-line. Second, disk dumps to create backup files for efficient restart procedures in case of catastrophe are not available to the user.

Interchangeable disks, conversely, provide great flexibility and make it practical to use small computers effectively for both sequential and random data processing applications. In sequential applications, files of virtually unlimited size can be handled through the use of multiple disk packs or cartridges.

Fixed-head (head-per track) disk and drum units can provide much faster access to on-line data than any other type of mass storage device. The reason is that there is no loss of time due to head positioning because a head is provided for each track. The only delay is rotational delay (latency), or the time required for the desired data to move under the read/write head. But the price of this type of equipment is higher than that of the preceding varieties, and less data can be stored on-line. Fixed-head devices are used when data bases are relatively small and very rapid access to the information is required.

Floppy disk (diskette) drives indicates whether floppies are available for a particular minicomputer and the minimum and maximum on-line capacities that are offered.



The Microtech Business Systems 300 Series provides 32K to 1024K bytes of main memory and accommodates up to 16 workstations. The 300-1, which includes 16M bytes of fixed disk storage and 16M bytes of removable disk storage, is available for \$27,500. The 300-2 and 300-3, offering 48M bytes and 80M bytes of fixed disk storage, respectively, are available for \$30,500 and \$33,500, respectively.

Disk pack/cartridge drives signifies whether one or the other, or both, types of devices can be interfaced to the system and the minimum and maximum on-line capacities available.

Drum/fixed-head disk storage informs the reader as to the availability of a drum or head-per-track (fixed-head) disk drive and the minimum and maximum on-line capacities offered.

The indicated maximum storage capacities are shown in thousands (K) or millions (M) of bytes and may be the capacity of a single disk or the total capacity of two or more (typically, four to eight) drives that can be connected to one controller. It is difficult to imagine minicomputer users wanting more disk storage, but if an I/O slot is open, theoretically, another controller and its associated drives can be added to most systems.

Magnetic tape cassettes and cartridges offer increased convenience in that they can be transported and stored with little fear of damaging the data that has been recorded. What's more, price tags for cassette and cartridge drives are significantly lower than those of the more conventional reel-to-reel variety, but once again the trade-off of slower transfer rates and reduced on-line storage must be accepted. The charts indicate the availability of *magnetic tape cassettes/cartridges* and *magnetic tape, 1/2-inch* drives and their associated transfer rates in characters per second (cps) or thousands of bytes per second (KBS).

Serial (character-at-a-time) printers are enjoying increased popularity with the prolific growth of the minicomputer marketplace. The main reason is price; serial printers can provide excellent-quality hard-copy reports for far less money than the line-at-a-time printers used with larger computers. However, for users who require faster printing capabilities, *line printers* are also available for many systems. Serial printers generally range in speed from about 30 to 600 or more characters per second (cps), while line printers operate at speeds of 100 to 2000 or more lines per minute (lpm). The user who needs faster printed output can obviously get it, but he must be willing to pay the higher price tag associated with the line printers.

Data communications interface describes the minicomputer's capabilities, if any, to send and receive data over a common-carrier communications link. Depending on the configuration, a minicomputer can be programmed to function as an intelligent terminal communicating with a larger host computer, or the mini can act as the host computer communicating with other terminals in a network. The chart entry indicates whether an interface is available and gives the range of data rates or the maximum data rate in bits per second (bps).

CRT indicates the availability of a CRT display unit and describes its standard screen size in characters per line and number of lines per screen (e.g., 80 char. x 24 lines). ▷

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▷ *Other standard peripheral units* lists the additional peripheral devices that are available for each system. Typical entries include analog/digital (A/D) converters, paper tape readers, paper tape punches, plotters, etc.

Software

A critically important area to be evaluated is *software*—the programming packages and languages used to program the computer and thereby direct its operations. It is important that you carefully investigate the available software. This investigation should include the operating systems, programming languages, preprogrammed utility packages such as sorts and file maintenance, and application packages such as payroll, inventory control, general ledger, etc. 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 capability of software should be carefully checked. This is particularly true of software that has been announced but not yet released. Vendors have frequently failed to live up to their marketing publicity.

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 own program 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 or, in some cases, a macro assembler.

A macro assembler is another software tool to aid the programmer and make his job a little easier. Macro routines can be called by the programmer and copied right into his 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: the use of macros usually wastes memory space.

Entries in this section of the charts indicate whether an assembler, a macro assembler, or both are available.

A *compiler* is a software tool designed to 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 virtually all large and medium-scale computer installations because of their demonstrated ability to slash programming costs—and they are becoming increasingly available for minicomputers. This trend is possible because of the more powerful central processors now being used, since compilation is an intricate process that requires more storage space and processing power than the earlier minicomputers provided. Where compilers are offered,



The MCM POWER is a multi-user system which supports up to 8 workstations. The system, which provides 64K bytes of main memory, also contains 256K bytes of virtual memory.

however, they frequently limit the programmer to restricted subsets of the standard programming languages and/or require the use of a larger computer to perform the compilation process.

Entries in this section of the charts may include *COBOL* (COmmon Business Oriented Language), *RPG* (Report Program Generator), *FORTRAN* (FORmula TRANslator), *BASIC* (Beginners All-purpose Symbolic Instruction Code), *ALGOL* (ALGORithmic Language), or proprietary languages that are available from a vendor for use on a particular system, and indicate the availability of those compilers for each minicomputer. The key word of warning here is that if you use a language that is unique to a vendor, you will be faced with a big problem if someday you decide to change vendors. Your investment in software will be lost, since the programs will not operate on any other system.

An *operating system* facilitates the operation of a computer by handling functions such as: (1) scheduling, loading, and supervising the execution of programs; (2) allocating storage and I/O devices; (3) initiating and controlling I/O operations; (4) analyzing interrupt signals and dealing with errors; (5) handling communications between the system and its human operator; and (6) controlling multiprogramming or time-sharing operations. ▷

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➤ 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 (communication between operator and system is not permitted once the job has begun); “interactive,” which means that the system allows data, parameters, etc., to be entered as the job is executing; “real-time,” which means that the system responds to external demands on a priority basis; or “time-sharing,” which means that the system allows multiple users to access the system and share all its resources at the same time.

Language implemented in firmware and operating system implemented in firmware tell the reader whether or not the language processor and/or the operating system are contained in microcode. The entries stipulate “fully,” “partially,” or “no” to indicate the extent of firmware implementation. An advantage to the user is that a language and/or operating system implemented in firmware frees up more memory space for the user’s programs and data. Also, the microcode is usually inaccessible to the user (generally contained in read-only memory), eliminating any possible tampering with the language processor or operating system and reducing chances for error. A third advantage derived from firmware implementation is the ability to create more sophisticated and complex system functions at the hardware level. Microcode routines can be substituted for often-used subroutines, thereby increasing system performance.

Pricing and Availability

The comparison charts show the *price of CPU, power supply, front panel, and minimum memory in chassis* along with the memory size in parentheses. *Price of memory increment* stipulates the costs of various sizes (when available) of memory increments, with the actual sizes in parentheses.

(Completely detailed pricing data is provided with each minicomputer system report in the Computers section of this service. Detailed pricing on any minicomputer which is not covered in the in-depth report format can be obtained directly from the Datapro analysts by using the Datapro Inquiry Service.)

If you’ll need two or more minicomputers, it’s also worth noting that most of the manufacturers offer sizeable discounts from their list prices on orders for multiple computers. Discounts of up to 40 percent are not unusual on large orders.

Date of first delivery indicates when the first production model of each minicomputer 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 approximately December, 1980. All figures were supplied by the manufacturers themselves.

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, or applications.

MINICOMPUTER MANUFACTURERS

Listed below, for your convenience in obtaining additional information, are the full names, addresses, and telephone numbers of the 63 suppliers whose products are listed in the comparison charts that follow.

AM Jacquard Systems, Executive Branch, 3340 Ocean Park Boulevard, Santa Monica, California 90405. Telephone (213) 450-1242.

Applied Data Processing, Inc., 33 Bernhard Road, North Haven, Connecticut 06473. Telephone (203) 787-4107.

Applied Systems Corporation, 26401 Harper Avenue, St. Clair Shores, Michigan 48081. Telephone (313) 779-8700.

Basic/Four Corporation, 14101 Myford Road, Tustin, California 92680. Telephone (714) 731-5100.

BRD (Bainbridge Research & Development), Inc., 12715A Miller Road, N.E., Bainbridge Island, Washington 98110. Telephone (206) 842-7610.

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

Burroughs Corporation, Burroughs Place, Detroit, Michigan 48232. Telephone (313) 972-7000.

CADO Systems Corporation, 2771 Toledo Drive, Torrance, California 90503. Telephone (213) 320-9660.

Cascade Data, Inc., 6300 28th Street, S.E., Grand Rapids, Michigan 49506. Telephone (616) 942-1420.

CDA (Computer Data Access), Inc., 1373 Broad Street, Clinton, New Jersey 07011. Telephone (201) 473-4700.

Centurion Computer Corporation, (formerly Warrex Computer Corporation), 1780 Jay Ell Drive, Richardson, Texas 75081. Telephone (214) 699-8400.

Century Computer Corporation, Spring Valley Business Center, 4410 Spring Valley Road, Dallas, Texas 75240. Telephone (214) 233-3238.

Compal Computer Systems, 6300 Variel Avenue, Suite E, Woodland Hills, California 91367. Telephone (213) 992-4425.

Computer Automation, Inc., Naked Mini Division, 18651 Von Karman Avenue, Irvine, California 92713. Telephone (714) 833-8830.

Computer Automation, Inc., SyFA Systems Division, (same address and telephone number as Naked Mini Division).

Computer Design Systems, Inc., 10911 Olson Memorial Highway, Minneapolis, Minnesota 55441. Telephone (612) 545-2855.

Computer Hardware, Inc., 4111 North Freeway Boulevard, Sacramento, California 95834. Telephone (916) 929-2020.

Computer Talk Inc., P.O. Box 100, Idledale, Colorado 80453. Telephone (303) 697-5485. ➤

All About Minicomputers



The multi-user, time-sharing line of Ultimate minicomputer systems provides 32K to 1024K bytes of main memory and supports 7 to 64 workstations. Prices for the line of Ultimate systems range from \$29,750 to \$98,000.

▷ **Control Data Corporation, Data Systems La Jolla Division**, 4455 Eastgate Mall, La Jolla, California 92037. Telephone (714) 452-6408.

Data General Corporation, 4400 Computer Drive, Westboro, Massachusetts 01581. Telephone (617) 366-8911.

Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284. Telephone (512) 699-7000.

Dataram Corporation, Princeton-Hightstown Road, Cranbury, New Jersey 08512. Telephone (609) 799-0071.

Digital Equipment Corporation, 129 Parker Street, Maynard, Massachusetts 01754. Telephone (617) 897-5111.

Digital Scientific Corporation, 11455 Sorrento Valley Road, San Diego, California 92121. Telephone (714) 453-6050.

Digital Systems Corporation, P.O. Box 158, Walkersville, Maryland 21793. Telephone (301) 845-4141.

Dimis, Inc., 1060 Highway 35, Middletown, New Jersey 07748. Telephone (201) 671-1011.

Display Data Corporation, Executive Plaza IV, Hunt Valley, Maryland 21031. Telephone (301) 667-9211.

Durango Systems, Inc., 3003 North First Street, San Jose, California 95134. Telephone (408) 946-5000.

Four-Phase Systems, Inc., 10700 North DeAnza Boulevard, Cupertino, California 95014. Telephone (408) 255-0900.

Functional Automation, Inc., 3 Graham Drive, Nashua, New Hampshire 03060. Telephone (603) 888-1905.

General Automation Corporation, 1055 S. East Street, Anaheim, California 92805. Telephone (714) 778-4800.

General Robotics Corporation, 55-57 North Main Street, Hartford, Wisconsin 53027. Telephone (414) 673-6800.

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

Hewlett-Packard, Data Systems Division, 11000 Wolfe Road, Cupertino, California 95014. Telephone (408) 257-7000.

Hewlett-Packard, GSD Division, 19410 Homestead Road, Cupertino, California 95014. Telephone (408) 725-8111.

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

IBM Corporation, General Systems Division, P.O. Box 2150, N.E., Atlanta, Georgia 30301. Telephone (404) 238-2000.

Kalbro, (formerly Northrop Data Systems), 1160 Sandhill Avenue, Carson, California 90746. Telephone (213) 637-1533.

MCM Computers Ltd., 6700 Finch Avenue, Suite 600, Rexdale, Ontario, Canada M9W 5P5. Telephone (416) 675-1353.

Microdata Corporation, 17481 Red Hill Avenue, Irvine, California 92805. Telephone (714) 540-6730.

Microtech Business Systems, 3176 Pullman Street, Suite 108, Costa Mesa, California 92626. Telephone (714) 557-8640.

Mitsubishi Electronics America, Inc. (formerly Melcom Business Systems, Inc.), 2200 W. Artesia Boulevard, Compton, California 90220. Telephone (213) 979-6055.

Modular Computer Systems, Inc., 1650 West McNab Road, Fort Lauderdale, Florida 33310. Telephone (305) 974-1380.

Mylee Digital Sciences, Inc., 155 Weldon Parkway, Maryland Heights, Missouri 63043. Telephone (314) 567-3420.

Nanodata Corporation, One Computer Park, Buffalo, New York 14203. Telephone (716) 631-6000.

NCR Corporation, Main and K Streets, Dayton, Ohio 45479. Telephone (513) 449-2000.

New England Digital Corporation, P.O. Box 305, Norwich, Vermont 05055. Telephone (802) 649-5183.

Northern Telecom, Inc., P.O. Box 1222, Minneapolis, Minnesota 55440. Telephone (612) 932-8000.

Northrop Data Systems, (see Kalbro).

Olivetti Corporation of America, 155 White Plains Road, Tarrytown, New York 10591. Telephone (914) 531-8100.

Perkin-Elmer, Computer Systems Division, 2 Crescent Place, Oceanport, New Jersey 07757. Telephone (201) 870-4500.

Point 4 Data Corporation, 2659 McCabe Way, Irvine, California 92714. Telephone (714) 754-4114.

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

Qantel Corporation, 4142 Point Eden Way, Hayward, California 94545. Telephone (415) 887-7777.

Raytheon Data Systems Company, 360 Forbes Boulevard, Mansfield, Massachusetts 02048. Telephone (617) 339-5731.

Rolm Corporation, 4900 Old Ironsides Drive, Santa Clara, California 95050. Telephone (408) 988-2900.

Sperry Univac Division, Sperry Rand Corporation, P.O. Box 500, Blue Bell, Pennsylvania 19424. Telephone (215) 542-4011.

Sperry Univac Minicomputer Operations, P.O. Box C-19504, 2722 Michelson Drive, Irvine, California 92713. Telephone (714) 833-2400.

STC, Inc., Nine Brook Avenue, Marywood, New Jersey 07607. Telephone (201) 845-0500. ▷

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

Terak Corporation, 14151 N. 76th Street, Scottsdale, Arizona 85260. Telephone (602) 998-4800.

Texas Instruments, Inc., P.O. Box 2909, Austin, Texas 78769. Telephone (512) 250-7309.

The Ultimate Corporation, 77 Brant Avenue, Clark, New Jersey 07066. Telephone (201) 388-8800.

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

Warrex Computer Corporation, (see Centurion Computer Corporation).

Xerox Corp., 440 Oakmead Parkway, Sunnyvale, California 94086. Telephone (408) 733-2300.□

All About Minicomputers

MANUFACTURER AND MODEL	AM Jacquard J-100	AM Jacquard J-500	Applied Data Processing Resource/100	Applied Systems Corporation ASC/80	Basic Four System 200
WORD LENGTH, BITS	16	16	16	8, 16	8-bit byte
NO. WORKSTATIONS SUPPORTED	14	1	16	—	2
MAIN STORAGE					
Storage type	MOS	MOS	Core	MOS	MOS
Cycle/access time, microseconds	1.5/3.0	.50/.66	0.8/0.4	1.0/0.5	0.60/0.40
Min./Max. capacity, words	96K/128K	128K/128K	65K/256K	4K/128K	40K/64K bytes
Parity checking	No	No	No	Optional	Standard
Error correction	No	No	No	Optional	No
Storage protection	No	No	No	Optional	No
CENTRAL PROCESSOR					
No. of directly addressable words	256	256	256K	128K	64K bytes
Control storage	ROM; 512 words	PROM; 28K bytes	No	PROM; 64K (max.)	ROM; 1K x 16 bits
Add time, microseconds	8.0	3.95	1.35	1.0	7.4
Hardware multiply/divide	No	No	Optional	Optional	No
Hardware floating point	No	No	Optional	Optional	No
Hardware byte manipulation	No	No	No	Standard	Standard
Battery backup	No	No	Optional	Optional	Standard
Real-time clock or timer	Standard	Standard	Optional	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Optional	Standard
Maximum I/O rate, words/sec.	500K	750K	1.1 M	50K	1M
No. of external interrupt levels	1	1	16	8 optional	8
COMMUNICATIONS					
Maximum number of lines	19	2	7	16, 32	1
Synchronous	Opt.; to 4800 bps	Std.; to 9600 bps	No	Opt.; to 50K bps	Opt.; 9600 bps
Asynchronous	Opt.; to 9600 bps	Std.; to 9600 bps	Std.; 1200 bps	Opt.; to 9600 bps	Std.; 9600 bps
Protocols supported	Async, Bisync, 2780/3780, TTY	Async, Bisync, 2780/3780, TTY	Bisync	IBM-Bisync; DECnet (RPQ)	Bisync
Network architectures supported	None	None	No	—	BFBIN
RJE terminals emulated	2780/3780, Univac	2780/3780, Univac	2780	Optional	2780/3780
IBM 3270 emulation	Yes	Yes	No	Optional	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	(2) 256K bytes	(2) 512K bytes	No	.24M-2M bytes	No
Disk pack/cartridge drives	Both; 48-320M bytes	Cartridge; 24-48M bytes	Both; 10MB, 320MB	Optional	Fixed; 10-20M bytes
Drum/fixed-head disk storage	No	No	No	Optional; 10-100M bytes	No
Magnetic tape cassettes/cartridges	No	No	No	A/R (optional)	Std.; 2.3M bytes
Magnetic tape, 1/2-inch	(10) 40KBS	No	120K	Optional	10 KBS
Serial printer	45-55 cps	45-55 cps	Yes; 165-330 cps	30/180 cps	120 cps; 160 cps opt.
Line printer	300 lpm, 150 cps	300 lpm, 150 cps	Yes; 300-600 lpm	A/R (optional)	Opt. 150 lpm
Data communications interface	Up to 9600 bps	Up to 9600 bps	Yes; 1200 bps	To 19.2K bps	1200 bps
CRT	1920 characters	2000 characters	Yes; 1998 char.	64 x 16 std.	80 char. x 24 lines
Other supported peripheral units	Phototypesetter, OCR reader	Phototypesetter, OCR reader	None	Plotters, graphic CRT, A/D-D/A I/O	—
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes; macro assembler (optional)	No
Compilers	BASIC, Data-Rite, Report-Rite	BASIC, Data-Rite, Report-Rite	BASIC	BASIC, FORTRAN, PASCAL, PL/M, COB.	Business BASIC
Operating system	Time-sharing	Time-sharing	Time-sharing	Optional (multi-user)	Multi-user, interactive
Language implemented in firmware	No	No	No	Optional	No
Operating system implemented in firmware	No	No	No	Optional	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	19,900	10,200	32,500	1,900 (basic system)	24,990 (40K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	172	92	325	—	260
Discounts available	GSA	GSA	—	Yes	—
Price of memory increment, \$	2,100 (32K bytes)	NA	4,500 (65K bytes)	150 (8K bytes)	2,000 (16K bytes)
Date of first delivery	August 1975	May 1980	June 1976	1977	1978
Number installed to date	80	200	NA	NA	9000 (all models)
COMMENTS	Includes dual floppy disk; opt. 150-cps printer available; word processing, phototypesetting, electronic mail applications accommodated	Includes dual floppy disk, disk controller, printer & controller, two communications controllers; word processing, typesetting, electronic mail applications accommodated; opt. 150-cps printer available	Resource/100 is a minicomputer-based business data processing system. It is marketed with applications software	Modular computer system designed for general applications and special business, communications, and real-time/control operations; 80 x 24 CRT available as an option	Price includes 40KB memory, 10MB fixed disk, 120 cps printer, 2.3MB magnetic tape cartridge drive, and one VDT; 8K bytes (\$1,500) also available

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MANUFACTURER AND MODEL	Basic Four System 410	Basic Four System 510	Basic Four System 610	Basic Four System 730	BRD Dolphin
WORD LENGTH, BITS	8-bit byte	8-bit byte	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	8	16	16	32	8
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	0.60/0.40	0.60/0.40	0.60/0.40	0.60/0.40	0.60
Cycle/access time, microseconds	40K/128K bytes	64K/256K bytes	64K/192K bytes	96K/256K bytes	4K/32K bytes
Min./Max. capacity, words	Standard	Standard	Standard	Standard	Standard
Parity checking	No	No	No	No	No
Error correction	No	No	No	No	Standard
Storage protection					
CENTRAL PROCESSOR					
No. of directly addressable words	128K bytes	—	64K	64K	65.5K
Control storage	ROM; 1K x 16 bits	ROM; 1K x 16 bits	ROM; 1K x 16 bits	ROM; 1K x 16 bits	EPROM; 14K
Add time, microseconds	7.4	7.4	7.4	7.4	5.0
Hardware multiply/divide	No	No	No	No	Standard
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Standard	Standard	Standard	Standard	No
Real-time clock or timer	Standard	Standard	Standard	Standard	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1M	1M	1M	1M	1M
No. of external interrupt levels	8	8	8	8	None
COMMUNICATIONS					
Maximum number of lines	8	16	16	32	8
Synchronous	Opt., 9600 bps	Opt., 9600 bps	Opt., 9600 bps	Opt., 9600 bps	No
Asynchronous	Std., 9600 bps	Std., 9600 bps	Std., 9600 bps	Std., 9600 bps	Std.; 1200 bps
Protocols supported	Bisync	Bisync	Bisync	Bisync	Programmable
Network architectures supported	BFBIN	BFBIN	BFBIN	BFBIN	—
RJE terminals emulated	2780/3780	2780/3780	2780/3780	2780/3780	—
IBM 3270 emulation	No	No	No	No	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	No	1.2MB; dual dr. std.
Disk pack/cartridge drives	Fixed; 14-42MB bytes	Pack; 20-300M bytes	Pack; 35M-300M bytes	Pack; 150-300M bytes	Opt.; 10M-byte Winchester
Drum/fixed-head disk storage	No	—	No	No	No
Magnetic tape cassettes/cartridges	Std.; 9.2M bytes	Std.; 9.2M bytes	Opt.; 9.2M bytes	Opt.; 9.2M bytes	No
Magnetic tape, 1/2-inch	10 KBS	10 KBS	10 KBS	10 KBS	No
Serial printer	120 cps; 160 cps opt.	120 cps	80, 120, 160 cps	80, 120, 160 cps	45-200 cps
Line printer	150, 300, 600 lpm	300 lpm	150, 300, 600 lpm	150, 300, 600 lpm	No
Data communications interface	1200 bps	1200 bps	1200 bps	1200 bps	300-1200 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	24 x 80 char.
Other supported peripheral units	—	—	—	—	No
SOFTWARE					
Assembler	No	No	No	No	B.A.L.
Compilers	Business BASIC	Business BASIC	Business BASIC	Business BASIC	ALPHABASIC
Operating system	Multi-user	Multi-user	Multi-user	Multi-user	Real-time
Language implemented in firmware	No	No	No	No	B.A.L./fully
Operating system implemented in firmware	Partially	Partially	Partially	Partially	Fully
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	32,500 (40K bytes)	44,000 (64K bytes)	51,400 (64K bytes)	95,000 (96K bytes)	\$15,000 to \$25,000
Monthly maint. of basic configuration above for on-site contract, \$	280	—	424	766	150
Discounts available	—	—	—	—	Educ. (15%)
Price of memory increment, \$	2,880 (32K bytes)	2,500 (16K bytes)	2,240 (32K bytes)	2,240 (32K bytes)	\$400 (4K bytes)
Date of first delivery	1978	1980	1978	1978	July 1977
Number installed to date	900 (all models)	9000 (all models)	9000 (all models)	9000 (all models)	125
COMMENTS	Price includes 40KB memory, 14MB fixed disk, 120 cps printer, 9.2MB magnetic tape cartridge drive, and one VDT; 64K bytes (\$4,100) also available		Price includes 64KB memory, 35MB disk drive & pack w/op. sys., 160 cps printer, and one VDT (desk/worktable); 64K bytes (\$4,100), 128K bytes (\$6,600) also available	Price includes 96KB memory, two 75MB disk drives & packs w/op. sys., 300 lpm printer and four VDTs (four desk/worktables); 64K bytes (\$4,100), 128K bytes (\$6,600) also available	Entry-level small business system; price also includes dual floppy disk drives, workstation, cabinet, and desk as standard; software packages available for most business applications

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MANUFACTURER AND MODEL	BRD Porpoise	BTI 5000	Burroughs B80	Burroughs B90	Burroughs B720/B730
WORD LENGTH, BITS	8-bit byte	16	8-bit byte	8-bit byte	64
NO. WORKSTATIONS SUPPORTED	8	32	4	8	9
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.60 4K/32K bytes Standard No Standard	MOS 0.60 64K bytes Standard Yes Standard	MOS 1.0/0.5 60K/128K bytes Standard No Standard	MOS 0.5/0.015 64K/512K bytes Standard No Standard	MOS 1.0/0.5 32K/80K bytes Standard No Standard
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	65.5K EPROM; 12K 5.0 Standard No Standard No No	NA PROM; 98K bits 20 Standard Standard Standard Standard Standard	— ROM; 4K bytes — — Standard	— ROM; 4K bytes — — — — —	— ROM; 3.5K bytes 0.43 No No Standard No No
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 1M None	Standard 61.6K NA	— — —	Standard — —	Standard 2M bytes —
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	8 No Std.; 300 bps Programmable — — —	32 No Std.; to 9600 bps Async No No No	4 To 4800 bps To 9600 bps BDLC, Bisync — None No	4 To 4800 bps To 9600 bps BDLC, Bisync — BNA — No	22 To 9600 bps To 9600 bps BDLC, Bisync — IBM 3780 No
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	622KB; dual dr. std. Opt.; 10M-byte Winchester No No No 30-55 cps No 300 bps 24 x 80 char. No	No Non-remov. pack, 10MB to 468MB No Cart; 10MB Optional No 300, 600, 900 lpm 9600 bps; async 24 x 80 char. None	243K-6M bytes Cartridge; 4.6-27.6M bytes No Cassette; 1 KBS No 60, 180 cps 160, 250 lpm 9600 bps 80 char. x 24 lines —	243K-6M bytes Cartridge; 4.6-27.6M bytes Fixed; 9.4-37.6M bytes Cassette; 1 KBS No 90, 120 cps 250-600 lpm To 9600 bps 24 lines x 80 char. —	243K-6M bytes Cartridge; 36.8M bytes No Cassette; 1 KBS 10 KBS 60 cps 85-400 lpm 9600 bps 80 char. x 24 lines Card punch, card reader/punch
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	B.A.L. ALPHABASIC Real-time B.A.L./fully Fully	No BASIC Time-sharing Partially Partially	No COBOL, RPG, NDL, MPL, DSC Interactive Fully Fully	No COBOL, RPG, NDL, MPL II Multiprogramming Fully Fully	No COBOL, RPG, AEL Real-time Fully Fully
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configu- ration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	\$10,000 to \$15,000 100 Educ. (15%) \$400 (4K bytes) January 1978 25	29,950 365 Quantity None August 1978 3000 (all models)	\$17,520 129 Dollar volume 412 (4K bytes) April 1976 Over 4000	7,900 56 Dollar volume 2,550 (128K bytes) December 1979 NA	26,500 — Dollar volume — March 1973 Over 3000
COMMENTS	Entry-level small business system; price also includes dual floppy disk drives, workstation, cabinet, and desk as standard; software packages available for most business applications	Packaged system includes non- removable and/or pack disk drives, cartridge magnetic tape drives, reel-to- reel tape drives and line printers are standard options; up to 32 users sup- ported; price is for minimum system (ES) configuration	Offers the technol- ogy of Burroughs larger computers	Growth path to the Burroughs' L Series	System price includes console printer; AEL and COBOL or RPG pro- grams can run con- currently

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MANUFACTURER AND MODEL	Burroughs B800 Series	Burroughs B920 Series	Burroughs B1800 Series	Burroughs B1900 Series	CADO Systems Corporation CADO C.A.T.
WORD LENGTH, BITS	64, 16	64	16-bit byte	16-bit byte	8
NO. WORKSTATIONS SUPPORTED	4-10	—	16	—	1
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS; bipolar 1.0/0.5 32K/112K bytes Standard No Standard	MOS 1.0/0.5 640K/1.5M bytes Standard Standard	MOS 1.2 64K/1048K bytes Standard Standard	MOS; bipolar 167-250 ns. 128K/2M bytes No Standard Standard	NMOS 1.3 32K/32K bytes No No No
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	— RAM; to 48K — — No — Standard	— — — — — —	— ROM; 4K bytes — No — Standard	— Cache; 8K bytes — — — —	32K bytes PROM; 4K bytes 3.9 (5 digits) No No Standard No Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 2M bytes —	Standard 2M bytes —	— — —	— — —	Standard 1M bytes —
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	4 To 9600 bps To 9600 bps BDLC, Bisync NDL IBM 3780 No	4 To 9600 bps To 9600 bps BDLC, Bisync	4 to 32 Opt.; to 50,000 bps To 9600 bps Bisync, BDLC, BNA	32 Opt.; to 50,000 bps Opt.; to 9600 bps BDLC, Bisync BNA HASP No	— — — — — — —
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	486K-2M bytes Both; 36.8M-521M bytes No Cassette; 1 KBS 10 KBS 120 cps 85-750 lpm 9600 bps 80 char. x 24 lines Card punch; card reader/punch; DDES	6M-27.6M bytes Both; 9.2M-130.4M bytes Fixed-head; 232M bytes Cassette; 1 KBS 40K bytes 120 cps 250-600 lpm 9600 bps 80 char. x 24 lines	486K-1M bytes Both; 74.4-697M bytes Fixed; 11.8M bytes Cassette; 1 KBS 10-120 KBS No 85-1500 lpm 9600 bps 80 char. x 24 lines Card punch/reader units	243K-1M bytes Pack; 130.4M bytes Fixed; 200M bytes Cassette; 1 KBS 40-120 KBS Optional 320 lpm To 50,000 bps 80 char. x 24 lines Card units, MICR units	1.2-2.4M bytes No No No 150 cps No No 80 char. x 24 lines —
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	No COBOL, RPG, NDL, MPL, AEL Batch, real-time Fully Fully	No COBOL, RPG, NDL, MPL II Batch, real-time Fully Fully	No See Comments Batch, real-time, time-sharing Fully Fully	No See Comments Batch, real-time, time-sharing Partially Partially	No CADOL II* Multi-tasking Partially Partially
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configuration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	35,045 (32K bytes) 198 Dollar volume — Second qtr. 1978 NA	60,500 — Dollar volume 1,350 (64K bytes) October 1980 NA	Contact vendor — — — May 1977 NA	71,500/148,960 410/648 3,450 (128K bytes) First qtr. 1980 NA	13,990 140 Contact vendor — July 1980 NA
COMMENTS		\$2,550 for 128K-byte memory increment	Compilers include COBOL, RPG, AEL, NDL, FORTRAN and BASIC	Compilers include BASIC, COBOL, MIL, SDL, RPG, FORTRAN 77, among others	*CADOL II combines BASIC with a CADO-designed I/O and format control system; includes Just Ask II, an English-like management/inquiry system

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MANUFACTURER AND MODEL	CADO Systems Corporation System 20/22	CADO Systems Corporation System 20/24	CADO Systems Corporation System 20/28	Cascade Data Concept II	Cascade Data Concept III
WORD LENGTH, BITS	8	8	8	16	16
NO. WORKSTATIONS SUPPORTED	1	2	4	16	16
MAIN STORAGE	NMOS	NMOS	NMOS	Core	MOS
Storage type	1.3	1.3	1.3	1.0/0.35	0.5/0.5
Cycle/access time, microseconds	32K/32K bytes	32K/48K bytes	32K/96K bytes	16K/64K	32K/64K
Min./Max. capacity, words	No	No	No	Standard	No
Parity checking	No	No	No	No	No
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR	32K bytes	48K bytes	96K bytes	32K	64
No. of directly addressable words	PROM; 4K bytes	PROM; 4K bytes	PROM; 8K bytes	No	No
Control storage	3.9 (5 digits)	3.9 (5 digits)	3.9 (5 digits)	8.8	7.5 (word)
Add time, microseconds	No	No	No	Standard	No
Hardware multiply/divide	No	No	No	No	No
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	No	No	No	Optional	Optional
Battery backup	Standard	Standard	Standard	Optional	Standard
Real-time clock or timer	Standard	Standard	Standard	Optional	Standard
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Standard
Direct memory access channel	1M bytes	1M bytes	1M bytes	413K	413K
Maximum I/O rate, words/sec.	—	—	—	0	0
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS	—	1	1	—	—
Maximum number of lines	—	To 9600 bps	To 9600 bps	Standard	Standard
Synchronous	—	To 9600 bps	To 9600 bps	Standard	Standard
Asynchronous	—	2770/2780/3780	2770/2780/3780	—	—
Protocols supported	—	—	—	None	None
Network architectures supported	—	2780/3780	2780/3780	None	None
RJE terminals emulated	—	Yes	Yes	No	No
IBM 3270 emulation	—	—	—	No	No
PERIPHERAL EQUIPMENT	1.2-3.6M bytes	2.4-4.8M bytes	2.4-7.2M bytes	No	1.2M bytes
Floppy disk (diskette) drives	Cart.; 52M bytes	Cart.; 52M bytes	Cart.; 52M bytes	Cartridge; 40MK	Cartridge; 40M bytes
Disk pack/cartridge drives	—	—	—	bytes	—
Drum/fixed-head disk storage	Fixed; 76M bytes	Fixed; 76M bytes	Fixed; 76M bytes	No	33-158M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	No	No	No	30-60 KBS	30-60 KBS
Serial printer	150 cps	150 cps	150 cps	55 cps	55 cps
Line printer	300 lpm	300 lpm	300 lpm	125-600 lpm	125-600 lpm
Data communications interface	No	9600 bps	9600 bps	9600 bps	9600 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	—	—	—	Paper tape reader and punch	Paper tape reader and punch, card reader
SOFTWARE	No	No	No	Macro assembler	Macro assembler
Assembler	CADOL II*	CADOL II*	CADOL II*	RPG	RPG
Compilers	Multi-tasking	Multi-user, multi-tasking	Multi-user, multi-tasking	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Operating system	Partially	Partially	Partially	No	No
Language implemented in firmware	Partially	Partially	Partially	No	No
Operating system implemented in firmware	—	—	—	—	—
PRICING & AVAILABILITY	17,330	24,740	45,410	22,200 (32K bytes)	26,900 (16K bytes)
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	170	240	435	—	—
Monthly maint. of basic configuration above for on-site contract, \$	Contact vendor	Contact vendor	Contact vendor	—	—
Discounts available	—	Contact vendor	Contact vendor	1,200 (16K bytes)	2,700 (32K bytes)
Price of memory increment, \$	July 1980	July 1980	July 1980	January 1970	November 1977
Date of first delivery	NA	NA	NA	300	50
Number installed to date	—	—	—	—	—
COMMENTS	*See CADO C.A.T. Comments	*See CADO C.A.T. Comments	*See CADO C.A.T. Comments	Operating system provides 2 partitions; system price includes 32KB CPU, 5MB disk, console CRT, and keyboard	Operating system provides 45 partitions; system price includes 32KB CPU, 5MB disk, and 2,000 char. display

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MANUFACTURER AND MODEL	Cascade Data Concept IV	CDA The Parts Handler DG MP/100	CDA The Parts Handler DG MP/200	CDA The Parts Handler DG Nova 4/C	CDA The Parts Handler DG Nova 4/X
WORD LENGTH, BITS	8	16	16	16	16
NO. WORKSTATIONS SUPPORTED	1 per application	9	9	9	—
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.6/0.2 16K/60K No No No	MOS 960/500 ns. 32K No No No	MOS 840/500 ns. 32K No No No	MOS 400/200 ns. 32K No No No	MOS 400/200 ns. 64K/128K No No Standard
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	64K bytes PROM; to 2K bytes 2.0 (byte) Optional Standard Standard No No	32K NA 5 Optional No No Optional Standard	32K NA 1.6 Optional No No Optional Standard	32K NA .8 Optional No No Optional Optional	128K NA .6 Optional Optional No Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Optional 750K 0	Standard 160K-1M 16	Standard 160K-1.8M 16	Standard 2M bytes 16	Standard 2M bytes 16
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	— Standard Standard — None None No	9 Standard Std.; to 19.2K bps 2780/3780, HASP NA 2780/3780, HASP No	9 Standard Std.; to 19.2K bps 2780/3780, HASP NA 2780/3780, HASP No	9 Standard Std.; to 19.2K bps 2780/3780, HASP NA 2780/3780, HASP No	12 Standard Std.; to 19.2K bps 2780/3780, HASP, X.25 — 2780/3780, HASP No
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	4.8M bytes No No No No 60 cps 125-600 lpm 19.2K bps 80 char. x 24 lines Paper tape reader and punch	Opt.; 1.6M bytes Std.; 10M bytes, opt.; 20M bytes Opt.; 12.5-25M- byte Winchester Opt.; 800/1600 bpi Opt.; 800/1600 bpi Std.; 180 cps Opt.; 300 lpm Std.; 1920 char. Card and paper tape readers	Std.; 1.26M bytes Opt.; 10-20M bytes Std.; 12.5M bytes; opt.; 25M bytes Opt.; 800/1600 bpi Opt.; 800/1600 bpi Std.; 180 cps Opt.; 300 lpm Std.; 1920 char. Card and paper tape readers	Std.; 1.26M bytes Opt.; 10M-2.5B bytes Std.; 12.5M bytes; opt.; 25M bytes Opt.; 800/1600 bpi Opt.; 800/1600 bpi Std.; 180 cps Opt.; 300-1500 lpm Std.; 1920 char. Card and paper tape readers	Std.; 1.26M bytes Opt.; 10M-2.5B bytes Std.; 12.5M bytes; opt.; 16-25M bytes Opt.; 800/1600 bpi Opt.; 800/1600 bpi Std.; 180 cps Opt.; 300-1500 lpm Std.; 1920 char. Card and paper tape readers
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Macro assembler, BASIC No Batch, real-time Partially Partially	Yes COBOL, RPG, BASIC DG/L Real-time, multi-tasking No No	Yes COBOL, RPG, BASIC DG/L Real-time, multi-tasking No No	Yes COBOL, RPG, BASIC DG/L Real-time, multi-tasking No No	Yes COBOL, RPG, BASIC DG/L Real-time, multi-tasking No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configu- ration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	16,900 (32K bytes) — — 1,500 (16K bytes) September 1978 25	29,945 202 4 percent net 3 NA April 1979 40	29,945 204 4 percent net 3 NA September 1980 2	35,945 216 4 percent net 3 NA October 1980 3	50,245 268 4 percent net 3 7,500 (64K) September 1979 3
COMMENTS	Applications com- patible with con- cept II and III; system price includes two appli- cation software packages, 32KB CPU, 2.4MB floppy disk, and 2,000 char. display				

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MANUFACTURER AND MODEL	CDA The Parts Handler DG Eclipse	Centurion 100	Centurion 200	Centurion III	Centurion 6200
WORD LENGTH, BITS	16	8	8	8	8
NO. WORKSTATIONS SUPPORTED	—	4	4	4	8
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	400/200 ns.	0.8/0.2	0.8/0.2	0.8/0.2	0.8/0.2
Min./Max. capacity, words	64K/1024K	16K/64K	16K/64K	32K/64K	64K/256K
Parity checking	Standard	No	No	No	Standard
Error correction	Standard	No	No	No	No
Storage protection	Standard	No	No	No	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	1024K	64K	64K	64K	64K
Control storage	NA	PROM; 7, 512 x 8	PROM; 7, 512 x 8	PROM; 7, 512 x 8	PROM; 14, 1024 x 8
Add time, microseconds	3	3.0	3.0	3.0	1.6
Hardware multiply/divide	Optional	No	No	No	Standard
Hardware floating point	Opt./std.	No	No	No	No
Hardware byte manipulation	No	No	No	No	Standard
Battery backup	Opt./std.	No	No	No	No
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.2-8.5M	1.25M	1.25M	1.25M	1.25M
No. of external interrupt levels	16	0-16	0-16	0-16	0-16
COMMUNICATIONS					
Maximum number of lines	128	3	3	3	7
Synchronous	Standard	No	No	No	Opt.; 1.2-9.6K bps
Asynchronous	Std.; to 19.2K bps	Std.; 300 bps	Std.; 300 bps	Std.; 300 bps	Std.; 300 bps
Protocols supported	2780/3780, HASP, X.25	None	None	None	IBM 3780
Network architectures supported	—	None	None	None	None
RJE terminals emulated	2780/3780, HASP	None	None	None	IBM 2780/3780
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Std.; 1.26M bytes	Std.; 600K-3.6M bytes	No	Opt.; 600K-3.6M bytes	No
Disk pack/cartridge drives	Opt.; 10M-4.3B bytes	No	Both; 10.4-41.6Mbytes	Both; 10.4-83.2M bytes	Std.; (2) 10.4-41.6M bytes
Drum/fixed-head disk storage	Std.; 16-25M-byte Winchester	No	No	No	No
Magnetic tape cassettes/cartridges	Opt.; 1600 bpi	No	No	No	No
Magnetic tape, 1/2-inch	Opt.; 800/1600 bpi	No	No	No	Std.; 1600 bpi
Serial printer	Opt.; 180 cps	Std.; 75 cps-200 lpm	Std.; 75 cps-200 lpm	Std.; 75 cps-200 lpm	Std.; 75 cps-200 lpm
Line printer	Opt.; 300-1500 lpm	300-600 lpm (opt.)	300-600 lpm (opt.)	300-600 lpm (opt.)	Opt.; 300-600 lpm
Data communications interface	—	No	No	No	Std.; 1.2-9.6K bps
CRT	Opt.; 1920 char.	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	Std.; 1920 char.
Other supported peripheral units	Card and paper tape readers	Any RS-232-C	Any RS-232-C	Any RS-232-C	Any RS-232-C
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes	Yes
Compilers	COBOL, RPG, BASIC DG/L	CPL, SMART	CPL, SMART	CPL, SMART	COBOL, BASIC, CPL, SMART
Operating system	Real-time, multi-tasking	Multi-tasking	Multi-tasking	Multi-tasking	Multi-tasking
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	Contact vendor	See Comments	See Comments	See Comments	See Comments
Monthly maint. of basic configuration above for on-site contract, \$	Contact vendor	Set by dealers	Set by dealers	Set by dealers	Set by dealers
Discounts available	4 percent net 3	For dealers 2,400 (32K)	For dealers 2,400 (32K)	For dealers 2,400 (32K)	For dealers 2,400 (32K)
Price of memory increment, \$	Contact vendor				
Date of first delivery	March 1979	Second qtr. 1979	Second qtr. 1979	1975	Fourth qtr. 1979
Number installed to date	2	125	100	1000+	150 (all 6000 Series)
COMMENTS		English-oriented JCL; large selection of applications; basic system includes 32K bytes, 4 ports, two floppy disk drives, a CRT, a 75-cps printer, for \$14,938	English-oriented JCL; large selection of applications; spooled sprint, basic system includes 32K bytes, 4 ports; 10.4M-byte fixed/removable disk drive, a CRT, a 150-cps printer, for \$27,335	English-oriented JCL; large selection of applications; spooled print; basic system includes 32K bytes, 4 ports; 10.4M-byte fixed/removable disk drive, a CRT, a 150-cps printer, for \$30,367	Basic system includes 64K bytes, 4 ports, 10.4M-byte fixed/removable disk drive, a CRT, a 150-cps printer, for \$29,903

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MANUFACTURER AND MODEL	Centurion 6300	Centurion 6400	Centurion 6500	Century Computer X100/X200	Century Computer 300
WORD LENGTH, BITS	8	8	8	16	8, 16
NO. WORKSTATIONS SUPPORTED	32	32	8	32	4
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.8/0.2 64K/256K Standard No Standard	MOS 0.8/0.2 64K/256K Standard No Standard	MOS 0.8/0.2 64K/256K Standard No Standard	MOS .3 256K/956K — Standard No	MOS .4/.2 32K/64K bytes No Standard No
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	64K PROM; 14, 1024 x 8 1.6 Standard No Standard No Standard	64K PROM; 14, 1024 x 8 1.6 Standard No Standard No Standard	64K PROM; 14, 1024 x 8 1.6 Standard No Standard No Standard	556 PROM, 4K 1.2 (16 bits) Standard Standard Standard Standard Optional	64K bytes 4K x 48 1.4 (16 bits) Standard Standard Standard No Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 1.25M 0-16	Standard 1.25M 0-16	Standard 1.25M 0-16	Standard 1.6-2M bytes 16-18	Standard 1.6M bytes 15
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported	31 Opt.; 1.2-9.6K bps Std.; 300 bps IBM 3780	31 Opt.; 1.2-9.6K bps Std.; 300 bps IBM 3780	7 Opt.; 1.2-9.6K bps Std.; 300 bps IBM 3780	32 Std.; 9600 bps Opt.; 19200 bps 2780/3780	8 Opt.; 9600 bps Std.; 19,200 bps Bisync/async
Network architectures supported RJE terminals emulated IBM 3270 emulation	None IBM 2780/3780 No	None IBM 2780/3780 No	None IBM 2780/3780 No	NA 2780/3780 Yes	— 2780/3780 Yes
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, ½-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	Opt.; (3) 600K-3.6MB Std.; (4) 10.4- 83.2M bytes No No Std.; 1600 bpi Std.; 75 cps-200 lpm Opt.; 300-600 lpm Std.; 1.2-9.6K bps Std.; 1920 char. Any RS-232-C	No Std.; (8) 2.65- 635M bytes No No Std.; 1600 bpi Std.; 75 cps-200 lpm Opt.; 300-600 lpm Std.; 1.2-9.6K bps Std.; 1920 char. Any RS-232-C	No Std.; (2) 26.5- 159M bytes No No Std.; 1600 bpi Std.; 75 cps-200 lpm Opt.; 300-600 lpm Std.; 1.2-9.6K bps Std.; 1920 char. Any RS-232-C	No 150-500M bytes No No Yes, 800/1600 bpi 180 cps 300-600 lpm Std.; 2400 bps Std.; 1920 char.	No Both; (10) 320K, 10- 40M bytes No No 36 KBS 165 cps 300 lpm 9600 cps 1920 characters
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Yes COBOL, BASIC, CPL, SMART Multi-tasking No No	Yes COBOL, BASIC, CPL, SMART Multi-tasking No No	Yes COBOL, BASIC, CPL, SMART Multi-tasking No No	Yes BASIC, FORTRAN, PASCAL Real-time Partially No	Assembler and macro assembler BASIC, FORTRAN, PASCAL Real-time No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configura- tion above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	See Comments Set by dealers For dealers 2,400 (32K) Fourth qtr. 1979 150 (all 6000 Series)	See Comments Set by dealers For dealers 2,400 (32K) Fourth qtr. 1980 150 (all 6000 Series)	See Comments Set by dealers For dealers 2,400 (32K) Fourth qtr. 1980 150 (all 6000 Series)	Contact vendor Contact vendor — Contact vendor NA NA	16,500 Contact vendor OEM — June 1975 NA
COMMENTS	Basic system in- cludes 64K bytes, 4 ports, 10.4M- byte fixed/remov- able disk drive, a CRT, a 150-cps printer, for \$32,790	Basic system in- cludes 64K bytes, 4 ports, 26.4M- byte fixed/remov- able disk drive, a CRT, a 150-cps printer, for \$40,299	Basic system in- cludes 64K bytes, 4 ports, 26.4M- byte fixed/remov- able disk drive, a CRT, a 150-cps printer, for \$36,711	Turnkey appli- cations for gen. business, credit unions, CPAs, order entry, in- ventory control, fleet mgt., school administration, and construction	May be upgraded to next size model as the customer needs more capacity; complete turnkey system for gen. business acctg., fleet mgt., credit unions, inv. control, finance, construction, school district acctg.; package works on all models

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MANUFACTURER AND MODEL	Century Computer 400	Century Computer 700	Century Computer 900	Compal 8200	Computer Automation Naked Mini LSI-2 Series
WORD LENGTH, BITS	8, 16	8, 16	8, 16	8	16 + 2
NO. WORKSTATIONS SUPPORTED	8	20	32	1	1
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	Core, MOS
Cycle/access time, microseconds	.4/.2	.4/.2	.4/.2	1.6/0.4	0.85-1.2/0.4-0.6
Min./Max. capacity, words	64K/256K bytes	96K/256K bytes	160K/512K bytes	56K/56K	8K/32K
Parity checking	No	No	No	No	Optional
Error correction	Standard	Standard	Standard	No	Optional
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	64K bytes	64K bytes	64K	32K
Control storage	4K x 48	4K x 48	4K x 48	No	ROM; 512 x 56 bits
Add time, microseconds	1.4 (16 bits)	1.4 (16 bits)	1.4 (16 bits)	5.6	4.12, 2.06
Hardware multiply/divide	Standard	Standard	Standard	No	Standard
Hardware floating point	Standard	Standard	Standard	No	No
Hardware byte manipulation	Standard	Standard	Standard	Yes	Standard
Battery backup	No	No	No	No	Optional
Real-time clock or timer	Standard	Standard	Standard	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	No	Standard
Maximum I/O rate, words/sec.	1.6M bytes	1.6M bytes	1.6M bytes	250K bytes	1M
No. of external interrupt levels	15	15	15	9	3
COMMUNICATIONS					
Maximum number of lines	16	20	32	3	4
Synchronous	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Std.; 110-9600 bps	Opt.; 9600 bps
Asynchronous	Std.; 19,200 bps	Std.; 19,200 bps	Std.; 19,200 bps	Std.; 110-9600 bps	Opt.; 9600 bps
Protocols supported	Bisync/async	Bisync/async	Bisync/async	Async, Bisync	Async
Network architectures supported	—	—	—	—	—
RJE terminals emulated	2780/3780	2780/3780	2780/3780	2780/3780	—
IBM 3270 emulation	Yes	Yes	Yes	No	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	Std.; 630K-2.4MB	243K-972K bytes
Disk pack/cartridge drives	Both; (10) 320K, 150-300M bytes	Both; (10) 640K, 150-300M bytes	Both; (10) 1200K, 300-500M bytes	Opt.; 6-35M bytes	Cartridge; 4.92- 19.68M bytes
Drum/fixed-head disk storage	No	No	No	Opt.; 9-27M bytes	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	36 KBS	36 KBS	36 KBS	No	20 KBS
Serial printer	165 cps	165 cps	165 cps	55, 150 cps	180 cps
Line printer	300 lpm	300-600 lpm	300-600 lpm	No	300-600 lpm
Data communications interface	9600 bps	9600 bps	9600 bps	110-9600 bps	To 9600 bps
CRT	1920 characters	1920 characters	1920 characters	1920 characters	80 char. x 24 lines
Other supported peripheral units	—	—	—	—	Paper tape units
SOFTWARE					
Assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Macro assembler
Compilers	BASIC, FORTRAN, PASCAL	BASIC, FORTRAN, PASCAL	BASIC, FORTRAN, PASCAL	BASIC, COBOL, FORTRAN, PASCAL	FORTRAN, BASIC
Operating system	Real-time	Real-time	Real-time	Real-time	Batch, real-time, multi-tasking
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	Partially	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	26,500	34,000	42,500	12,500	3,295 (2/10 Alpha) 3,645 (2/20 Alpha)
Monthly maint. of basic configuration above for on-site contract, \$	Contact vendor	Contact vendor	Contact vendor	63	—
Discounts available	OEM	OEM	OEM	OEM	Quantity
Price of memory increment, \$	—	—	—	NA	2,100 (32K bytes)
Date of first delivery	June 1975	June 1975	June 1975	November 1979	July 1973
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Additional workstations available; complete turnkey system for gen. business, acctg., fleet mgt., credit unions, inv. control, finance, construction, school district acctg.; package works on all models	See Century Computer 400 Comments	See Century Computer 400 Comments	Price includes turnkey computer systems with one application software package, training, installation, on-going support	ROM/EPROM & RAM/ROM/PROM are available in combination; ROM, PROM, EROM available in max. capacities of 8K, 2K, & 4K words respectively

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MANUFACTURER AND MODEL	Computer Automation Naked Mini 4 Family	Computer Automation Naked Mini 4/95	Computer Automation Scout Naked Mini 4/04	Computer Automation SyFA System 50	Computer Automation SyFA System 300
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	4	32	1	2	4
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	Core, MOS 0.55-0.85/0.3-0.4 4K/64K Optional Optional No	MOS .52 4M No Standard Standard	MOS 1.0/786 16K/64K No No No	MOS 0.7/0.5 32K/32K bytes Standard No No	MOS 0.7/0.5 64K/304K bytes Standard No No
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	64K None 1.5-3.0 Standard Optional Standard Optional Standard	64K — 1.5 Standard Standard Standard No Standard	64K Up to 32K bytes 3.40 Standard Optional Standard Optional Standard	32K ROM; 512 x 32 bits 7.9/4.1 Standard No Standard Optional Standard	32K ROM; 512 x 56 bits 4.1/2.1 Standard No Standard Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Optional 1.8M 4	Standard 1.8M 4	Standard 1M 3	Standard NA NA	Standard NA NA
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported	8 Optional Opt.; 19,200 bps Bisync, SDLC	8 Optional Opt.; 19.2K bps Bisync, SDLC	4 Optional Opt.; 19.2K bps Bisync, SDLC	1 — Opt.; 1200 bps —	5 Std.; 4800 bps Std.; 9600 bps Bisync
Network architectures supported RJE terminals emulated IBM 3270 emulation	— Yes —	— 2780/3780 No	— Yes No	— — No	— IBM 3780 No
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	(1-4) 1M-4M bytes Both; 5-1200M bytes No No 20 KBS 180 cps 300-600 lpm To 19.2K bps 80 char. x 24 lines Paper tape units; A/D & D/A converters, IEE 488	(1-4) 1M-4M bytes 5-1200M bytes No No 20 KBS 180 cps 300-600 lpm To 19.2K bps 80 char. x 24 lines IEE 488	(1-4) 1M-4M bytes No No No No 180 cps 300-600 lpm To 19.2K bytes 80 char. x 24 lines A/D & D/A, relay digital I/O	Standard — No No No 150 cps No No Yes, (1) 1920 char. —	No Both; (4) 880M bytes No No No 150 cps 300, 600 lpm Yes Yes, (2) 1920 char. —
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Assembler & macro assembler FORT., COBOL, PASC., BCPL, CORAL 66 Batch, real-time, multi-tasking No No	Macro assembler FORT., PASC., BCPL, COBOL, CORAL 66 Batch, real-time, multi-tasking No No	Assembler FORTRAN IV, PASC., COB., BCPL, CORAL 66 Real-time, batch, multi-tasking No No	No SYMBOL Time-sharing No No	No SYMBOL Time-sharing No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configuration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	2,075 (4/10 Alpha) 6,635 (4/90 Alpha) — Quantity — June 1977 NA	10,000 (128K bytes) — Quantity 3,500 (128K bytes) June 1980 20	1,020 (32KB RAM) NA Quantity 625 (32K bytes) January 1980 NA	9,925 110 No — 1980 638 (all systems)	36,000 311 No — 1979 638 (all systems)
COMMENTS	All processors include powerfail, auto restart, auto load, and real-time clock capabilities as standard features	High-speed cache, ECC, system/user mode, protection	Each SCOUT board has on the board a self testing diagnostic feature and functions called ISOLITE which execute at power up and under program control	Price includes 1 CRT, 1 floppy disk drive, and 32K bytes of memory	Price includes 2 CRTs, a Bisync controller, a 32MB-disk drive, and 64K bytes of memory

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MANUFACTURER AND MODEL	Computer Automation SyFA System 1000	Computer Automation SyFA System 2000	Computer Automation SyFA System 2500	Computer Designed Systems Adviser IV/700	Computer Designed Systems Adviser IV/800
WORD LENGTH, BITS	16	16	16	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	32	48	64	32	64
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.7/0.5 64K/304K bytes Standard No No	MOS 0.5/0.3 256K/256K bytes Standard Standard No	MOS 0.5/0.3 256K/512K bytes Standard Standard No	Core, MOS .50, .80/.04 16K/8000K Optional Optional Optional	Core, MOS .50, .80/.04 16K/8000K Optional Optional Optional
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	32K ROM; 512 x 56 bits 4.1/2.1 Standard No Standard Optional Standard	32K ROM; 1024 x 40 bits 2.4/0.8 Standard No Standard Optional Standard	32K ROM; 1024 x 40 bits 2.4/0.8 Standard No Standard Optional Standard	64K ROM; 10K x 32 bits 1.05 Standard Optional Standard Optional Optional	64K ROM; 10K x 32 bits 1.05 Standard Optional Standard Optional Optional
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard NA NA	Standard NA NA	Standard NA NA	Standard 1.6M 1-125	Standard 1.6M 1-125
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	34 Opt.; 4800 bps Std.; 9600 bps Bisync, SDLC SNA See Comments Optional	50 Opt.; 4800 bps Std.; 9600 bps Bisync, SDLC SNA See Comments Optional	66 Opt.; 4800 bps Std.; 9600 bps Bisync, SDLC SNA See Comments Optional	32 Opt.; 9600 bps Opt.; 9600 bps 2780, 3780, SNA/ SDLC SNA (opt.) 2780/3780 Optional	32 Opt.; 9600 bps Opt.; 9600 bps 2780, 3780, SNA/ SDLC SNA (opt.) 2780/3780 Optional
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	No Both; (8) 1760M bytes Opt.; (Semiconductor "disk") No Yes 150 cps 300, 600 lpm Yes Yes, (32) 1920 char.	No Both; (8) 1760M bytes Opt.; (Semiconductor "disk") No Yes 150 cps 300, 600 lpm Yes Yes, (48) 1920 char.	No Both; (8) 1760M bytes Opt.; (Semiconductor "disk") No Yes 150 cps 300, 600 lpm Yes Yes, (64) 1920 char.	No Both; 2.4B bytes No No 120 KBS 200 cps 300-1200 lpm To 9600 bps 80 x 24 char. A/D-D/A conv., plotters, graphics	No Both; 2.4B bytes No No 120 KBS 200 cps 300-1200 lpm To 9600 bps 80 x 24 char. A/D-DA conv., plotters, graphics
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	No SYBOL Time-sharing No No	No SYBOL Time-sharing No No	No SYBOL Time-sharing No No	Macro assembler PASCAL, COBOL, BASIC, FORTRAN, Batch, real-time multi-task, interactive Partially Partially	Macro assembler PASCAL, COBOL, BASIC, FORTRAN, Batch, real-time, multi-task, interactive Partially Partially
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configuration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	26,000 220 No — 1976 638 (all systems)	65,000 350 No — 1981 638 (all systems)	Contact vendor Contact vendor No — 1981 638 (all systems)	59,000 (64K) 5,400 Quantity 18,000 (64K) October 1977 NA	82,000 (64K) 5,400 Quantity 18,000 (64K) October 1977 NA
COMMENTS	RJE terminals emulated include IBM 3780, HASP Mod. 20, and SNA PU-Type 2	See System 1000 Comments	See System 1000 Comments	Single source responsibility, field upgradable, virtual mem., min. terminal degradation under load, turnkey systems avail., interactive, direct processing system	Single source responsibility, upgradable, virtual degradation, turnkey avail., interactive, direct processing system

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MANUFACTURER AND MODEL	Computer Hardware Inc. 2130	Computer Hardware Inc. 3230	Computer Hardware Inc. 4210	Computer Hardware Inc. 4250	Computer Hardware Inc. 4800
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	32	32	4	16	4
MAIN STORAGE					
Storage type	MOS, core	MOS	MOS	MOS	Bipolar dynamic
Cycle/access time, microseconds	0.8/0.25	1.6/0.25	0.47/0.3	0.47/0.3	—
Min./Max. capacity, words	8K/2,000K	8K/64K	4K/26K	4K/1024K	16K/128K
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Optional	No	No	Optional	Optional
Storage protection	Standard	Standard	Optional	Optional	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	32K	64K	32K
Control storage	No	No	No	PROM; 11,520 bits	No
Add time, microseconds	1.6	2.7	4.662	3.5	—
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Optional	No	No	No
Hardware byte manipulation	No	No	Standard	Standard	Standard
Battery backup	No	No	No	No	No
Real-time clock or timer	Optional	Optional	Optional	Optional	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.25M	1.25M	—	—	—
No. of external interrupt levels	8	8	8	16	7
COMMUNICATIONS					
Maximum number of lines	32	32	4	16	4
Synchronous	Opt.; 50-9600 bps	Opt.; 50-9600 bps	Opt.; 50-9600 bps	Opt.; 50-9600 bps	Opt.; 50-9600 bps
Asynchronous	Opt.; 50-9600 bps	Opt.; 50-9600 bps	Opt.; 50-9600 bps	Opt.; 50-9600 bps	Opt.; 50-9600 bps
Protocols supported	Bisync	Bisync	Bisync	Bisync	Bisync
Network architectures supported	None	None	None	None	None
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	2780/3780
IBM 3270 emulation	No	No	No	Yes	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	Yes	Yes	1-4M bytes
Disk pack/cartridge drives	Pack; 1600M bytes	Pack; 1600M bytes	No	Cart.; 3M or 10M bytes	No
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	—	—	—	—	Cassette; 10 ips
Magnetic tape, 1/2-inch	Yes	Yes	No	No	No
Serial printer	No	No	30-180 cps	30-180 cps	No
Line printer	300, 600 lpm	300, 600 lpm	300 lpm	300 lpm	84 lpm
Data communications interface	To 4800 bps; synch.	To 4800 bps; synch.	9600 bps	9600 bps	19.2K bps
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	1920 characters
Other supported peripheral units	Card, PT, plotter	Card, PT, plotter	None	None	—
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler	Macro assembler	2-pass
Compilers	COBOL, FORTRAN, RPG	COBOL, FORTRAN, RPG	FORTRAN	BASIC, COBOL, FORTRAN	BASIC, COBOL, FORTRAN
Operating system	Batch, time-sharing	Batch, time-sharing	Real-time	Real-time	Real-time
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	32,000 (16K bytes)	15,000 (16K bytes)	13,200	37,800	8,850
Monthly maint. of basic configuration above for on-site contract, \$	Contact vendor	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Discounts available	Contact vendor	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Price of memory increment, \$	1,500 (16K bytes)	1,500 (16K bytes)	960 (8K bytes)	2,160 (16K bytes)	1,500 (32K bytes)
Date of first delivery	June 1974	April 1976	October 1977	January 1978	October 1979
Number installed to date	NA	NA	NA	NA	NA
COMMENTS			Price includes CPU, two 250K bytes diskettes, cassette, 60 cps printer, operating system, and time system application	Price includes 96K bytes of ECC memory, a 10M byte disk cartridge, cassette, CRT, 60 cps printer, DX10 operating system, FORTRAN compiler, sort/merge, and time system application	Price includes 64K bytes memory, 84 lpm printer, 40 char. display keyboard, two 5-inch diskettes (328K bytes), two RS-232-C operating systems, BASIC, Assembler, and time/attendance application

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MANUFACTURER AND MODEL	Computer Talk Model 400	Computer Talk Model 407	Computer Talk Model 408	Control Data Cyber 18 Series	Data General Eclipse C/150
WORD LENGTH, BITS	16	16	16	16 + 2	16 + 5
NO. WORKSTATIONS SUPPORTED	256	256	256	—	64
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.5, 0.3/0.3, 0.15 16K/512K Standard Standard See Comments	MOS 0.5, 0.3/0.3, 0.15 16K/512K Standard Standard See Comments	MOS 0.5, 0.3/0.3, 0.15 16K/512K Standard Standard See Comments	MOS 75/0.3 16K/256K bytes Standard Optional Standard	Core, MOS 0.8, 0.5, 0.7/0.4 64K/512K No Standard Standard
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	32K; 512K PROM; 1K words 1.0 Standard Standard Standard Standard Standard with date	32K; 512K PROM; 1K words 1.0 Standard Standard Standard Standard Standard with date	32K; 512K PROM; 1K words 1.0 Standard Standard Standard Standard Standard with date	64K ROM/RAM; 8K 0.95 Standard No Standard No Standard	32K ROM; 2K x 56 bits 0.6 Standard Standard Standard Standard Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 1M 1-256	Standard 1M 1-256	Standard 1M 1-256	Standard 1.2M 16	Standard 1.25M 16
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	256 Opt.; 50-9600 bps Opt.; 50-9600 bps Async, Bisync, SDLC None Most RJE terminals Yes	256 Opt.; 50-9600 bps Opt.; 50-9600 bps Async, Bisync, SDLC None Most RJE terminals Yes	256 Opt.; 50-9600 bps Opt.; 50-9600 bps Async., Bisync., SDLC None Most RJE terminals Yes	— Opt.; 4800 bps Opt.; 9600 bps None None 2780/3780, HASP No	— Opt.; 56000 bps Opt.; 9600 bps Bisyn., X.25 X.25 2780/3780, HASP Yes
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	110K-10,240K bytes Both; 1.2M-1 billion bytes Moving-head; 30M bytes 30-800 cps; 4 KBS 5-120 KBS 10-200 cps 220-600 lpm 50-9600; 56K 96 char. x 32 lines Digitizers, plotters, factory automation equipment	110K bytes Both; 1.2M-1 billion bytes Moving-head; 30M bytes 30-800 cps; 4 KBS 50-120 KBS 10-200 cps 300 lpm 50-9600; 56K 96 char. x 32 lines Digitizers, plotters, factory automation equipment	110K-10240K bytes Both; 1.2M-1 billion bytes Moving-head; 30M bytes 100 cps; 50 KBS 50-120 KBS 10-200 cps 300 lpm 50-9600; 56K 96 char. x 32 lines Digitizers, plotters, factory automation equipment	280K-560K bytes Both; 8-400M bytes No 80K bps 180 cps 300, 600, 900 lpm Up to 9600 bps 1920 characters Macro assembler	315K-2.5M bytes Pack & cartridge; 10-1520M bytes Fixed-head; 1-16M bytes No 10-72 KBS 180 cps 300-900 lpm 56,000 bps 80 char. x 24 lines Modular digital & analog data control & acq. subsys. opt.
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Assembler and macro assembler BASIC, FORTRAN, APL Batch, real-time, time-sharing Partially Partially	Assembler and macro assembler BASIC, FORTRAN, APL Batch, real-time, time-sharing Partially Partially	Assembler and macro assembler BASIC, FORTRAN, APL Batch, real-time, time-sharing Partially Partially	Macro assembler FORTRAN, COBOL, RPG Batch, real-time, time-sharing No No	Assembler & macro assembler COBOL, BASIC, RPG II, FORTRAN, PL/1, DG/L Batch, real-time, time-sharing, multipro. No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configuration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	28,700 (16K MOS) — Volume 2,530 (16K words) May 1975 NA	36,225 (16K MOS) — Volume 2,530 (16K words) January 1978 NA	37,030 (16K MOS) — Volume 2,530 (16K words) January 1978 NA	13,700-15,300 — Quantity 3,000 (32K bytes) 6,000 (64K bytes) May 1976 NA	34,000 (128K bytes) 285 Various type 6,000 (64K bytes) February 1979 NA
COMMENTS	Storage protection std. by memory partition and opt. by page; mapping to 512K opt.; 4K PROM opt.; on low power, memory is stored on disk; price includes CRT, light pen, modem, 1.2M-byte disk, arith. & I/O processors, & battery pack operation	Expanded Model 400 with additional features; disk expanded to 30M bytes, 300-lpm x 132 printer and mini-floppy disk for I/O	Expanded Model 400 with additional features; disk expanded to 30M bytes, 300-lpm x 132 printer and mini-cassette for I/O	System includes RPG System 3 compatibility; comm. package available for IBM 2780/3780, HASP, and CDC 200 UT	C/150 AOS compatible with C/350 and M/600 AOS systems

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MANUFACTURER AND MODEL	Data General Eclipse C/300	Data General Eclipse C/330	Data General Eclipse C/350	Data General Eclipse M/600	Data General Eclipse S/130
WORD LENGTH, BITS	16	16	16 + 5	16 + 5	16 + 5
NO. WORKSTATIONS SUPPORTED	64	64	64	64	64
MAIN STORAGE					
Storage type	Core	Core, MOS	Core, MOS	Core, MOS	Core, MOS
Cycle/access time, microseconds	0.8/NA	0.8, 0.5/NA	0.8, 0.7/0.5	0.8, 0.7/0.5	0.8, 0.7/0.5
Min./Max. capacity, words	32K/256K bytes	64K/512K bytes	32K/1024K	32K/1024K	16K/512K
Parity checking	No	No	No	No	No
Error correction	Optional	Standard	Standard	Standard	Standard
Storage protection	Optional	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	—	32K	32K	32K	64K
Control storage	ROM; 2K x 56 bits	ROM; 2K x 56 bits	ROM; 2K x 56 bits	ROM; 2K x 56 bits	PROM/ RAM
Add time, microseconds	0.6	0.6	0.6	0.6	0.6
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Standard	Standard	Standard	Standard	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Optional
Battery backup	—	—	No	No	Optional
Real-time clock or timer	—	—	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.25M	1.25M	1.25M/5.0M	1.25M/5.0M	1.25M
No. of external interrupt levels	16	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56000 bps	Opt.; 56000 bps	Opt.; 56000 bps
Asynchronous	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps
Protocols supported	Bisync, X.25	Bisync, X.25	bisync., X.25	Bisync., X.25	Bisync., X.25
Network architectures supported	X.25	X.25	X.25	X.25	X.25
RJE terminals emulated	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP
IBM 3270 emulation	Yes	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	315K-2.5M bytes	315K-2.5M bytes	315K-2.5M bytes	315K-2.5M bytes	315K-2.5M bytes
Disk pack/cartridge drives	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 10-6080M bytes	Pack & cartridge; 10-1520M bytes
Drum/fixed-head disk storage	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	10-72KBS	10-72KBS	10-72 KBS	10-72 KBS	10-72 KBS
Serial printer	180 cps	180 cps	180 cps	180 cps	180 cps
Line printer	300-900 lpm	300-900 lpm	300-900 lpm	300-900 lpm	300-900 lpm
Data communications interface	56,000 bps	56,000 bps	56,000 bps max.	56,000 bps max.	56,000 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	Plotters, card readers, paper tape units	Plotters, card readers, paper tape units	Modular digital & analog data control & acq. subsys. opt.	Modular digital & analog data control & acq. subsys. opt.	Modular digital & analog data control & acq. subsys. opt.
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	COBOL, RPGII, BASIC, FORTRAN, ALGOL	COBOL, RPGII, BASIC, FORT., ALGOL, PL/1	COBOL, BASIC, RPG II, FORT., PL/1, ALG.	COBOL, BASIC, RPG II, FORTRAN, PL/1	FORTRAN, BASIC, ALGOL
Operating system	Multi-terminal, batch, real-time	Batch, real-time, multi-terminal	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	30,700 (32KB Core)	33,000 (64KB Core)	49,500 (128K bytes)	80,000 (256K bytes)	16,500 (128K bytes)
Monthly maint. of basic configura- tion above for on-site contract, \$	269	280	330	470	105
Discounts available	Various types	Various types	Various types	Various type	Various type
Price of memory increment, \$	4,500 (32KB Core)	4,500 (32KB Core)	6,000 (64K MOS)	8,000 (256K bytes)	4,500 (32K core)
Date of first delivery	March 1975	August 1976	October 1978	April 1978	March 1977
Number installed to date	NA	NA	NA	NA	1000+ (all models)
COMMENTS	Includes Extended Arithmetic Processor (EAP)	Includes Extended Arithmetic Processor (EAP)	Standard features in- clude extended floating-point func- tions, and a com- mercial instruction set; a 10MB/second Burst Multiplexer Channel is optional	Includes I/O proc- essor with 64KB for handling low-speed character-oriented data movement; a 10MB/second Burst Multiplexer channel is optional; supports a variety of data base management systems and the AZ-TEXT WP package	1K 56-bit words of Writable Control Storage (WCS) optionally available

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MANUFACTURER AND MODEL	Data General Eclipse S/140	Data General Eclipse S/230	Data General Eclipse S/250	Data General Nova 3/4	Data General Nova 3/12
WORD LENGTH, BITS	16 + 5	16 + 5	16	16	16
NO. WORKSTATIONS SUPPORTED	64	64	64	—	—
MAIN STORAGE	MOS	Core, MOS	Core, MOS	Core, MOS	Core, MOS
Storage type	0.4/0.2	0.8, 0.7/0.5	0.8/0.4	0.8/0.4	0.8/0.4
Cycle/access time, microseconds	64K/512K	32K/512K bytes	64K/1024K bytes	8K/32K	8K/128K
Min./Max. capacity, words	No	No	Standard	Optional	Optional
Parity checking	Standard	Opt.(Core),Std. (MOS)	Standard	Standard	Standard
Error correction	Standard	Standard	Standard	—	Optional
Storage protection					
CENTRAL PROCESSOR					
No. of directly addressable words	32K	32K	32K	32K	32K
Control storage	ROM; 2K x 56 bits	ROM; 2K x 56 bits	PROM; 2K x 56 bits	—	—
Add time, microseconds	0.2	0.2	—	0.7	0.7
Hardware multiply/divide	Standard	Standard	Standard	Optional	Optional
Hardware floating point	Optional	Standard	Standard	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Standard	—	—	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1M	NA	1.25M/5M	1.1M	1.1M
No. of external interrupt levels	16	NA	16	16	16
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	Opt.; 56,000 bps	Opt.; 56,000 bps	Opt.; 56,000 bps	Opt.; 56,000 bps	Opt.; 56,000 bps
Asynchronous	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps
Protocols supported	Bisync., X.25	Bisync., X.25	Bisync., X.25	Bisync., X.25	Bisync., X.25
Network architectures supported	X.25	X.25	X.25	X.25	X.25
RJE terminals emulated	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP
IBM 3270 emulation	Yes	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	315K-2.5M bytes	315K-2.5M bytes	315K-2.5M bytes	315K-1.26M bytes	315K-1.26M bytes
Disk pack/cartridge drives	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 40-190M bytes	Pack & cartridge; 40-190M bytes
Drum/fixed-head disk storage	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Fixed-head; 1-8M bytes	Fixed-head; 1-8M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	10-72K bps	10-72K bps	10-72K bps	42-120 KBS	42-120 KBS
Serial printer	180 cps	30-60 cps	180 cps	180 cps	180 cps
Line printer	300-900 lpm	300-900 lpm	300-900 lpm	300-900 lpm	300-900 lpm
Data communications interface	56,000 bps	56,000 bps	56,000 bps	56,000 bps	56,000 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	Modular digital & analog data control & acq. subsys. opt.	Paper tape units, card readers, plotters	Modular digital & analog data control & acq. subsys. opt.	Plotters, paper tape units, card readers, teleterminals	Plotters, paper tape units, card readers, teleterminals
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	COBOL, PL/1, PASC, BASIC, FORTRAN, DG/L	FORTRAN, BASIC, PL/1, ALGOL	FORTRAN, BASIC, ALGOL, DG/L, PL/1	FORTRAN, BASIC, ALGOL	FORTRAN, BASIC, ALGOL
Operating system	Batch, real-time, time-sharing	Real-time, batch, time-sharing	Real-time, batch, time-sharing	Real-time, batch, time-sharing	Real-time, batch, time-sharing
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	17,300 (128K bytes)	17,000 (32KB Core)	31,500 (64K bytes)	4,080 (8K Core)	5,180 (8K Core)
Monthly maint. of basic configuration above for on-site contract, \$	110	145	297	50	56
Discounts available	Various types	Various types	Various types	Various types	Various types
Price of memory increment, \$	5,250 (128K bytes)	6,000 (64K bytes)	6,000 (64K bytes)	2,205 (8K Core)	2,205 (8K Core)
Date of first delivery	November 1979	September 1976	August 1978	April 1976	April 1976
Number installed to date	NA	NA	NA	40,000 (all Nova models)	40,000 (all Nova models)
COMMENTS	Includes AZ-TEXT word processing package	256 56-bit words of Writable Control Storage (WCS) optionally available	Options include a high-speed Burst Multiplexer Channel (BMC), and Integral Array Processor, a Character Instruction Set, and a Writable or Fixed User Control Storage		

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MANUFACTURER AND MODEL	Data General Nova 3/D	Data General Nova 4C	Data General Nova 4S	Data General Nova 4X	Datapoint 1500
WORD LENGTH, BITS	16	16	16	16	8-bit byte
NO. WORKSTATIONS SUPPORTED	—	64	64	64	4
MAIN STORAGE					
Storage type	Core, MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.8/0.4	.40	—	—	0.65/0.3
Min./Max. capacity, words	32K/128K	16K/32K	16K/32K	16K/128K	32K/64K bytes
Parity checking	Standard	No	No	No	Standard
Error correction	Standard	No	No	No	Standard
Storage protection	Standard	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	32K	1K	1K	1K	60K bytes
Control storage	—	No	No	No	ROM; 4K bytes
Add time, microseconds	0.7	0.2	0.2	0.2	1.8
Hardware multiply/divide	Optional	Optional	Optional	Optional	No
Hardware floating point	Optional	No	Optional	Optional	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	—
Battery backup	Standard	Optional	Optional	Optional	No
Real-time clock or timer	Optional	Optional	Standard	Standard	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	No
Maximum I/O rate, words/sec.	1.1M	1M	1M	1M	250K
No. of external interrupt levels	16	16	16	16	—
COMMUNICATIONS					
Maximum number of lines	—	128	128	128	—
Synchronous	Opt.; 56,000 bps	Opt.; (32) 56K bps	Opt.; (32) 56K bps	Opt.; (32) 56K bps	—
Asynchronous	Opt.; 9600 bps	Opt.; (128) 19200 bps	Opt.; (128) 19200 bps	Opt.; (128) 19200 bps	Up to 4800 bps
Protocols supported	Bisync, X.25	Bisync., X.25	Bisync., X.25	Bisync., X.25	Bisync, TTY, Async
Network architectures supported	X.25	XODIAC, IBM BSC	XODIAC, IBM BSC	XODIAC, IBM BSC	—
RJE terminals emulated	2780/3780, HASP	2780/3780, HASP II	2780/3780, HASP II	2780/3780, HASP II	IBM 2780/3780
IBM 3270 emulation	Yes	No	No	No	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	315K-1.26M bytes	Yes	Yes	Yes	512K-1M bytes
Disk pack/cartridge drives	Pack & cartridge 40-190M bytes	Yes	Yes	Yes	10-40M bytes
Drum/fixed-head disk storage	Fixed-head; 1-8M bytes	Yes	Yes	Yes	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	42-120 KBS	Yes	Yes	Yes	No
Serial printer	180 cps	Yes	Yes	Yes	160 cps
Line printer	300-900 lpm	Yes	Yes	Yes	No
Data communications interface	56,000 bps	Yes	Yes	Yes	Up to 4800 bps
CRT	80 char. x 24 lines	Yes	Yes	Yes	80 char. x 24 lines
Other supported peripheral units	Plotters, paper tape units, card readers, teleterminals	Digital & analog, data control sub-system	Digital & analog, data control sub-system	Digital & analog, data control sub-system	—
SOFTWARE					
Assembler	Assembler & macro assembler	Yes	Yes	Yes	Yes
Compilers	FORTRAN, BASIC, ALGOL	BASIC, FORTRAN, ALGOL	BASIC, FORTRAN, ALGOL	BASIC, FORTRAN, ALGOL	DATABUS, DATAFORM, BASIC, FORT.
Operating system	Real-time, batch, time-sharing	Real-time, RDOS, multi-tasking	Real-time, RDOS, multi-tasking	Real-time, RDOS, multi-tasking	Batch, stand-alone multi-tasking
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	13,230 (32KB Core)	2,940 (32K bytes)	6,090 (32K bytes)	10,920 (128K bytes)	7,075
Monthly maint. of basic configuration above for on-site contract, \$	135	47	59	82	67
Discounts available	Various types	—	—	—	Quantity
Price of memory increment, \$	2,205 (8K Core)	—	2,310 (32K bytes)	5,250 (128K bytes)	675 (32K bytes)
Date of first delivery	November 1976	1979	1979	1979	October 1977
Number installed to date	40,000 (all Nova models)	40,000 (all Nova models)	40,000 (all Nova models)	40,000 (all Nova models)	4000
COMMENTS					Price includes 32K bytes, 512K-byte dual diskette, 1 CRT, and 1 communications interface; DATASHARE compiler also supported

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MANUFACTURER AND MODEL	Datapoint 1800/3800	Datapoint 6600	Datapoint 8800	Dataram BM-1	Dataram BM-2
WORD LENGTH, BITS	8-bit byte	8-bit byte	16-bit byte	16	16
NO. WORKSTATIONS SUPPORTED	9	24	24	—	—
MAIN STORAGE	MOS	MOS	MOS	Core, MOS	Core, MOS
Storage type	0.63	0.6/0.2	400 ns.	1.2/1.2	1.2/1.2
Cycle/access time, microseconds	64K/128K bytes	64K/256K bytes	256K/1024K bytes	120K/120K bytes	8K/128K bytes
Min./Max. capacity, words	Standard	Standard	Standard	No	No
Parity checking	Standard	Standard	Standard	No	No
Error correction	Standard	Standard	Standard	No	No
Storage protection	Standard	Standard	Standard	No	No
CENTRAL PROCESSOR	60K bytes	256K bytes	1024K bytes	128K	128K
No. of directly addressable words	ROM/RAM; 4KB	ROM; 4K bytes	PROM; 8K bytes	ROM, 1K; PROM, 1K	ROM, 1K; PROM, 1K
Control storage	3.8	1.15	.47	3.5	3.5
Add time, microseconds	No	Standard	Standard	Optional	Optional
Hardware multiply/divide	—	No	No	Optional	Optional
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	No; auto restart	No	No	No	No
Battery backup	Standard	No	No	Optional	Optional
Real-time clock or timer	Standard	No	No	Optional	Optional
INPUT/OUTPUT CONTROL	Standard	No	Standard	Standard	Standard
Direct memory access channel	Instr.-dependent	125K	1.2M bytes	833K	833K
Maximum I/O rate, words/sec.	4	—	8	Variable	Variable
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS	—	—	—	—	—
Maximum number of lines	—	Standard	Std.; 9.6K bps	—	—
Synchronous	—	Standard	Std.; 56K bps	—	—
Asynchronous	—	2780/3780	DATAPOLL, 2780/3780, HASP	—	—
Protocols supported	Bisync, TTY, Async	—	ARC	—	—
Network architectures supported	ARC (3800)	ARC	2780/3780	—	—
RJE terminals emulated	2780/3780, HASP	See Comments	ARC	—	—
IBM 3270 emulation	—	Yes	No	—	—
PERIPHERAL EQUIPMENT	2M bytes (dual-den.)	No	No	No	No
Floppy disk (diskette) drives	10-40M bytes	Both; 2.5-200M bytes	Std.; 67M bytes	No	No
Disk pack/cartridge drives	No	No	Std.; 135M bytes	No	No
Drum/fixed-head disk storage	No	Cassette; 352 cps	Cassette	No	No
Magnetic tape cassettes/cartridges	No	—	—	No	No
Magnetic tape, 1/2-inch	560-1600 bpi; 7-9 trk.	9.6-20 KBS	9.6-20KBS	No	No
Serial printer	160 cps	45-160 cps	45-180 cps	No	No
Line printer	300, 600, 900 lpm	300, 600, 900 lpm	300, 600, 900 lpm	No	No
Data communications interface	Up to 9600 bps	Up to 9600 bps	To 56K bps	No	No
CRT	80 char. x 24 lines	80 char. x 12 lines	Std.; 1920 char.	No	No
Other supported peripheral units	Serial printers, belt printers	Card reader, tape reader	Card reader, tape reader	1-megabyte BULK-CORE storage is standard	4-megabyte BULK SEMI is standard
SOFTWARE	Macro assembler	Yes	Yes	Assembler, macro assembler	Assembler, macro assembler
Assembler	—	—	—	NA	BASIC, FORTRAN
Compilers	COBOL, BASIC, RPG-PLUS, FORTRAN	COBOL, RPG, DATASHARE	DATASHARE, COBOL, RPG	Batch, real-time	Batch, real-time
Operating system	Batch, interactive, real-time, virtual	Batch, real-time multi-tasking	Batch, real-time, multi-tasking	No	No
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	Partially	No	No	No	No
PRICING & AVAILABILITY	10,975	Contact vendor	Contact vendor	9,865 (64KB memory + 256KB BULK CORE)	11,865 (64KB mem. + 512KB BULK SEMI)
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	107	—	—	NA	NA
Monthly maint. of basic configuration above for on-site contract, \$	Quantity	—	—	Quantity	Quantity
Discounts available	1,500 (64K bytes)	—	—	595 (32K bytes)	595 (32K bytes)
Price of memory increment, \$	August 1978	July 1977	Second qtr. 1981	November 1978	December 1979
Date of first delivery	3000	NA	NA	NA	NA
Number installed to date	Price includes 64K bytes, 1M byte dual diskette, one CRT, and one communications interface; 3800 utilizes ARC networking system; DATASHARE compiler also supported	RJE terminals emulated include TTY, 2780/3780, 2770, 3770, RES, Univac DCT 2000, UNISCOPE 200, Honeywell 6-115, VIP 7700; CDC UT 200, HASP, Burroughs STD POLL SELECT, & NEW LINE RJE	—	—	—
COMMENTS	—	—	—	—	—

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MANUFACTURER AND MODEL	Digital Equipment PDP-8/A	Digital Equipment PDP-11/03L	Digital Equipment PDP-11/23	Digital Equipment PDP-11/34A	Digital Equipment PDP-11/44
WORD LENGTH, BITS	12	16	16 + 2	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	—	—	—	—	—
MAIN STORAGE					
Storage type	Core; MOS	MOS	MOS	Core, MOS	MOS/cache
Cycle/access time, microseconds	1.2; 1.5; 2.4, 0.6;	1.2	0.5	0.98; 0.725/0.51	0.48, 0.96/0.48
Min./Max. capacity, words	8K/128K	32K/64K	128K/256K bytes	16K/124K	256K/1M bytes
Parity checking	No	No	No	Standard	No
Error correction	No	No	No	No	Standard
Storage protection	No	No	No	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	256	32K	64K bytes	32K	32K
Control storage	—	ROM; PROM; 1K	—	—	No
Add time, microseconds	3.0-3.8	3.5	1.72	2.03	0.87
Hardware multiply/divide	Optional	Standard	Standard	Optional	Standard
Hardware floating point	Optional	Standard	Standard	Optional	Optional
Hardware byte manipulation	No	Standard	Standard	Standard	Standard
Battery backup	Optional	No	No	Optional	Optional
Real-time clock or timer	Optional	Optional	Optional	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	74K	1.67M bytes	—	—	1M
No. of external interrupt levels	1-64	Variable	Variable	Variable	4
COMMUNICATIONS					
Maximum number of lines	20	—	—	—	—
Synchronous	No	Up to 1M bps	Up to 1M bps	Up to 1M bps	Up to 1M bps
Asynchronous	To 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps
Protocols supported	—	DDCMP, DNA	DDCMP, DNA	DDCMP, DNA	DDCMP, DNA
Network architectures supported	—	DECnet	DECnet	DECnet	DECnet
RJE terminals emulated	Any RS-232-C	Control Data, Univac	Control Data, Univac	Control Data, Univac	Control Data, Univac
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	128K-2M (12-bit)	256K-512K bytes	256K-512K bytes	256K-512K bytes	256K-512K bytes
Disk pack/cartridge drives	Cart.; 5.2M-80.2M (12-bit)	Cartridge; 5.2M-10.4M bytes	Cart.; 5.2-10.4M bytes	Cart. & pack; 2.5-1408M bytes	Both; 2.5-1408M bytes
Drum/ fixed-head disk storage	No	No	No	Fixed-head; 512K-8M bytes	Fixed-head; 512K-8M bytes
Magnetic tape cassettes/cartridges	Cassette; 562 cps	Cassette; 562 cps	Cassette; 562 cps	Cassette; 562 cps	Cassette; 562 cps
Magnetic tape, 1/2-inch	10-36 KBS	No	No	10-72 KBS	10-72 KBS
Serial printer	30-960 cps	180 cps	180 cps	30-180 cps	30-180 cps
Line printer	230 lpm	300-600 lpm	300-600 lpm	230-1200 lpm	230-1200 lpm
Data communications interface	110-71K bps	50-56,000 bps	50-56,000 bps	50-56,000 bps	50-56,000 bps
CRT	—	—	—	—	80 char. x 24 lines
Other supported peripheral units	Paper tape reader, paper tape punch	Serial line and parallel line controllers	—	Paper tape reader; paper tape punch	Paper tape units
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	BASIC, DIBOL, FORTRAN	BASIC, FORTRAN	BASIC, FORTRAN, COBOL	BASIC, FORTRAN, COBOL, FOCAL	BASIC, FORTRAN, COBOL, APL, CORAL
Operating system	Batch, real-time, time-sharing	Batch, real-time	Batch, real-time, multi-user	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	4,750	4,300 (32K MOS)	7,600 (128K bytes)	12,800 (32K MOS)	28,300 (256K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	57	46	92	94	160
Discounts available	—	—	—	—	—
Price of memory increment, \$	2,500 (8K bytes)	1,050 (32K bytes)	1,200 (64K bytes)	2,200 (32K bytes)	6,000 (256K bytes)
Date of first delivery	September 1974	NA	1979	March 1976	June 1980
Number installed to date	Over 40,000	Over 15,000	Over 4000	Over 750	NA
COMMENTS	Also available in packaged version called Datasystem 310; hardware configuration is software dependent; all prices subject to change	LSI-11 bus; uses LSI-11 microprocessor	LSI-11 bus; uses LSI-11/23 microprocessor	Uses similar technology to PDP-11/04; includes memory management for greater addressing capability; packaged version called Datasystem 530 is also available	Optional CIS processor & 1M byte memory increment (\$20,000) available; enhanced main-table features and an intelligent console subsystem

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MANUFACTURER AND MODEL	Digital Equipment PDP-11/60	Digital Equipment PDP-11/70	Digital Scientific 5020	Digital Scientific 5030	Digital Systems Galaxy/3
WORD LENGTH, BITS	16 + 2	16 + 2	16 + 2	16 + 2	8 to 20
NO. WORKSTATIONS SUPPORTED	—	—	16	32	15
MAIN STORAGE					
Storage type	Core, MOS	Core	MOS	Core, MOS	MOS
Cycle/access time, microseconds	0.98/—	0.98/0.36	0.5	0.35	.50/.50
Min./Max. capacity, words	128K/256K	64K/1024K	8K/64K	128K/2M	96K/128K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Standard (MOS)	No	No	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard	Optional
CENTRAL PROCESSOR					
No. of directly addressable words	32K	32K	64K	64K	128K bytes
Control storage	RAM; 1K words	—	PROM	PROM	PROM; 512 x 40
Add time, microseconds	2.2	0.30-1.20	1.44	1.14	.30
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Standard	Optional	Optional	Optional	No
Hardware byte manipulation	Standard	Standard	No	No	Standard
Battery backup	No	No	No	Optional	Optional
Real-time clock or timer	Standard	Standard	Optional	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	—	2.9M	1M-2M	3M	200K
No. of external interrupt levels	Variable	Variable	6	6	15
COMMUNICATIONS					
Maximum number of lines	—	—	—	64	15
Synchronous	Up to 1M bps	Up to 1M bps	2	3	Std.; to 15,000 bps
Asynchronous	Up to 9600 bps	Up to 9600 bps	16	64	Std.; to 9,600 bps
Protocols supported	DDCMP, DNA	DDCMP, DNA	3780, Bisync, HASP	3780, Bisync, HASP	Programmable
Network architectures supported	DECnet	DECnet	No	Opt.; SDLC, HDLC	None
RJE terminals emulated	Control Data, Univac	Control Data, Univac	2780, 3780, 3740	2780, 3780, 3740	None
IBM 3270 emulation	—	—	No	Optional	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	256K-512K bytes	256K-512K bytes	Yes	Yes	No
Disk pack/cartridge drives	Cart. & pk.; 2.5-1408M bytes	Cart. & pk.; 2.5-1408M bytes	Both; 1-160M bytes	Both; 1-160M bytes	Cartridge; 27M bytes/drive
Drum/fixed-head disk storage	Fixed-head; 512K-8M bytes	Fixed-head; 512K-8M bytes	Fixed; 1-2M bytes	Fixed; 1-2M bytes	No
Magnetic tape cassettes/cartridges	Cassette; 562 cps	Cassette; 562 cps	No	No	No
Magnetic tape, 1/2-inch	10-72 KBS	10-72 KBS	30, 60 KBS	30, 60 KBS	1600 bpi
Serial printer	30-180 cps	30-180 cps	180 cps	180 cps	No
Line printer	230-1200 lpm	230-1200 lpm	300, 600 lpm	300, 600 lpm	300, 600, 900 lpm
Data communications interface	50-56,000 bps	50-56,000 bps	Up to 19,300 bps	Up to 19,200 bps	110 to 9600 bps
CRT	80 char. x 24 lines	—	24 x 80 char.	24 x 80 char.	80 char. x 24 lines
Other supported peripheral units	Paper tape reader, paper tape punch	Paper tape reader, paper tape punch	Paper tape reader/punch, XY plotter	Paper tape reader/punch, XY plotter	15 port async., multiplexer, 360/370 interface
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Yes
Compilers	BASIC, FORTRAN, COBOL	BASIC, FORTRAN, COBOL, FOCAL	COBOL, RPG II, APL, BASIC, FORTRAN	COBOL, RPG II, APL, BASIC, FORTRAN	RPG II, BASIC/5, PL/G, COBOL
Operating system	Real-time, inter., time-sharing	Real-time, inter., time-sharing	Batch, time-sharing	Batch, time-sharing, multiprogramming	Time-sharing
Language implemented in firmware	No	No	No	Partially	Partially
Operating system implemented in firmware	No	No	No	No	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	61,600 (128K MOS)	84,500 (512K core)	24,500	39,600	28,700
Monthly maint. of basic configuration above for on-site contract, \$	385	361	222	433	200
Discounts available	—	—	Quantity	Quantity	On request
Price of memory increment, \$	6,650 (64K core)	18,590 (128K core)	1,800/2,000 (8KB)	1,800/2,000 (8KB)	3,400 (32K bytes)
Date of first delivery	June 1977	NA	NA	NA	June 1979
Number installed to date	—	NA	NA	NA	5
COMMENTS	Includes user-accessible microprogramming; error-correcting memory; includes LA DECwriter 120 and dual RL01s floppy disk drives	Uses same technology as PDP-11/45 and includes 2048 bytes of cache memory for increased performance; disk storage & mag tape periph. avail. in packaged system called Data-system 570; includes an LA DECwriter 120	Up to 8 concurrent users in a mixed conversational batch mode; expandable to Model 5030	Up to 64 concurrent users in a mixed conversational and batch mode; attached processor available	In-cabinet, on-site upgrades available on all configurations; Galaxy/3 is a multiple microprocessor system; DMA channel and communications interface are both microprocessor-based

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MANUFACTURER AND MODEL	Digital Systems Galaxy/5	Dimis, Inc. Total 100 (10)	Dimis, Inc. Total 100 (30)	Dimis, Inc. Total 100 (70)	Display Data Corporation in * sight
WORD LENGTH, BITS	8 to 20	16	16	16	8
NO. WORKSTATIONS SUPPORTED	60	8	27	50	32
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	.50/.50	.6	250/250	250/250	1.00/0.35
Min./Max. capacity, words	128K/1024K bytes	128K	128K/512K	128K/4096K	64K/128K
Parity checking	Standard	Standard	Standard	Standard	—
Error correction	Standard	Standard	Standard	Standard	—
Storage protection	Optional	Standard	Standard	Standard	—
CENTRAL PROCESSOR					
No. of directly addressable words	1024K bytes	64K	64K	64K	—
Control storage	PROM; 1024 x 40	No	No	No	—
Add time, microseconds	.30	1.5	0.3	0.2	4.6
Hardware multiply/divide	Standard	Standard	Standard	Standard	—
Hardware floating point	No	Standard	Standard	Standard	—
Hardware byte manipulation	Standard	Standard	Standard	Standard	—
Battery backup	Optional	Standard	Optional	Optional	—
Real-time clock or timer	Standard	Standard	Standard	Standard	—
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	—
Maximum I/O rate, words/sec.	200K	800K	2-8M	4-8M	—
No. of external interrupt levels	60	To 128	To 128	To 128	—
COMMUNICATIONS					
Maximum number of lines	120	32	32	32	32
Synchronous	Std.; to 15,000 bps	Optional	Optional	Optional	No
Asynchronous	Std.; to 9,600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Std.; 9600 bps
Protocols supported	Programmable	Programmable	Programmable	Programmable	Async, X3.25
Network architectures supported	None	—	—	—	None
RJE terminals emulated	None	No	No	No	None
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	Optional	Optional	Optional	No
Disk pack/cartridge drives	Pack; 80M bytes/drive	Both; (4) 200M bytes	Both; (4) 200M bytes	Both; (4) 200M bytes	Cart.; 10-40M bytes
Drum/fixed-head disk storage	No	Optional	Optional	Optional	No
Magnetic tape cassettes/cartridges	No	No	No	No	Opt.; 10, 20 KBS
Magnetic tape, 1/2-inch	1600 bpi	Yes	Yes	Yes	—
Serial printer	No	Optional	Optional	Optional	Std.; 120 cps
Line printer	300, 600, 900 lpm	300 lpm	600 lpm	600 lpm	Opt.; 150-1100 lpm
Data communications interface	110 to 9600 bps	36 KBS	36 KBS	36 KBS	Std.; 9600 bps
CRT	80 char. x 24 lines	24 x 80 char.	24 x 80 char.	24 x 80 char.	Std.; 24 x 80 char.
Other supported peripheral units	15 port async., multiplexer, 360/370 interface	A/D, D/A converters, discrete I/O and memory	A/D, D/A converters, discrete I/O and memory	A/D, D/A converters, discrete I/O and memory	None
SOFTWARE					
Assembler	Yes	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Yes
Compilers	RPG II, BASIC/5, PL/G, COBOL	FORTRAN	FORTRAN	FORTRAN	No
Operating system	Time-sharing	Batch, real-time	Batch, real-time	Batch, real-time	—
Language implemented in firmware	Partially	No	No	No	Fully
Operating system implemented in firmware	Partially	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	44,930	110,000	165,000	220,000	29,700
Monthly maint. of basic configuration above for on-site contract, \$	315	—	—	—	274
Discounts available	On request	—	—	—	Quantity
Price of memory increment, \$	6,200 (64K bytes)	—	10,500 (128K bytes)	36,000 (512K bytes)	5,000 (64K bytes)
Date of first delivery	August 1976	October 1980	June 1974	December 1978	January 1974
Number installed to date	30	4	22*	19	1,200
COMMENTS	In-cabinet, on-site upgrades available on all configurations; Galaxy/5 is a multiple microprocessor system; DMA channel and communications interface are both microprocessor-based	One CRT (std.); package includes staff & mgmt. training & conversion support; available on a rental basis; system price includes all application software	Three CRTs standard; package includes staff & mgmt., training & conversion support; *includes compatible Mod-comp II; system price includes all applications software	Three CRTs standard; package includes staff & mgmt., training & conversion support; system price includes all applications software	Specialists in complete turnkey systems, support, forms, & maintenance for selected businesses

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MANUFACTURER AND MODEL	Durango Systems Inc. F-85	Four-Phase IV/40	Four-Phase IV/50	Four-Phase IV/70	Four-Phase IV/90
WORD LENGTH, BITS	8-bit byte	24	24	24	24
NO. WORKSTATIONS SUPPORTED	5	16	24	32	32
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.50/0.25	2.0	2.0	2.0	0.8
Min./Max. capacity, words	64K/128K	24K/96K bytes	24K/96K bytes	24K/96K bytes	96K/384K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	No	No	No	No	Standard
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	96K bytes	96K bytes	96K bytes	96K bytes
Control storage	EPROM; 2K-8K	ROM; 1K x 48 bits	ROM; 1K x 48 bits	ROM; 1K x 48 bits	ROM; 1K x 48 bits
Add time, microseconds	1.33	16	16	16	12
Hardware multiply/divide	No	Standard	Standard	Standard	Standard
Hardware floating point	No	Standard	Standard	Standard	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	—	—	—	—
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	No	No	No	No
Maximum I/O rate, words/sec.	750K	125K	125K	125K	125K
No. of external interrupt levels	8	8	8	8	8
COMMUNICATIONS					
Maximum number of lines	5	2	8	32	32
Synchronous	Opt.; (1) to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps
Asynchronous	Opt.; (4) to 9600 bps	Up to 2400 bps	Up to 2400 bps	Up to 2400 bps	Up to 2400 bps
Protocols supported	Bisync, async	Async, bisync	Async, bisync	Async, bisync	Bisync, async
Network architectures supported	—	SNA	SNA/SDLC	SNA/SDLC	SNA/SDLC
RJE terminals emulated	2780/3780	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP
IBM 3270 emulation	Yes	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	500K-4M bytes	354K bytes	354K bytes	—	—
Disk pack/cartridge drives	Cart.; 12-24M bytes	Cart.; 2.5-10M bytes	Cart.; 2.5M-270M bytes	Pack & cartridge; 2.5M-270M bytes	Pack & Cartridge; 2.5M-780M bytes
Drum/fixed-head disk storage	No	10-20M bytes	12.5M bytes	10-20M bytes	10-20M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	No	No	No	10, 60 KBS	10, 60 KBS
Serial printer	165 cps; 9 pin	55 cps	55 cps	55 cps	55 cps
Line printer	No	120-1000 lpm	120-1000 lpm	120-1000 lpm	120-1000 lpm
Data communications interface	Up to 9600 bps	Up to 9600 bps	9600 bps	Up to 9600 bps	Up to 9600 bps
CRT	24 lines x 80 char.	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	—	None	None	None	None
SOFTWARE					
Assembler	No	Yes	Yes	Yes	Yes
Compilers	Star BASIC	COBOL, RPG	COBOL, RPG	COBOL, RPG	COBOL, RPG
Operating system	Batch, real-time, multiprogramming	IDOS, DOS	IDOS, DOS	IDOS, DOS, MFE	IDOS, DOS, MFE
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	11,975	37,440 (24K bytes)	69,330	72,315 (48K bytes)	1,930/month (42 month lease)
Monthly maint. of basic configuration above for on-site contract, \$	107	166	349 (approx.)	—	—
Discounts available	Quantity	—	—	—	—
Price of memory increment, \$	2,500 (64K)	—	—	—	—
Date of first delivery	December 1978	June 1973	April 1976	February 1971	July 1977
Number installed to date	2200	10,000 (all sys.)	10,000 (all sys.)	10,000 (all sys.)	10,000 (all sys.)
COMMENTS	Totally integrated desktop small business system; emphasis on packaged applications software; system price includes two 473K-byte diskette drives, CRT, keyboard, & printer; does not include system software (\$550)	System price also includes 4 CRTs, 2.5-megabyte disk drive, and bisync communications controller		System price also includes 12 CRTs, 2.5-megabyte disk drive, and 9-track magnetic tape drive	System price also includes 12 CRTs, 2.5-megabyte disk drive, and 9-track magnetic tape drive

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MANUFACTURER AND MODEL	Functional Automation F6401	Functional Automation F6420	Functional Automation F6424	Functional Automation F6430	Functional Automation F6440
WORD LENGTH, BITS	64	8, 32	8, 32	8, 16, 32	8, 32
NO. WORKSTATIONS SUPPORTED	0	8	32	0	0
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.25/0.25	0.5/0.5	0.5/0.5	0.5/0.5	0.5/0.5
Min./Max. capacity, words	32K/2048K	256K/16,384K	256K/16,384K	256K/16,384K	256K/16,384K
Parity checking	Optional	Optional	Optional	Optional	Optional
Error correction	Optional	Optional	Optional	Optional	Optional
Storage protection	Standard	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	16,384K bytes	16,384K bytes	16,384K bytes	16,384K bytes	16,384K bytes
Control storage	ROM/ PROM;	ROM/ EPROM;	ROM/ EPROM	ROM/ EPROM	ROM/ EPROM;
Add time, microseconds	0.25	3.0	3.0	3.0	3.0
Hardware multiply/divide	No	No	No	No	No
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Standard	No	No	No	No
Battery backup	Optional	Optional	Optional	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	No	No	Standard	Standard
Maximum I/O rate, words/sec.	2.66M bps	8 x 9600 bps	32 x 1200 bps	2.66M bps	1.25M bps
No. of external interrupt levels	None	None	None	None	None
COMMUNICATIONS					
Maximum number of lines	1	8	32	2	2
Synchronous	Std.; 8M bps	—	—	—	—
Asynchronous	No	Std.; 19,200 bps	Std.; 19,200K bps	No	No
Protocols supported	FABUS	FABUS	FABUS	FABUS	FABUS
Network architectures supported	FABUS	FABUS	FABUS	FABUS	FABUS
RJE terminals emulated	None	None	None	None	None
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	—	—	—	—	—
Disk pack/ cartridge drives	—	—	—	—	Std.; (8) 600M bytes
Drum/ fixed-head disk storage	—	—	—	—	—
Magnetic tape cassettes/ cartridges	—	Cart.; 2M bytes	Cart.; 2M bytes	—	Cart.; 2M bytes
Magnetic tape, 1/2-inch	—	—	—	—	—
Serial printer	—	—	—	—	—
Line printer	—	Std.; 300 lpm	Std.; 300 lpm	—	—
Data communications interface	—	(8) 19,200 bps	(32) 19,200 bps	—	300/9600 bps
CRT	—	3,168 chars.	132 char. x 24 lines	—	3,168 chars.
Other supported peripheral units	—	Programmable controllers	Programmable controllers	—	—
SOFTWARE					
Assembler	Assembler/loader	Yes	Yes	Yes	Yes
Compilers	None	FASL	FASL	FASL	FASL
Operating system	Real-time	Real-time, multi-user	Real-time, multi-user	Real-time	Real-time
Language implemented in firmware	Partially	Partially	Partially	Partially	Fully
Operating system implemented in firmware	Fully	Partially	Partially	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	38,822	19,572	21,952	20,952	23,452
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	Quantity, 20%	Quantity, 20%	Quantity, 20%	Quantity, 20%	Quantity, 20%
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	1981	November 1979	1980	1981	1980
Number installed to date	NA	8	2	NA	3
COMMENTS	Interfaces with other computers in modular system; intended for OEM market	Interfaces via FABUS to other computers in network; intended for OEM market	Interfaces via FABUS to other computers in network; intended for OEM market	Interfaces via FABUS to other computers in network; intended for OEM market	Interfaces via FABUS to other computers in network; intended for OEM market

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MANUFACTURER AND MODEL	General Automation Solution Series GA-16/110	General Automation Solution Series GA-16/220	General Automation Solution Series GA-16/230	General Automation Solution Series GA-16/240	General Automation Solution Series GA-16/440
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	16	16	16	16	16
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 1/5 16K/64K Standard No Optional	MOS 1/5 16K/64K Standard No Optional	MOS 1/5 16K/64K Standard No Optional	MOS 1/5 16K/256K Standard Standard Optional	Core 1/24 32K/1M Optional No Optional
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	64K 4K RAM; 6K EPROM 2.1 Standard Optional Standard Optional Standard	64K 4K RAM; 6K EPROM 2.1 Standard Optional Standard Optional Standard	64K ROM, 1.2K bytes 2.1 Standard Optional Standard Optional Standard	64K ROM, 1.2K bytes 2.1 Standard Optional Standard Optional Standard	64K ROM, 2K bytes 1.9 Standard Optional Standard No Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	No 2M DMT Unlimited, vectored	Standard 1M DMA Unlimited, vectored	Standard .8M Unlimited, vectored	Standard .8M Unlimited, vectored	Standard 1.1M Unlimited, vectored
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	See Comments Opt.; to 9600 bps Opt.; to 9600 bps 2780/3780, SDLC, multiplexers AUTONET 2780/3780, HASP Yes	See Comments Opt.; to 9600 bps Opt.; to 9600 bps 2780/3780, SDLC, multiplexers AUTONET 2780/3780, HASP Yes	See Comments Opt.; to 9600 bps Opt.; to 9600 bps 2780/3780, SDLC, multiplexers AUTONET 2780/3780, HASP Yes	See Comments Opt.; to 9600 bps Opt.; to 9600 bps 2780/3780, SDLC, multiplexers AUTONET 2780/3780, HASP Yes	See Comments Opt.; to 9600 bps Opt.; to 9600 bps 2780/3780, SDLC, multiplexers AUTONET 2780/3780, HASP Yes
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	No Opt.; (1-4) 10M bytes Opt.; (1-8) 80MB, opt.; (1-8) 300MB No Yes (1-4) 72KBS Opt.; (1-2) 165 cps Opt.; 300-600 lpm Opt.; 38.4K-2.4M bps Opt.; (1-16) 1920 ch. Punch card reader	Opt.; (1-4) .6MB Opt.; (1-4) 10M bytes Opt.; (1-8) 80MB, opt.; (1-8) 300MB No Yes (1-4) 72KBS Opt.; (1-2) 165 cps Opt.; 300-600 lpm Opt.; 38.4K-2.4M bps Opt.; (1-16) 1920 ch. Punch card reader	Opt.; (1-4) .6MB Opt.; (1-4) 10M bytes Opt.; (1-8) 80MB, opt.; (1-8) 300MB No Yes (1-4) 72KBS Opt.; (1-2) 165 cps Opt.; 300-600 lpm Opt.; 38.4K-2.4M bps Opt.; (1-16) 1920 ch. Punch card reader	Opt.; (1-4) .6MB Opt.; (1-4) 10M bytes Opt.; (1-8) 80MB, opt.; (1-8) 300MB No Yes (1-4) 72KBS Opt.; (1-2) 165 cps Opt.; 300-600 lpm Opt.; 38.4K-2.4M bps Opt.; (1-16) 1920 ch. Punch card reader	Opt.; (1-4) .6MB Opt.; (1-4) 10M bytes Opt.; (1-8) 80MB, opt.; (1-8) 300MB No Yes (1-4) 72KBS Opt.; (1-2) 165 cps Opt.; 300-600 lpm Opt.; 38.4K-2.4M bps Opt.; (1-16) 1920 ch. Punch card reader
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Macro assembler COBOL, BASIC, FORTRAN Batch No Partially	Macro assembler COBOL, BASIC, FORTRAN Batch, real-time, foreground./background. No Partially	Macro assembler COBOL, BASIC, FORTRAN Batch, real-time, foreground./background. No Partially	Macro assembler COBOL, BASIC, FORTRAN Batch, real-time, foreground./background. No Partially	Macro assembler COBOL, BASIC, FORTRAN Batch, real-time, foreground./background. No Partially
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configuration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	3,275 None Quantity, 5-40% 1,500 (32K) December 1975 3,250	3,600 43 Quantity, 5-40% 1,500 (32K) January 1976 4,290	7,325 147 Quantity, 5-40% — May 1980 200	9,000 126 Quantity, 5-40% 3,250 (128K) May 1980 200	12,000 108 Quantity, 5-40% 4,000 (32K core) June 1975 1800
COMMENTS	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds

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MANUFACTURER AND MODEL	General Automation Solution Series GA-16/460	General Automation Solution Series GA-16/470	General Automation Solution Series GA-16/480	General Robotics Polaris	General Robotics Gemini
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	16	16	16	Variable	Variable
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	1/.24	1/.24	1/.24	0.45/0.30	0.45/0.30
Min./Max. capacity, words	32K/1M	64K/64K	128K/1M	32K/32K	32K/128K
Parity checking	Standard	Standard	Standard	No	No
Error correction	Optional	Standard	Standard	No	No
Storage protection	Optional	Optional	Optional	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	64K	32K	32K/128K
Control storage	ROM, 2K bytes	ROM, 2K bytes	ROM, 2K bytes	PROM; 512 x 16	PROM; 512 x 16
Add time, microseconds	.85	.85	8.5	3.5	3.5
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Optional	Optional	Standard	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Standard	Standard	Standard	No	No
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.1M DMA	1.1M DMA	1.1M DMA	833K	833K
No. of external interrupt levels	Unlimited, vectored	Unlimited, vectored	Unlimited, vectored	Variable	Variable
COMMUNICATIONS					
Maximum number of lines	See Comments	See Comments	See Comments	Variable	Variable
Synchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Optional	Optional
Asynchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Standard	Standard
Protocols supported	2780/3780, SDLC, multiplexers	2780/3780, SDLC, multiplexers	2780/3780, SDLC, multiplexers	—	—
Network architectures supported	AUTONET	AUTONET	AUTONET	DECnet	DECnet
RJE terminals emulated	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	IBM 2780	IBM 2780
IBM 3270 emulation	Yes	Yes	Yes	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Opt.; (1-4) .6MB	Opt.; (1-4) .6MB	Opt.; (1-4) .6MB	1M bytes	2.5M bytes
Disk pack/cartridge drives	Opt.; (1-4) 10M bytes	Opt.; (1-4) 10M bytes	Opt.; (1-4) 10M bytes	Optional	Optional
Drum/fixed-head disk storage	Opt.; (1-8) 80MB, opt.; (1-8) 300MB	Opt.; (1-8) 80MB, opt.; (1-8) 300MB	Opt.; (1-8) 80MB, opt.; (1-8) 300MB	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	Yes (1-4) 72KBS	Yes (1-4) 72KBS	Yes (1-4) 72KBS	No	No
Serial printer	Opt.; (1-2) 165 cps	Opt.; (1-2) 165 cps	Opt.; (1-2) 165 cps	110 cps	No
Line printer	Opt.; 300-600 lpm	Opt.; 300-600 lpm	Opt.; 300-600 lpm	No	No
Data communications interface	Opt.; 38.4K-2.4M bps	Opt.; 38.4K-2.4M bps	Opt.; 38.4K-2.4M bps	Optional	Optional
CRT	Opt.; (1-16) 1920 ch.	Opt.; (1-16) 1920 ch.	Opt.; (1-16) 1920 ch.	480 characters	No
Other supported peripheral units	Paper tape reader & punch card reader	Paper tape reader & punch card reader	Paper tape & punch card reader	None	None
SOFTWARE					
Assembler	Macro assembler	Macro assembler	Macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	COBOL, BASIC, FORTRAN	COBOL, BASIC, FORTRAN	COBOL, BASIC, FORTRAN	FORTRAN, BASIC, APL, DIBOL	FORTRAN, BASIC, APL, DIBOL
Operating system	Batch, real-time, foreground./background.	Batch, real-time, foreground./background.	Batch, real-time, foreground./background.	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	Partially	Partially	Partially	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	15,000	16,000	20,500	12,000	9,500
Monthly maint. of basic configuration above for on-site contract, \$	134	131	168	—	—
Discounts available	Quantity, 5-40%	Quantity, 5-40%	Quantity, 5-40%	OEM	Yes
Price of memory increment, \$	3,500 (64K), 6,250 (128K)	—	3,250 (128K), 7,500 (256K ECC)	—	1,000
Date of first delivery	May 1978	August 1980	August 1980	January 1978	January 1978
Number installed to date	870	180	340	100	210
COMMENTS	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Up to 256 lines with 1800 bps, and 96 lines with 9600 bps communications speeds	Complete desktop LSI-11 computer system with keyboard, screen, printer, CPU, and disks in self-contained unit	Based on the DEC LSI-11

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MANUFACTURER AND MODEL	General Robotics Tristar	General Robotics Pegasus	Harris 80	Harris 100	Hewlett-Packard General Systems Division HP 250
WORD LENGTH, BITS	16	16	24	24	16
NO. WORKSTATIONS SUPPORTED	Variable	Variable	Appl. dependent	Appl. dependent	6
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.45/0.30	0.45/0.30	0.40/0.29	0.40/0.29	0.833
Min./Max. capacity, words	32K/128K	32K/128K	192K/768K bytes	192K/768K bytes	192K/576K bytes
Parity checking	No	No	No	No	Standard
Error correction	No	No	Standard	Standard	No
Storage protection	No	No	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	32K/128K	32K/128K	96K bytes	96K bytes	32K
Control storage	PROM; 512 x 16	PROM; 512 x 16	No	No	—
Add time, microseconds	3.5	3.5	0.6	0.6	1.6
Hardware multiply/divide	Standard	Standard	Standard	Standard	No
Hardware floating point	Standard	Standard	Optional	Optional	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	Optional	Optional	No
Real-time clock or timer	Standard	Standard	Optional	Optional	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Optional	Optional	Standard
Maximum I/O rate, words/sec.	833K	833K	To 19M bps	To 19M bps	1.2M bytes
No. of external interrupt levels	Variable	Variable	8-24	8-24	2.0
COMMUNICATIONS					
Maximum number of lines	Variable	Variable	32	32	6
Synchronous	Optional	Optional	Opt.; 56K bps	Opt.; 56K bps	Opt.; to 19.2K bps
Asynchronous	Standard	Standard	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 110-9600 bps
Protocols supported	—	—	—	Async, bisync	Async, bisync
Network architectures supported	DECnet	DECnet	None	None	HP DSN
RJE terminals emulated	IBM 2780	IBM 2780	See Comments	See Comments	2780/3780
IBM 3270 emulation	—	—	Yes	Yes	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	3.8M bytes	Optional	No	No	Std.; 1 x 1.2M
Disk pack/cartridge drives	Optional	20M/90M bytes	Std.; 80M bytes opt.; 124B bytes	Opt.; 40M-124B bytes	Opt.; 20-40M bytes
Drum/fixed-head disk storage	No	No	No	No	Opt.; 12M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	No	No	469K bps	469K bps	No
Serial printer	No	No	Opt.; 165 cps	Opt.; 165 cps	30, 180 cps
Line printer	No	No	Opt.; 240-1200 lpm	240-1200 lpm	400 lpm
Data communications interface	Optional	Optional	56K bps	56K bps	Up to 19.2K bps
CRT	No	No	1920 characters	1920 characters	80 char. x 24 lines
Other supported peripheral units	None	None	—	Printer/plotters	—
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Macro assembler	Macro assembler	No
Compilers	FORTRAN, BASIC, APL, DIBOL	FORTRAN, BASIC, APL, DIBOL	FORTRAN, APL, RPG II, COBOL, BASIC	FORTRAN, BASIC, APL, COBOL, RPG II	Business BASIC, see Comments
Operating system	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Real-time, time-sharing	Real-time, batch, time-sharing	Interactive, see Comments
Language implemented in firmware	No	No	No	No	See Comments
Operating system implemented in firmware	No	No	No	No	See Comments
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	11,000	17,500	69,950 (912K bytes)	45,000 (192K bytes)	17,000
Monthly maint. of basic configuration above for on-site contract, \$	—	—	Special quote	Special quote	90
Discounts available	Yes	Yes	Yes	Yes	OEM, volume
Price of memory increment, \$	1,000	1,000	7,300 (192K bytes)	7,300 (192K bytes)	2,500 (128K bytes)
Date of first delivery	June 1978	November 1977	First qtr. 1981	First qtr. 1977	September 1978
Number installed to date	220	180	NA	NA	NA
COMMENTS	Based on the DEC LSI-11	Based on the DEC LSI-11	RJE terminals emulated; 2780/3780, HASP workstation, UT-200, U-1004	RJE terminals emulated; 2780/3780, HASP workstation, UT-200, U-1004	BASIC statements are semi-compiled when entered, and are executed interpretively; the OS is entirely implemented as BASIC extensions; Language/Operating System is resident in RAM as if it were fully implemented in firmware

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MANUFACTURER AND MODEL	Hewlett-Packard General Systems Division HP 300	Hewlett-Packard HP 1000 E Series	Hewlett-Packard HP 1000 F Series	Hewlett-Packard HP 1000 L Series	Hewlett-Packard HP 1000 M Series
WORD LENGTH, BITS	16	16 + 1	16 + 1	16 + 1	16 + 1
NO. WORKSTATIONS SUPPORTED	16	64	64	64	64
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.5/0.43 128K/512M bytes Standard Standard Standard	MOS 0.60, 0.35 64K/2048K bytes Standard Optional Optional	MOS 0.35 64K/1024K bytes Standard Optional Optional	MOS — 64K/512K bytes Standard No Standard	MOS 0.65 64K/2048K bytes Standard Optional Optional
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	640M ROM; 6K x 32 1.98 Standard Standard Standard Standard Standard	2K PROM/RAM; 16K 1.19 Standard Firmware Standard Optional Optional	2K PROM/RAM; 16K 0.91 Standard Firmware Standard Optional Optional	2K — 4.5 Standard No Standard Standard Standard	2K PROM/RAM; 4K 1.9 Standard Firmware Standard Optional Optional
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 1.2M bytes 0.5	Optional 1140K 54	Optional 1140K 50	Standard 2.7M bps 21	Optional 616K 54
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	16 No Opt.; to 9600 bps None	56 Opt.; to 19.2K bps Opt.; to 2.5M bps Bisync, async, HDLC	56 Opt.; to 19.2K bps Opt.; to 2.5M bps Bisync, async, HDLC	56 Opt.; to 19.2K bps Opt.; to 2M bps Async, bisync, HDLC	56 Opt.; to 19.2K bps Opt.; to 2.5M bps Bisync, async, HDLC
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	1M byte Opt.; to 480M bytes Std.; 12M bytes No	0.5-2M bytes Both; 960M bytes Std.; 12M bytes No	0.5-2M bytes Both; to 960M bytes Std.; 12M bytes No	0.5-2M bytes Both; to 960M bytes Std.; 12M bytes —	0.5-2M bytes Both; to 960M bytes Std.; 12M bytes No
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	SL/300 BASIC, RPG, FORTRAN Batch, multi-task, multiprogramming Partially Partially	Assembler & micro assembler FORTRAN, BASIC, PASCAL Real-time, DBMS, time-sharing Partially Partially	Assembler & micro assembler FORTRAN, BASIC, PASCAL Real-time, DBMS time-sharing Partially Partially	Assembler & micro assembler FORTRAN, BASIC, PASCAL Real-time, DBMS time-sharing Partially Partially	Assembler & micro assembler FORTRAN, BASIC, PASCAL Real-time, DBMS time-sharing No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configura- tion above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	35,000-63,000 153-245 OEM, volume 2,500 (128K words) December 1978 NA	9,100 (64K bytes) 74 OEM & end-user qty. 4,500 (128K bytes) November 1976 NA	14,000 (64K bytes) 109 OEM & end-user qty. 4,500 (128K bytes) July 1978 NA	4,450 (64K bytes) 25 OEM & end-user only 2,500 (128K bytes) March 1980 NA	7,700 (64K bytes) 71 OEM & end-user qty. 3,900 (128K bytes) May 1974 NA
COMMENTS		HP1000 Model 20 & Model 40 packaged systems include E-Series; DS/1000 & DATACAP/100 support; E-Series also available as board computer	HP1000 Model 25 & Model 45 packaged systems include F-Series; DS/1000 & DATACAP/100 support; F-Series scientific instruction set provides high performance transcendentals; optional vector instruction set provides high performance matrix operations		M-Series processor supports DS/1000, high-level networking software; factory data capture software (DATACAP /1000) supported; M-Series also available as a board computer

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MANUFACTURER AND MODEL	Hewlett-Packard HP 3000 Series 30	Hewlett-Packard HP 3000 Series 33	Hewlett-Packard HP 3000 Series III	Hewlett-Packard HP 3000 Series 44	Honeywell Level 6 Model 23
WORD LENGTH, BITS	16	16	16	16	16 + 2
NO. WORKSTATIONS SUPPORTED	48	48	96	96	16
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS .86/.43 256K/1024K bytes Standard Standard Standard	MOS .86/.43 256K/1024K bytes Standard Standard Standard	MOS .70/.35 256K/2048K bytes Standard Standard Standard	MOS .60/.30 1024K/4096KB Standard Standard Standard	MOS 1.0 16K/64K Standard No No
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	32K (64K bytes) ROM; 10K x 16 bits — Standard Standard Standard Standard Standard	32K (64K bytes) ROM; 10K x 16 bits — Standard Standard Standard Standard Standard	32K (64K bytes) ROM; 10K x 32 bits — Standard Standard Standard Standard Standard	32K (64K bytes) ROM; 12K x 48 bits — Standard Standard Standard Standard Standard	64K ROM; 1K x 48 bits 3.5 Standard No Standard Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 2M 120	Standard 2M 120	Standard 2.86M 124	Standard 2M 120	Standard 900KW 64
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	Sync.; 3 Opt.; (3) 56K bps Std.; (4) 9600 bps Bisync, 2780/3780, TTY HP-DSN 2780/3780, HASP, Yes	Sync.; 7 Opt.; (7) 56K bps Std.; (4) 9600 bps Bisync, 2780/3780, TTY HP-DSN 2780/3780, HASP, Yes	Sync.; 9 Opt.; (2) 2.5M bps Std.; (16) 2400 bps Bisync, 2780/3780, TTY HP-DSN HASP2,JES 2-3,ASP Yes	Sync.; 7 Opt.; (7) 56K bps Std.; (4) 9600 bps Bisync, 2780/3780, TTY HP-DSN HASP2,JES 2-3,ASP Yes	16 (any mixture) Opt.; 50-9600 bps Opt.; 50-9600 bps Bisync, VIP, TTY, async — 2780/3780, HASP Yes
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	Opt.; 1.2M bytes Cart.; 20M bytes pack; 50, 120M bytes No — 75K bps 180 cps 300-1000 lpm Opt.; 9600 bps 1920 characters Graphics terminal, 4-color plotter, laser printer	Opt.; 1.2M bytes Cart.; 20M bytes pack; 50, 120M bytes No — 75K bps 180 cps 300-1000 lpm Opt.; 9600 bps 1920 characters Graphics terminal, 4-color plotters, laser printer	No Pack; 50, 120M bytes No — 75K bps 180 cps 300-1000 lpm Opt.; 9600 bps 1920 characters Graphic terminal, 4-color plotters	Opt.; 1.2M bytes Cart.; 20M bytes pack; 50, 120M bytes No — 75K bps 180 cps 300-1000 lpm Opt.; 9600 bps 1920 characters Graphic terminal, 4-color plotters, laser printer	4 x 256/512K bytes Cart.; 4 x 26/80M bytes No No 30-160 cps 240-900 lpm 50-9600 bps 960,1920,2000 char. —
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction proc. Partially Partially	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction proc. Partially Partially	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction proc. Partially Partially	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction proc. Partially Partially	Assembler and macro preprocessor COBOL, FORTRAN, RPG Multiprogramming, trans. processing No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configu- ration above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	24,925 (256K bytes) 220 Quantity, OEM 5,000 (256K bytes) October 1979 5,900 (all sys.)	36,700 (256K bytes) 250 Quantity, OEM 5,000 (256K bytes) October 1978 5,900 (all sys.)	60,545 (256K bytes) 409 Quantity, OEM 3,750 (256K bytes) June 1978 5,900 (all sys.)	73,100 (1024 KB) 231 Quantity, OEM 10,000 (512K bytes) January 1981 5,900 (all sys.)	4,800 52 Yes 2,525 (32K words) 1978 NA
COMMENTS	Entry-level HP3000 system; operates as a stand-alone system or as a station in a distributed processing network; upgradeable software compatible common operating system; other RJE terminals emulated: JES 2-3	Entry-level HP 3000 system; operates as a stand-alone sys. or as a station in a proc. network; expanded I/O and comm. capabilities; upgradeable software compatible, common operating sys.; other RJE terminals emulated: JES 2-3	Mid-range HP 3000 system; simultaneously handles transaction processing, data communications, on-line program development, and batch processing; upgradeable software compatible, common operating system	High-performance HP 3000 system; optimized for throughput; simultaneously handles trans. prog., data comm., on-line program development, and batch proc. essing; upgradeable software compatible, common operating system	

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MANUFACTURER AND MODEL	Honeywell Level 6 Model 33	Honeywell Level 6 Model 43	Honeywell Level 6 Model 47	Honeywell Level 6 Model 53	Honeywell Level 6 Model 57
WORD LENGTH, BITS	16 + 2, + 6	16 + 2, + 6	16 + 2, + 6	16 + 2, + 6	16 + 2, + 6
NO. WORKSTATIONS SUPPORTED	No practical limit	No practical limit	No practical limit	No practical limit	No practical limit
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.65 or 0.55 16K/64K words Standard Optional No	MOS 0.65 or 0.55 16K/1024K words Standard Optional Optional	MOS 0.65 or 0.55 16K/1024K words Standard Optional Optional	MOS 0.65 or 0.55 16K/1024K Standard Optional Standard	MOS 0.65 or 0.55 16K/1024K Standard Optional Standard
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	64K ROM; 512 x 56 bits 1.9 Standard No Standard Optional Standard	1024K ROM; 1K x 64 bits 1.0 Standard Optional Standard Optional Standard	1024K ROM; 1K x 64 bits 1.0 Standard Optional Standard Optional Standard	1024K ROM; 1K x 64 bits 0.7 Standard Optional Standard Optional Standard	1024K ROM; 1K x 64 bits 0.7 Standard Optional Standard Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 3MW 64	Standard 3MW 64	Standard 3MW 64	Standard 3M 64	Standard 3M 64
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	160 (any mixture) Opt.; 50-72,000 bps Opt.; 50-19,200 bps Bisync, VIP, HDLC, TTY, async — 2780/3780, HASP, Yes	160 (any mixture) Opt.; 50-72,000 bps Opt.; 50-19,200 bps Bisync, VIP, HDLC TTY, async — 2780/3780, HASP, Yes	152 (any mixture) Opt.; 50-72,000 bps Opt.; 50-19,200 bps Bisync, VIP, HDLC TTY, async — 2780/3780, HASP Yes	152 (any mixture) Opt.; 50-72,000 bps Opt.; 50-19,200 bps Bisync, HDLC, VIP, async — 2780/3780, HASP Yes	144 (any mixture) Opt.; 50-72,000 bps Opt.; 50-19,200 bps Bisync, HDLC, VIP, async — 2780/3780, HASP Yes
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives Drum/fixed-head disk storage Magnetic tape cassettes/cartridges Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	4 x 256/512K bytes Cart.; 8x10/26/80MB pack; 8x67/256MB No No 36-120 KBS 30-160 cps 240-900 lpm 50 bps/72KB 960,1920,2000 char. MICR units	4 x 256/512K bytes Cart.; 8x10.26/80MB pack; 8x67/256MB No No 36-120 KBS 30-160 cps 240-900 lpm 50 bps/72KB 960,1920,2000 char. MICR units	4 x 256/512K bytes Cart.; 8x10/26/80MB pack; 8x67/256MB No No 36-120 KBS 30-160 cps 240-900 lpm 50 bps/72KB 960,1920,2000 char. MICR units	4 x 256/512K bytes Cart.; (8)10/26/80MB pack; (8) 67/256MB No No 36-120 KBS 30-160 cps 240-900 lpm 50 bps/72KB 960,1920,2000 char. MICR units	4 x 256/512K bytes Cart.; (8)10/26/80MB pack; (8) 67/256MB No No 36-120 KBS 30-160 cps 240-900 lpm 50 bps/72KB 960,1920,2000 char. MICR units
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Assembler and macro preprocessor COBOL, FORTRAN, RPG Multiprogramming, trans. processing No No	Assembler and macro preprocessor COBOL, FORTRAN, RPG Multiprogramming, time-sharing No No	Assembler and macro preprocessor COBOL, FORTRAN, RPG Multiprogramming, time-sharing No No	Assembler and macro assembler COBOL, FORTRAN, RPG Multiprogramming, time-sharing No No	Assembler and macro assembler COBOL, FORTRAN, RPG Multiprogramming, time-sharing No No
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configura- tion above for on-site contract, \$ Discounts available Price of memory increment, \$ Date of first delivery Number installed to date	7,275 77 Yes 875 (8K words) 1976 NA	10,325 114 Yes 2,240 (32K words) 1977 NA	22,275 227 Yes 2,250 (32K words) 1978 NA	22,175 174 Yes 2,250 (32K words) 1978 NA	46,975 334 Yes 2,250 (32K words) 1978 NA
COMMENTS	Field upgradable to all higher models	Field upgradable to all higher models; writable control store optional	Field upgradable to Model 57; writ- able control store optional; includes high-speed commer- cial instructions (decimal arithmetic, etc.)	Field upgradable to Model 57; writ- able control store optional; includes 8K bytes of high- speed cache memory	Writable control store optional; in- cludes high-speed commercial instruc- tions (decimal arith- metic, etc.); in- cludes 8K bytes of high-speed cache memory

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MANUFACTURER AND MODEL	Honeywell Series 60 Level 62	IBM Series/1	IBM System/3	IBM System/32	IBM System/34
WORD LENGTH, BITS	8-bit byte	16	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	No practical limit	Variable	Variable	—	64 (remote)
MAIN STORAGE					
Storage type	MOS	MOS	Core, MOS	MOS	MOS
Cycle/access time, microseconds	1.0/0.5	2.1, 0.8, 0.6	1.52	0.6/0.250	0.6
Min./Max. capacity, words	96K/992K bytes	16K/256K bytes	8K/512K bytes	16K/32K bytes	32K/128K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Yes	No	Std. (Model 15)	No	No
Storage protection	Standard	Model 4955 only	Std. (Model 15)	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	992K bytes	64K bytes	64K bytes	32K bytes	32K bytes
Control storage	ROM; to 30K bytes	No	No	ROM; 4K bytes	—
Add time, microseconds	Varies	8.4/2.64	24.32 (5 digits)	150.8 (5 digits)	68.5 (5 digits)
Hardware multiply/divide	Standard	Mod. 4953, 4955	No	No	No
Hardware floating point	Optional	Optional	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	Optional	No	No	—
Real-time clock or timer	Standard	Optional	Optional	No	—
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.587M	—	658K	889K	—
No. of external interrupt levels	1-14	256	5 (Model 8, 10, 12) 8 (Model 15)	4	—
COMMUNICATIONS					
Maximum number of lines	25	8	8	1	16
Synchronous	Up to 19,200 bps	Up to 56,000 bps	Up to 56,000 bps	Up to 7200 bps	Up to 9600 bps
Asynchronous	Up to 9,600 bps	Up to 9600 bps	—	—	—
Protocols supported	Bisync	Async, Bisync	SDLC	SDLC, Bisync	SNA/SDLC
Network architectures supported	TTY, ISO, BSC, VIP	SNA	—	—	—
RJE terminals emulated	2780/3780	2780, 3870, HASP	360/370, HASP II	System/370	System/34
IBM 3270 emulation	Yes	Yes	Yes	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	256/512K bytes	492-606K bytes	243K bytes/drive	243-303K bytes	303K bytes
Disk pack/cartridge drives	Pack; 40-1,800M bytes	Non-removable cart.; 9.3-258M bytes	Both. 9.9-506M bytes	Non-removable cart; 3.2-13.7M bytes	Non-removable cart.; 8.6-27.1M bytes
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	700 bps	No	No	No	No
Magnetic tape, 1/2-inch	10-60 KBS	45-75 ips	20-80 KBS	No	No
Serial printer	30/120 cps	120 cps	85 cps	40-80 cps	40, 80, 120 cps
Line printer	100-1600 lpm	80 to 414 lpm	100-1100 lpm	50-155 lpm	160, 300 lpm
Data communications interface	To 19,200 bps	To 56,000 bps	Up to 50K bps	Up to 7200 bps	Up to 9600 bps
CRT	80 char. x 24 lines	24 x 80 char.	12/24 x 80 char.	40 char. x 6 lines	960 or 1920 char.
Other supported peripheral units	Card punch	Sensor I/O	MICR reader/sorter, optical mark reader	Magnetic card reader	Punched card input, MICR reader/sorter
SOFTWARE					
Assembler	No	Macro assembler	No	Macro assembler	Yes
Compilers	COBOL, FORTRAN, RPG	FORTRAN, PL/1, COBOL	BASIC, RPG II, COBOL, FORTRAN	RPG II, FORTRAN	RPG II, FORTRAN, COBOL, BASIC
Operating system	Batch, real-time, time-sharing	Real-time, multi-tasking	Batch, time-sharing	Batch (one-program)	Interactive
Language implemented in firmware	No	Partially	No	No	Partially
Operating system implemented in firmware	No	Partially	No	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	33,192	4,600-6,790	15,040 (8K bytes)	26,870	34,700
Monthly maint. of basic configuration above for on-site contract, \$	160	23-73	184	185	240 (approx.)
Discounts available	—	—	—	—	Educational (10%)
Price of memory increment, \$	2,750 (128K bytes)	1,175 (16K bytes)	Contact vendor	878 (8K bytes)	1,175 (16K bytes)
Date of first delivery	January 1979	—	December 1970	March 1975	December 1977
Number installed to date	Over 1000	NA	54,000+	15,000+	35,000 (estimated)
COMMENTS	CPU is available with four different performance levels	Offered on a purchase-only basis; eleven different CPU models	Six different model lines currently available	Entry-level business computer; strong emphasis on packaged applications software; system price also includes 3.2M-byte fixed disk drive, diskette drive, CRT, keyboard, and 40-cps unidirectional printer	Similar to System/32, but features more processing power, larger memory, larger disk capacity, and multiple independent workstations

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MANUFACTURER AND MODEL	IBM System/38	IBM 5100 Portable Computer	IBM 5110 Computing System	IBM 5120 Computing System	IBM 5280 Distributed Data System
WORD LENGTH, BITS	8-bit byte	8-bit byte	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	40	1	1	—	4
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	1.1, 0.6	0.533/0.330	0.53/0.33	0.53/0.33	NA
Cycle/access time, microseconds	512K/1536K bytes	16K/64K bytes	16K/64K bytes	16K/64K bytes	32K/160K bytes
Min./Max. capacity, words	No	Standard	Standard	Standard	NA
Parity checking	Standard	No	No	No	No
Error correction	No	No	No	No	No
Storage protection	—	—	—	—	—
CENTRAL PROCESSOR	512K bytes	64K bytes	64K bytes	64K bytes	160K bytes
No. of directly addressable words	4K-8K words	ROM; 180K x 9 bits	ROM; 18K x 9 bits	ROM; 18K x 9 bits	—
Control storage	—	1000 (approx.)	1000 (approx.)	1000 (approx.)	NA
Add time, microseconds	NA	Standard	Standard	Standard	Standard
Hardware multiply/divide	NA	Standard	Standard	Standard	Standard
Hardware floating point	NA	Standard	Standard	Standard	Standard
Hardware byte manipulation	NA	No	No	No	—
Battery backup	NA	No	No	No	—
Real-time clock or timer	NA	—	—	—	—
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Standard
Direct memory access channel	2.5M bytes	500K	500K	500K	—
Maximum I/O rate, words/sec.	NA	3	3	3	—
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS	4 (remote)	1	1	1	1
Maximum number of lines	Up to 9600 bps	No	Up to 9600 bps	Up to 4800 bps	Up to 4800 bps
Synchronous	Up to 1200 bps	To 300 bps	Up to 300 bps	Up to 300 bps	—
Asynchronous	Bisync	Bisync	Bisync	2770, 3741	Bisync, SDLC
Protocols supported	—	—	—	—	—
Network architectures supported	System/370	—	IBM/370, 2741	Most IBM sys.	System/370
RJE terminals emulated	No	No	No	No	No
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT	24M bytes	No	303K-4.8M bytes	2.4-4.8M bytes	1.2-9.6M bytes
Floppy disk (diskette) drives	Non-removable pack;	No	No	No	No
Disk pack/cartridge drives	285.6M bytes	—	—	—	—
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	Cartridge; 2.85 KBS	Cartridge; 2.85 KBS	No	No
Magnetic tape, 1/2-inch	800 bpi, 12-50 ips	No	No	No	No
Serial printer	No	80, 120 cps	80, 120 cps	80, 120 cps	40, 120 cps
Line printer	44-650 lpm	No	No	No	195-560 lpm
Data communications interface	Up to 9600 bps	Up to 300 bps	Up to 9600 bps	Up to 4800 bps	Up to 4800 bps
CRT	960 or 1920 char.	64 char. x 16 lines	64 char. x 16 lines	1024 char.	6/24 x 80 char.
Other supported peripheral units	Card unit	RS-232-C interface available for non-IBM peripherals	RS-232-C, IEEE interfaces available for non-IBM peripherals	RS-232-C interface available for non-IBM peripherals	RS-232-C interface available for non-IBM peripherals
SOFTWARE	—	—	—	—	—
Assembler	No	No	No	No	Yes
Compilers	RPG III	BASIC, APL	BASIC, APL	BASIC, APL	COBOL, FORTRAN
Operating system	Interactive, batch	Batch (one-program)	Batch (one-program)	Batch (one-program)	Batch, interactive
Language implemented in firmware	No	Fully	Fully	Fully	No
Operating system implemented in firmware	No	Fully	Fully	Fully	No
PRICING & AVAILABILITY	70,210 (512K bytes)	6,285	8,475 (16K bytes)	9,990 (16K bytes)	5,280 (32K bytes)
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	358	63.50	45	85	42
Monthly maint. of basic configuration above for on-site contract, \$	—	—	Educational (10%)	Educational (10%)	Educational (10%)
Discounts available	—	—	1,175 (16K bytes)	1,175 (16K bytes)	600 (32K bytes)
Price of memory increment, \$	5,000 (256K bytes)	1,175 (16K bytes)	—	—	—
Date of first delivery	August 1979	September 1975	February 1978	February 1980	June 1980
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Most powerful computer offered by IBM's General Systems Division, available in 48 packaged models	Portable computer weighing 50 pounds; system price also includes cartridge tape drive, CRT, and BASIC language interpreter	Features floppy disk and/or magnetic tape storage, and approximately two to three times the internal computing power of the 5100	Enhanced version of 5110	—

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MANUFACTURER AND MODEL	IBM 8100 Information System	KALBRO BDS Series 500	KALBRO BDS Series 1000	KALBRO BDS Series 2000	MCM Computers MCM/900
WORD LENGTH, BITS	8-bit byte	Variable 8-32	Variable 8-32	Variable 8-32	8
NO. WORKSTATIONS SUPPORTED	24	2	4	8	1
MAIN STORAGE	MOS	Core	Core	Core	MOS
Storage type	0.8, 1.5	1.0/NA	1.0/NA	1.0/NA	.3
Cycle/access time, microseconds	256K/512K bytes	24K/32K	24K/32K	32K/32K	64K/64K
Min./Max. capacity, words	Standard	No	No	No	No
Parity checking	No	No	No	No	No
Error correction	Standard	No	No	No	No
Storage protection					
CENTRAL PROCESSOR	256K bytes	24K	24K	32K	64K
No. of directly addressable words	—	PROM, ROM; 4KB	PROM, ROM; 4KB	PROM, ROM; 4K	ROM; 40K
Control storage	Standard	9.68 (7 digits)	9.68 (7 digits)	9.68 (7 digits)	—
Add time, microseconds	Standard	No	No	No	No
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	No	No	No	No	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	Standard	Standard	Standard	No
Real-time clock or timer	Optional	No	No	No	No
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	No
Direct memory access channel	—	1M	1M	1M	—
Maximum I/O rate, words/sec.	8	2; 128	2; 128	2; 128	None
No. of external interrupt levels					
COMMUNICATIONS	24	1	4	8	199
Maximum number of lines	600 to 9600 bps	No	No	No	No
Synchronous	—	Std.; 1,200 bps	Std.; 1,200 bps	Std.; 1,200 bps	Opt.; to 19.2K bps
Asynchronous	SDLC, BSC	—	—	—	None
Protocols supported					
Network architectures supported	SNA	—	—	—	None
RJE terminals emulated	Most IBM systems	—	—	—	None
IBM 3270 emulation	Yes	—	—	—	No
PERIPHERAL EQUIPMENT	Up to 962K bytes	No	No	No	Std.; 1-4M bytes
Floppy disk (diskette) drives	Up to 320M bytes	5MB, 10MB	10MB	20MB, 40MB	No
Disk pack/cartridge drives					
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	20-160 KBS	Opt.; 20 KBS	Opt.; 20 KBS	Opt.; 20 KBS	Opt.; 20 KBS
Serial printer	40-120 cps	Opt.; 100 cps	Opt.; 100 cps	Opt.; 100 cps	45-180 cps
Line printer	120-500 lpm	150, 300, 600 lpm	150, 300, 600 lpm	150, 300, 600 lpm	300 lpm
Data communications interface	Up to 9600 bps	1200 bps	1200 bps	1200 bps	Opt.; to 19.2K bps
CRT	Up to 3440 char.	Std.; 24 x 80 char.	Std.; 24 x 80 char.	Std.; 24 x 80 char.	Std.; 21 x 96 char.
Other supported peripheral units	RS-232-C, V.35 interfaces available	—	—	—	IEEE 488
SOFTWARE	Yes	Yes	Yes	Yes	No
Assembler					
Compilers	COBOL, FORTRAN	—	—	—	APL
Operating system	Batch, interactive	Real-time	Real-time	Real-time	Virtual memory (256K)
Language implemented in firmware	No	Partially	Partially	Partially	Fully
Operating system implemented in firmware	No	Partially	Partially	Partially	Fully
PRICING & AVAILABILITY	26,460	\$29,500	\$34,920	\$40,355	Contact vendor
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	163	\$250	\$283	\$372	Contact vendor
Monthly maint. of basic configura- tion above for on-site contract, \$	—	—	—	—	Contact vendor
Discounts available	2,475 (128K bytes)	NA	NA	NA	Contact vendor
Price of memory increment, \$					Contact vendor
Date of first delivery	August 1979	1977	1972	1973	October 1978
Number installed to date	NA	Over 200 (all models)	Over 200 (all models)	Over 200 (all models)	NA
COMMENTS	Price includes 256K bytes, 1M byte diskette storage, 29M bytes disk storage, 8 I/O hard- ware interrupt levels, and instruc- tions set	Price includes CRT and printer	Price includes CRT and printer	Price includes CRT and printer	Floppy-based, single-user, desk- top APL computer

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MANUFACTURER AND MODEL	MCM Computers MCM/POWER	Microdata Reality Series 2000	Microdata Reality Series 4000	Microdata Reality Series 6000	Microdata Reality Series 8000
WORD LENGTH, BITS	8	8 data bits: 16, 32, 48 instr. bits	8 data bits: 16, 32, 48 instr. bits	8 data bits: 16, 32, 48 instr. bits	8 data bits: 16, 32, 48 instr. bits
NO. WORKSTATIONS SUPPORTED	8	8	32	32	48
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	3	800 ns.	800 ns.	800 ns.	800 ns.
Min./Max. capacity, words	64K/64K	32K/64K bytes	64K/132K bytes	64K/256K bytes	256K/512K bytes
Parity checking	No	Standard (MOS)	Standard (MOS)	Standard (MOS)	Standard (MOS)
Error correction	No	—	—	—	—
Storage protection	No	—	—	—	—
CENTRAL PROCESSOR					
No. of directly addressable words	64K	58K bytes	58K bytes	122K bytes	504K bytes
Control storage	ROM; 40K	No	No	No	No
Add time, microseconds	—	—	—	—	—
Hardware multiply/divide	No	Standard	Standard	Standard	Standard
Hardware floating point	Standard	Optional	Optional	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	Standard	Standard	Standard	Standard
Real-time clock or timer	Standard	No	No	No	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	No	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	—	40,000 bytes	40,000 bytes	40,000 bytes	40,000 bytes
No. of external interrupt levels	None	—	—	—	—
COMMUNICATIONS					
Maximum number of lines	199	8	32	32	48
Synchronous	Opt.; to 19.2K bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps
Asynchronous	Opt.; to 19.2K bps	No	No	No	No
Protocols supported	Various	Bisync	Bisync	Bisync	Bisync
Network architectures supported	None	—	—	—	—
RJE terminals emulated	Various	See Comments	See Comments	See Comments	See Comments
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Opt.; 1-4M bytes	No	No	No	No
Disk pack/cartridge drives	No	Cart.; to 10M bytes	Cart.; to 40M bytes	Cart.; to 40M bytes	Cart.; to 40M bytes
Drum/fixed-head disk storage	Std.; 10-30M bytes	No	Fixed; to 50M bytes	Fixed; to 514M bytes	Fixed; to 514M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	No	20-40 KBS	20-40 KBS	20-40 KBS	20-40 KBS
Serial printer	45-180 cps	165 cps	165 cps	165 cps	165 cps
Line printer	300 lpm	150, 300, 600 lpm	150, 300, 600 lpm	150, 300, 600 lpm	150, 300, 600 lpm
Data communications interface	Opt.; to 19.2K bps	To 9600 bps	To 9600 bps	To 9600 bps	To 9600 bps
CRT	Std.; 21 x 96 char.	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	IEEE 488	5750 communica- tions terminal	5750 communica- tions terminal	5750 communica- tions terminal	5750 communica- tions terminal
SOFTWARE					
Assembler	No	Yes	Yes	Yes	Yes
Compilers	APL	ENGLISH, DATA/ BASIC, PROC	ENGLISH, DATA/ BASIC, PROC	ENGLISH, DATA/ BASIC, PROC	ENGLISH, DATA/ BASIC, PROC
Operating system	Virtual memory (256K)	Interactive, multi-user	Interactive, multi-user	Interactive, multi-user	Interactive, multi-user
Language implemented in firmware	Fully	Partially	Partially	Partially	Partially
Operating system implemented in firmware	Fully	Fully	Fully	Fully	Fully
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	Contact vendor	34,500	42,700	52,800	84,975
Monthly maint. of basic configura- tion above for on-site contract, \$	Contact vendor	350	350	395	595
Discounts available	Contact vendor	—	—	—	—
Price of memory increment, \$	Contact vendor	2,100 (16K bytes)	2,950 (32K bytes)	2,950 (32K bytes)	4,900 (128K bytes)
Date of first delivery	September 1980	December 1977	November 1973	November 1973	October 1979
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	MCM/POWER is a multi-user, hard disk, upgradeable and upward com- patible version of the MCM/900	Packaged system includes 32KB MOS memory, magnetic tape, 10MB disk drive, 165 cps printer, and 1 CRT; RJE terminals emulated include HASP, 2780/ 3780, 2770, 3741	Packaged system includes 64KB MOS memory, magnetic tape, 30MB disk drive, 165 cps printer, and 1 CRT; RJE terminals emulated include HASP, 2780/ 3780, 2770, 3741	Packaged system includes 64KB MOS memory, magnetic tape, 48MB disk drive, 165 cps printer, and 1 CRT; RJE terminals emulated include HASP, 2780/ 3780, 2770, 3741	Packaged system includes 256KB MOS memory, magnetic tape, 128MB disk drive, 300 lpm printer, and 2 CRTs; RJE terminals emu- lated include HASP, 2780/3780, 2770, 3741; PEP (Per- formance Enhanced Processor) pro- vides improved CPU time

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MANUFACTURER AND MODEL	Microtech Business Systems 50 Series	Microtech Business Systems 100 Series	Microtech Business Systems 200 Series	Microtech Business Systems 300 Series	Microtech Business Systems 400 Series
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	2	5	8	16	32-64
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	.8	.8	.4	.4	.4
Min./Max. capacity, words	32K/32K	32K/32K	32K/1024K	32K/1024K	32K/1024K
Parity checking	No	No	Optional	Optional	Optional
Error correction	No	No	No	No	No
Storage protection	Standard	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	32K	32K	128K	128K	128K
Control storage	No	No	No	No	No
Add time, microseconds	.8	.8	.4	.4	.4
Hardware multiply/divide	No	No	Optional	Optional	Optional
Hardware floating point	No	No	Optional	Optional	Optional
Hardware byte manipulation	No	No	No	No	No
Battery backup	No	No	Standard	Standard	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	—	—	—	—	—
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS					
Maximum number of lines	1	4	7	15	31-63
Synchronous	No	No	No	No	No
Asynchronous	Std.; 30-9600 bps	Std.; 30-9600 bps	Std.; 30-9600 bps	Std.; 30-9600 bps	Std.; 30-9600 bps
Protocols supported	Async	Async	Async	Async	Async
Network architectures supported	None	None	None	None	None
RJE terminals emulated	None	None	None	None	None
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	None	None	None	None	None
Disk pack/cartridge drives	Cart.; 10-30M bytes	Cart.; 10-30M bytes	Cart.; 10-30M bytes	Cart.; 32-96M bytes	Pack.; 10M-1.2B bytes
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	Yes, 45 ips	Yes, 45 ips	Yes, 45 ips	Yes, 45 ips	Yes, 45 ips
Serial printer	Std.; 150 cps	Opt.; 150 cps	Opt.; 150 cps	Opt.; 150 cps	Opt.; 150 cps
Line printer	Opt.; 150-600 lpm	Opt.; 150-600 lpm	Opt.; 100-600 lpm	Opt.; 150-600 lpm	Opt.; 50-600 lpm
Data communications interface	Std.; 11-9600 bps	Std.; 11-9600 bps	Std.; 11-9600 bps	Std.; 11-9600 bps	Std.; 11-9600 bps
CRT	Std.; 24 x 80 char.	Opt.; 24 x 80 char.	Opt.; 24 x 80 char.	Opt.; 24 x 80 char.	Opt.; 24 x 80 char.
Other supported peripheral units	Paper tape readers	Paper tape readers	Paper tape readers	Paper tape readers	Paper tape readers
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes	Yes
Compilers	BASIC	BASIC	BASIC	BASIC	BASIC
Operating system	Real-time	Real-time	Real-time	Real-time	Real-time
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	6,450 (64K bytes)	9,450 (64K bytes)	11,000 (64K bytes)	11,000 (64K bytes)	11,000 (64K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	Contact vendor	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Discounts available	Contact vendor	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Price of memory increment, \$	NA	NA	3,000 (64K bytes)	3,000 (64K bytes)	3,000 (64K bytes)
Date of first delivery	November 1980	June 1980	12,000 (512K bytes)	12,000 (512K bytes)	12,000 (512K bytes)
Number installed to date	6	20	May 1979	October 1979	May 1979
COMMENTS	System 50-14 (\$14,450) includes 10MB-disk drive, CRT, printer, and 1 additional port; 50-20 (\$20,450) includes 32MB-disk drive, CRT, and 1 additional port	System 100 (\$19,950) includes 10MB-disk drive, CRT, printer, and 4 additional ports; 100-32 (\$25,450) includes 32MB-disk drive, CRT, printer, and 4 additional ports	System 200 (\$21,500) includes 10MB-disk drive, and DMA-type multiplexer; all 200 models and higher numbered systems include a DMA-type multiplexer	System 300-1 (\$27,500) includes 16MB of fixed and 16MB of removable disk storage capacities; 300-2 (\$30,500) offers 48MB of fixed and 16M of rem. disk storage; 300-3 (\$33,500) offers 80MB fixed and 16MB rem. disk storage	System 400-1 (\$39,500) includes two 50MB-disk drives; 400-2 (\$43,500) includes two 80MB-disk drives; 400-3 (\$63,500) includes two 300MB-disk drives

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MANUFACTURER AND MODEL	Mitsubishi Electronics America, Inc. 8018	Mitsubishi Electronics America, Inc. 8028	Mitsubishi Electronics America, Inc. 8038	Modular Computer Systems Inc. Classic 7810/3140	Modular Computer Systems Inc. Classic 7820/7821
WORD LENGTH, BITS	8	16	16	16	16
NO. WORKSTATIONS SUPPORTED	5	4	27	32	96
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	0.33	0.6/0.4	0.6/0.4	.6/.6	.125/.250
Cycle/access time, microseconds	48K/96K bytes	256K/256K bytes	256K/512K bytes	64K/128K bytes	128K/2048K bytes
Min./Max. capacity, words	Standard	Standard	Standard	Standard	Standard
Parity checking	No	No	No	No	Standard
Error correction	No	Standard	Standard	Optional	Standard
Storage protection					
CENTRAL PROCESSOR	64K bytes	64K bytes	64K bytes	128K bytes	2048K bytes
No. of directly addressable words	ROM; 1.5K bytes	ROM; 12K bytes	ROM; 12K bytes	No	No
Control storage	900 (12 digits)	37.75 (5 digits)	37.75 (5 digits)	.90	.30
Add time, microseconds	Standard	Standard	Standard	Standard	Standard
Hardware multiply/divide	Optional	Optional	Optional	No	Optional/Standard
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	No	No	No	Optional	Optional
Battery backup	No	Standard	Standard	Standard	Standard
Real-time clock or timer					
INPUT/OUTPUT CONTROL	No	Std.; high-speed	Std.; high-speed	Standard	Standard
Direct memory access channel	40K	1.6M	1.6M	500K bytes	5.125M bytes
Maximum I/O rate, words/sec.	1	1	1	Up to 128	Up to 128
No. of external interrupt levels					
COMMUNICATIONS	1	32	32	256 FDX	256 FDX
Maximum number of lines	Opt.; 1200-9600 bps	Opt.; 1200-9600 bps	Opt.; 1200-9600 bps	Opt.; 48-230.4K bps	Opt.; 48-230.4K bps
Synchronous	Opt.; 200-9600 bps	Opt.; 300-9600 bps	Opt.; 300-9600 bps	Opt.; 50-19.2K bps	Opt.; 50-19.2K bps
Asynchronous	BSC, BC-1	BSC, BC-1	BSC, BC-1	SDLC/HDLC, Bisync	SDLC/HDLC, Bisync
Protocols supported					
Network architectures supported	—	—	—	MAXNET	MAXNET
RJE terminals emulated	—	—	—	HASP, 2780/3780	HASP, 2780/3780
IBM 3270 emulation	No	No	No	—	—
PERIPHERAL EQUIPMENT	Std.; 512K-1M bytes	Opt.; 256K-2M bytes	Opt.; 256K-2M bytes	315-630K bytes	315-630K bytes
Floppy disk (diskette) drives	Cart.; 10-40M bytes	Both; 10-200M bytes	Both; 10-400M bytes	Both; 2.5-256M	Both; 2.5-256M bytes
Disk pack/cartridge drives					
Drum/ fixed-head disk storage	No	No	No	Fixed; (3) .5-2M bytes	Fixed; (3) .5-2M bytes
Magnetic tape cassettes/cartridges	Cassette; 6K bps (opt.)	Cassette; 6K bps (opt.)	Cassette; 6K bps (opt.)	No	No
Magnetic tape, 1/2-inch	No	Opt.; 20-40KBS	Opt.; 20-40KBS	(7) 36-409.6K bytes	(7) 36-409.6K bytes
Serial printer	Std.; 120 cps	Std.; 200 cps	Std.; 200 cps	(4) 30-440 cps	(4) 30-440 cps
Line printer	No	Opt.; 300-600 lpm	Opt.; 300-600 lpm	(5) 280-1000 lpm	(5) 280-1000 lpm
Data communications interface	Opt.; 200-9600 bps	Opt.; 300-9600 bps	Opt.; 300-9600 bps	50-200K bps	50-200K bps
CRT	Std.; 1024 characters	Std.; 2000 characters	2,000 characters	24 x 80 char.	24 x 80 char.
Other supported peripheral units	Auto ledger/feed	Auto ledger/feeder	Auto ledger/feed	A/D & D/A converts, card inputs, others	A/D & D/A converts, card inputs, others
SOFTWARE					
Assembler	Yes	No	No	Assembler and macro assembler	Assembler and macro assembler
Compilers	BASIC, COBOL	COBOL, BASIC, RPG	BASIC, COBOL, RPG	COBOL, FORTRAN IV, CORAL 66	COBOL, PASC., CORAL 66, FORTRAN IV & 77
Operating system	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	Fully	Partially	Partially	No	No
Operating system implemented in firmware	Fully	Partially	Partially	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	18,900	Contact vendor	Contact vendor	8150	17,400
Monthly maint. of basic configuration above for on-site contract, \$	Contact vendor	Contact vendor	Contact vendor	85	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	Contact vendor	Contact vendor	Contact vendor	1,180 (32K bytes)	7,500 (128K bytes)
Date of first delivery	February 1979	August 1980	November 1979	May 1979	NA
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Optional 2000-character CRT display available			Remote system diagnostics available on MODACS II process control system	Remote system diagnostics available on MODACS II process control system; includes TSX, time-sharing terminal executive and the INFINITY data base management system; 7820/7821 provides a 4-slot CPU chassis

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MANUFACTURER AND MODEL	Modular Computer Systems Inc. Classic 7830/7835	Modular Computer Systems Inc. Classic 7840	Modular Computer Systems Inc. Classic 7860	Modular Computer Systems Inc. Classic 7870	Modular Computer Systems Inc. Modcomp II
WORD LENGTH, BITS	16	16	16	16	16 + 1
NO. WORKSTATIONS SUPPORTED	96	96	128	128	—
MAIN STORAGE	MOS	MOS	Core, MOS	MOS	Core
Storage type	.125/.250	.125/.250	.125/.250	.125/.250	0.8/0.4
Cycle/access time, microseconds	128K/2048K bytes	256K/2M bytes	128K/4096K bytes	512K/4096K bytes	32K/128K
Min./Max. capacity, words	Standard	Standard	Standard	Standard	Standard
Parity checking	Standard	Standard	Standard MOS	Standard	No
Error correction	Standard	Standard	Standard	Standard	Optional
Storage protection					
CENTRAL PROCESSOR	2048K bytes	2048K bytes	8192K bytes	8192K bytes	128K bytes
No. of directly addressable words	No	No	No	No	No
Control storage	.30	.30	.20	.20	0.8
Add time, microseconds	Standard	Standard	Standard	Standard	Standard
Hardware multiply/divide	Optional/Standard	Optional/Standard	Standard	Standard	Optional
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	Optional	Optional	Optional	Optional	No
Battery backup	Standard	Standard	Standard	Standard	Optional
Real-time clock or timer					
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Standard
Direct memory access channel	5.125M bytes	5.125M bytes	To 96K bytes	To 96K bytes	To 96K bytes
Maximum I/O rate, words/sec.	Up to 128	Up to 128	Up to 128	Up to 128	Up to 128
No. of external interrupt levels					
COMMUNICATIONS	256 FDX	256 FDX	256 FDX	256 FDX	—
Maximum number of lines	Opt.; 48-230.4K bps	Opt.; 48-230.4K bps	Opt.; 48-230.4K bps	Opt.; 48-230.4K bps	—
Synchronous	Opt.; 50-19.2K bps	Opt.; 50-19.2K bps	Opt.; 50-19.2K bps	Opt.; 50-10.2K bps	—
Asynchronous	SDLC/HDLC, Bisync	SDLC/HDLC, Bisync	SDLC/HDLC, Bisync	SDLC/HDLC, Bisync	—
Protocols supported					
Network architectures supported	MAXNET	MAXNET	MAXNET, X.25	MAXNET, X.25	MAXNET
RJE terminals emulated	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT	315-630K bytes	315-630K bytes	315-630K bytes	315-630K bytes	315-630K bytes
Floppy disk (diskette) drives	Both; 2.5-256M bytes	Both; 2.5-256M bytes	Both; 2.5-256M bytes	Both; 2.5-256M bytes	Both; 2.5-256M bytes
Disk pack/cartridge drives					
Drum/fixed-head disk storage	Fixed; (3) 5-2M bytes	Fixed; (3) 5-2M bytes	Fixed; (3) 5-2M bytes	Fixed; (3) 5-2M bytes	Fixed; (3) 5-2M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	(7) 36-409.6K bytes	(7) 36-409.6K bytes	(7) 36-409.6K bytes	(7) 36-409.6K bytes	(7) 36-409.6K bytes
Serial printer	(4) 30-440 cps	(4) 30-440 cps	(4) 30-440 cps	(4) 30-440 cps	(4) 30-440 cps
Line printer	(5) 280-1000 lpm	(5) 280-1000 lpm	(5) 280-1000 lpm	(5) 280-1000 lpm	(5) 280-1000 lpm
Data communications interface	50-200K bps	50-200K bps	50-200K bps	50-200K bps	50-200K bps
CRT	24 x 80 char.	24 x 80 char.	24 x 80 char.	24 x 80 char.	24 x 80 char.
Other supported peripheral units	A/D & D/A converts, card inputs, others	A/D & D/A converts, card inputs, others	A/D & D/A converts, card inputs, others	A/D & D/A converts, card inputs, others	A/D & D/A converts, printer, plotter, color graphic CRT
SOFTWARE	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler
Assembler	COB., PASC., CORAL	COB., PASC., CORAL	COB., PASC., CORAL	COB., PASC., CORAL	COB., PASC., CORAL
Compilers	66, FORTRAN IV & 77	66, FORTRAN IV & 77	66, FORTRAN IV & 77	66, FORTRAN IV & 77	66, FORTRAN IV & 77
Operating system	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY	25,500/29,500	27,800	40,800	66,000	16,750 (64K bytes)
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	155/192	—	242	382	—
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	8,000 (128K bytes)	13,000 (256K bytes)	8,000 (128K bytes)	28,000 (512K bytes)	5,400 (16K bytes)
Price of memory increment, \$					
Date of first delivery	September 1979	NA	April 1978	October 1978	March 1971
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Remote system diagnostics available on MODACS II process control system; includes TSX, time-sharing terminal executive and the INFINITY data base management system	See 7830/7835 Comments	See 7830/7835 Comments	See 7830/7835 Comments	NASA specifications 16-bit minicomputer

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MANUFACTURER AND MODEL	Mylee Digital Sciences 3000	Nanodata QM/1	NCR Century 50	NCR Century 75	NCR Century 100
WORD LENGTH, BITS	16	18 + 2	8 + 1	8 + 1	8 + 1
NO. WORKSTATIONS SUPPORTED	16	Appl. dependent	—	—	—
MAIN STORAGE					
Storage type	MOS	Core	Thin film	Core	Thin film
Cycle/access time, microseconds	0.8	0.75-125/0.35	0.8	1.2/0.65	0.8
Min./Max. capacity, words	88K/286K	16K/1024K	16K/32K bytes	16K/64K bytes	16K/32K bytes
Parity checking	No	Standard	Standard	Standard	Standard
Error correction	No	Optional	No	No	No
Storage protection	No	Optional	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	56K	1024K	—	—	—
Control storage	ROM	RAM; 40K x 18	No	No	No
Add time, microseconds	20	0.75	59 (5 digits)	25 (5 digits)	59 (5 digits)
Hardware multiply/divide	Standard	Standard	No	Optional	No
Hardware floating point	No	Standard	Standard	Standard	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Yes	Optional	No	No	No
Real-time clock or timer	No	Optional	No	Optional	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Optional	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1M	1M	40K & 108K	120K & 416K	40K & 108K
No. of external interrupt levels	Up to 24	2,048	2	8	2
COMMUNICATIONS					
Maximum number of lines	15	Appl. dependent	16	10	16
Synchronous	Opt.; to 9600 bps	Optional	Opt.; to 9600 bps	Opt.; to 4800 bps	Opt.; to 9600 bps
Asynchronous	Opt.; 1200 bps	Optional	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps
Protocols supported	Bisync	Bisync, Async	Bisync	Bisync	Bisync
Network architectures supported	—	—	—	—	—
RJE terminals emulated	2780/3780	See Comments	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes	No	No	No	No
Disk pack/cartridge drives	Cart.; 16-64M bytes	Both; 12-60M bytes	Pack; to 33.5M bytes	Cart.; to 9.8M bytes	Pack; 8.4-33.5M bytes
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	Cartridge; 2.5M bytes	Cassette; 750 cps	No	Cassette; 750 cps
Magnetic tape, 1/2-inch	No	200KBS	10-40 KBS	10-320 KBS	10-80 KBS
Serial printer	165 cps	200-1000 cps	6 cps	6 cps	6 cps
Line printer	300 lpm	600-1250 lpm	125-900 lpm	200-450 lpm	450-3000 lpm
Data communications interface	9600 bps	Up to 50K bps	45-50,000 bps	45-50,000 bps	45-50,000 bps
CRT	32 char. x 11 lines	Yes	24 x 80 char.	Interface only	80 char. x 24 lines
Other supported peripheral units	None	IBM/360 & Univac 1100 compatible channel	PT; MICR/OCR	PT; MICR/OCR	Paper tape units; MICR/OCR units
SOFTWARE					
Assembler	No	Assembler & macro assembler	No	No	No
Compilers	ACE	PASCAL, APL/SV, See Comments	BASIC, COBOL, FORTRAN, NEAT/3	BASIC, COBOL, FORTRAN, RPG	COBOL, BASIC, FORTRAN, NEAT/3
Operating system	Real-time	See Comments	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming
Language implemented in firmware	Partially	Yes	No	No	No
Operating system implemented in firmware	Partially	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	28,995 (56K bytes)	176,000	32,000 (16K bytes)	56,850 (16K bytes)	40,000 (16K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	9%	—	—	—	—
Discounts available	—	None	—	—	—
Price of memory increment, \$	3,000 (96K bytes)	4,960 (16K words)	3,500 (16K bytes)	5,000 (8K bytes)	3,500 (16K bytes)
Date of first delivery	May 1976	1975	December 1970	May 1976	March 1963
Number installed to date	175	24	NA	NA	NA
COMMENTS	System price also includes a CRT (32 x 11 or 24 x 80), 16MB of disk storage, a 165-cps printer, system software, and an inventory control applications package	Existing emulators include IBM 360/370, 7094; Univac 1106; DEC 11/05, 11/40; DG Nova; CDC 160A; Delco 352; RCA 234SCP, UYK-7, -20; and microprocessor; emulation lab software provided; both vertical and horizontal control store	System price also includes line printer, 8.4 MB disk drive, and card reader, no longer manufactured, available only in used or used-refurbished units	System price also includes a card reader, line printer, disk drive, TTY and cabinet; can be upgraded to Century 101	System price also includes line printer, 8.4-MB disk drive, and card reader, no longer manufactured; available only in used or used-refurbished units

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MANUFACTURER AND MODEL	NCR Century 101	NCR Century 151	NCR 499	NCR 8130	NCR 8150
WORD LENGTH, BITS	8 + 1	8 + 1	16 + 1	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	—	—	—	1	4
MAIN STORAGE					
Storage type	Core	MOS	Core	MOS	MOS
Cycle/access time, microseconds	1.2/0.6	0.75 (1 or 2 bytes)	1.2/0.65	0.6	0.6
Min./Max. capacity, words	16K/128K bytes	32K/128K bytes	12K/32K	48K/64K bytes	48K/256K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	Optional	Optional	No	Optional	Optional
CENTRAL PROCESSOR					
No. of directly addressable words	—	—	—	32K	32K
Control storage	No	No	ROM, 64K words	ROM, 4K bytes	ROM, 4K bytes
Add time, microseconds	28.8 (5 digits)	18.0 (5 digits)	1.7 milliseconds	—	—
Hardware multiply/divide	Optional	Standard	Standard	No	No
Hardware floating point	Standard	No	No	No	No
Hardware byte manipulation	Standard	Standard	No	Standard	Standard
Battery backup	No	No	No	Optional	Optional
Real-time clock or timer	Optional	Optional	No	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	120K & 416K	120K & 545K	833K	866K bytes	866K bytes
No. of external interrupt levels	9	9	8	16	16
COMMUNICATIONS					
Maximum number of lines	255	255	2	1	—
Synchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; 2000-9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps
Asynchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; 300-1800 bps	No	No
Protocols supported	Bisync	Bisync	Async, Bisync	Bisync	Bisync, NCR/SDLC
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	—	—	2780/3780	2780/3780
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	500K-4096K bytes	250K bytes
Disk pack/cartridge drives	Pack; 8.4-381.6M bytes	Pack; 8.4-381.6M bytes	Cart.; 4.9-9.8MB	No	5 to 40M bytes
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette; 750 cps	Cassette; 750 cps	Cassette; 750 bpi	Cassette; 750 bpi	Both
Magnetic tape, 1/2-inch	10-320 KBS	10-320 KBS	No	No	No
Serial printer	6 cps	6 cps	75, 130 cps	110 cps	110 cps
Line printer	450-3500 lpm	450-3500 lpm	55-300 lpm	50-200 lpm	50-200 lpm
Data communications interface	45-50,000 bps	45-50,000 bps	300-9600 bps	To 9600 bps	To 9600 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	No	512, 1920 char.	512, 1920 char.
Other supported peripheral units	Paper tape units; MICR/OCR units	Paper tape units; MICR/OCR units	PT, mag ledger card	—	—
SOFTWARE					
Assembler	No	No	Neat/AM	No	No
Compilers	COBOL, BASIC, FORTRAN, NEAT/3	COBOL, BASIC, FORTRAN, NEAT/3	No	COBOL, BASIC	COBOL, BASIC
Operating system	Batch, multi- programming	Batch, multi- programming	No	Interactive	Interactive
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	69,520 (16K bytes)	120,325 (64K bytes)	17,900 (12K bytes)	10,700	18,300
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	136	192
Discounts available	—	—	—	—	—
Price of memory increment, \$	5,000 (8K bytes)	20,000 (64K bytes)	1,100 (2K bytes)	600 (16K bytes)	1,000 (32K bytes)
Date of first delivery	August 1972	February 1975	February 1976	March 1978	March 1978
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	System price also includes line printer, 8.4-MB disk drive, and card reader			Price includes processor (48K bytes), CRT, flexible disk (1M byte), and printer (50 lpm)	Price includes processor (48K bytes), CRT, cartridge disk (2.5M bytes), fixed disk (5M bytes), and printer (50 lpm)

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MANUFACTURER AND MODEL	NCR 8231	NCR 8251	NCR 8271	New England Digital Able/40	New England Digital Able/60
WORD LENGTH, BITS	16 + 2	16 + 2	16 + 2	16	16
NO. WORKSTATIONS SUPPORTED	5	24	24	NA	NA
MAIN STORAGE	MOS	MOS	MOS	Static MOS	Static MOS
Storage type	0.8	0.8	0.8	0.5 (avg.)/0.5 (avg.)	0.5 (avg.)/0.5 (avg.)
Cycle/access time, microseconds	64K/96K bytes	64K/128K bytes	128K/512K bytes	16K/64K	16K/64K
Min./Max. capacity, words	Standard	Standard	Standard	No	No
Parity checking	No	No	No	No	No
Error correction	Optional	Optional	Optional	No	No
Storage protection					
CENTRAL PROCESSOR	64K	64K	—	64K	64K
No. of directly addressable words	No	No	No	16 x 256	16 x 256
Control storage	—	—	—	0.25	0.25
Add time, microseconds	Standard	Standard	Standard	Optional	Optional
Hardware multiply/divide	No	No	No	Optional	Optional
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	Optional	Optional	Optional	Optional	Optional
Battery backup	Standard	Standard	Standard	Standard	Standard
Real-time clock or timer					
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Optional	Optional
Direct memory access channel	833K	833K	833K	2M	2M
Maximum I/O rate, words/sec.	8	8	8	12	12
No. of external interrupt levels					
COMMUNICATIONS	—	—	—	64	64
Maximum number of lines	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Optional	Optional
Synchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	300-38.4K bps	300-38.4K bps
Asynchronous	Bisync	Bisync	Bisync	Bisync	Bisync
Protocols supported					
Network architectures supported	—	—	—	NED WORK	NED WORK
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780	IBM 2780
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT	250K-1024K bytes	250K-1024K bytes	243K-1024K bytes	180K bytes	1.2M bytes
Floppy disk (diskette) drives	Cart.; to 40M bytes	Cart.; to 80M bytes	Fixed & removable; 10M-364M bytes	No	24M bytes
Disk pack/cartridge drives					
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette; 15 ips	Cassette; 15 ips	Cassette; 15 ips	No	No
Magnetic tape, 1/2-inch	10-20 KBS	10-20 KBS	10-20 KBS	No	800 bpi
Serial printer	50-125 cps	50-125 cps	50-125 cps	30,120 cps	30,120 cps
Line printer	200-600 lpm	200-600 lpm	200-900 lpm	300 lpm	300 lpm
Data communications interface	To 9600 bps	To 9600 bps	Up to 9600 bps	300-38,400 bps	300-38,400 bps
CRT	24 x 80 char.	24 x 80 char.	24 x 80 char.	80 x 24 char.	24 x 80 char.
Other supported peripheral units	Card reader	Card reader	Card reader	Plotter, graphic CRT, 16 channel A/D & A/D quad D/A, digital I/O	Plotter, graphic CRT, 16 channel A/D & quad D/A, digital I/O
SOFTWARE					
Assembler	No	No	No	Yes	Yes
Compilers	NEAT/3, COBOL	NEAT/3, COBOL	NEAT/3, COBOL	XPL, PASCAL, BASIC	XPL, PASCAL, BASIC
Operating system	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming	Real-time	Real-time
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	27,240	29,240	62,950	7,950	9,650
Monthly maint. of basic configuration above for on-site contract, \$	183	183	307	—	—
Discounts available	—	—	—	Educ., qty.	Educ., qty.
Price of memory increment, \$	1,000 (16K bytes)	1,000 (16K bytes)	4,000 (first 64K) 1,500 (addl. 64K)	1,000 (8K words)	1,000 (8K words)
Date of first delivery	June 1977	March 1977	December 1979	June 1977	April 1978
Number installed to date	5500 (all sys.)	5500 (all sys.)	5500 (all sys.)	NA	NA
COMMENTS	Entry level system includes CPU, cassette, 64KB memory, 10MB disk storage, CRT, 75-lpm printer, all cables, and power units	Entry level system includes CPU, cassette, 64KB memory, 10MB disk storage, CRT, 75-lpm printer, all cables, and power units	Typical entry-level system includes CPU, cassette, 256K bytes of memory, 3 CRTs, 8MB-disk drive, 300-lpm printer, and all cables and power supplies	Includes minifloppy drives, RTC, APL, and serial port	Includes 8-inch floppy drives, RTC, APL, and serial port

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MANUFACTURER AND MODEL	Northern Telecom, Inc. 405	Northern Telecom, Inc. 410	Northern Telecom, Inc. 435	Northern Telecom, Inc. 440	Northern Telecom, Inc. 445
WORD LENGTH, BITS	8	8	8	8	8
NO. WORKSTATIONS SUPPORTED	2	1	2	8	8
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.25/0.25	0.50/0.25	0.25/0.25	0.50/0.25	0.25/0.25
Min./Max. capacity, words	48K/64K bytes	40K/64K bytes	64K/128K bytes	24K/64K bytes	64K/256K bytes
Parity checking	Optional	—	Optional	—	Optional
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	64K bytes	64K bytes	64K bytes	64K bytes
Control storage	—	—	—	—	—
Add time, microseconds	5.5	5.5	5.5	5.5	5.5
Hardware multiply/divide	No	No	No	No	No
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	Optional	No	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	—	—	—	—	—
No. of external interrupt levels	8	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	2	2	3	2	3
Synchronous	Opt.; 600-9600 bps	Opt.; 600-4800 bps	Std.; 600-9600 bps	Opt.; 600-9600 bps	Std.; 600-9600 bps
Asynchronous	Opt.; 37.5-1200 bps	Opt.; 37.5-1200 bps	Opt.; 37.5-2400 bps	Opt.; 37.5-1200 bps	Opt.; 37.5-1200 bps
Protocols supported	Bisync, SDLC	Bisync, SDLC	Bisync, SDLC, CDC, Burroughs, IBM	Bisync, SDLC	Bisync, SDLC
Network architectures supported	IBM/SNA	None	None	None	None
RJE terminals emulated	Several	Several	2770,2780,3780,3774	Several	Several
IBM 3270 emulation	Yes	No	Yes	No	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	5-1.0M bytes	256K bytes	256K bytes	256K bytes	256K bytes
Disk pack/cartridge drives	No	Cartridge: 5M bytes	No	No	Pack; 4-74.5M bytes
Drum/fixed-head disk storage	No	No	Std.; 5-10M bytes	To 20M bytes	5, 10, 20M bytes
Magnetic tape cassettes/cartridges	No	Cartridge: 1000 cps	Cart.; 12000 cps	Cartridge: 1000 cps	Cartridge: 12K cps
Magnetic tape, 1/2-inch	800/1600 bpi	800/1600 bpi	Yes, 800/1600 bpi	800/1600 bpi	800/1600 bpi
Serial printer	To 180 cps	To 180 cps	To 180 cps	To 180 cps	To 180 cps
Line printer	300 or 600 lpm	300 lpm	300 lpm	300 lpm	300 to 600 lpm
Data communications interface	300-9600 bps	300-9600 bps	Std.; 1200-9600 bps	300-9600 bps	300-9600 bps
CRT	2000 characters	576 characters	2000 characters	Standard	2000 characters
Other supported peripheral units	Printer, magnetic tape drive	Printer, magnetic tape drive, cassette/cartridge	Printer, magnetic tape drive, cassette/cartridge	Printer, magnetic tape drive, cassette/cartridge	Printer magnetic tape drive, cassette/cartridge
SOFTWARE					
Assembler	No	No	No	No	No
Compilers	COBOL, BASIC, TAL 2000	COBOL, BASIC, TAL-2	COBOL, TAL 2000	COBOL, BASIC, TAL-2	COBOL, TAL 2000
Operating system	Multiprogramming, multi-task	Multiprogramming, multi-task	Multi-tasking	Multiprogramming, multi-task	Multiprogramming, multi-task
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	6,150	23,960	18,000	21,240	20,680
Monthly maint. of basic configuration above for on-site contract, \$	234	546	280	528	280
Discounts available	Quantity	Quantity	Quantity	Quantity	Quantity
Price of memory increment, \$	800 (16K)	1,160 (8K)	NA	1,160 (8K)	2,000 (32K)
Date of first delivery	August 1978	May 1976	May 1980	May 1976	May 1978
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Designed for transaction proc. in distributed or stand-alone environments; Omniword word processing package available	Designed for transaction processing in distributed or stand-alone environments; industry application software packages are avail. through distributors	Omniword word processing package available		Six remote workstations on-line concurrently unlimited in timesharing; Omniword word processing package available

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MANUFACTURER AND MODEL	Northern Telecom, Inc. 585	Olivetti BCS 2025	Olivetti BCS 2030 FDU	Olivetti BCS 2030 FV	Olivetti BCS 2030 MDU
WORD LENGTH, BITS	8	8-bit byte	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	16	1	1	1	1
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	.167/.167	1/2.3	1/2.3	1/2.3	1/2.3
Cycle/access time, microseconds	128K/512K bytes	64K/64K bytes	4K/16K bytes	64K/64K bytes	4K/16K bytes
Min./Max. capacity, words	Optional	Standard	Standard	Standard	Standard
Parity checking	No	No	No	No	No
Error correction	No	Optional	Optional	Optional	Optional
Storage protection					
CENTRAL PROCESSOR					
No. of directly addressable words	64K/512K bytes	—	—	—	—
Control storage	—	RAM	RAM	RAM	ROM
Add time, microseconds	—	6	6.0	6	6.0
Hardware multiply/divide	No	Standard	Standard	Standard	Standard
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	—	No	No	No	No
Real-time clock or timer	Standard	No	Standard	No	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	No	Standard	No
Maximum I/O rate, words/sec.	—	250K bps	250K bps	250K bps	—
No. of external interrupt levels	16	1	1	1	1
COMMUNICATIONS					
Maximum number of lines	3	—	1	1	1
Synchronous	Std.: 600-9600 bps	—	Standard	Opt.: 1200-9600 bps	Standard
Asynchronous	Opt.: 37.5-2400 bps	—	No	Optional	No
Protocols supported	Bisync, SDLC, CDC, Burroughs, IBM	—	Bisync	Bisync	Bisync
Network architectures supported	None	None	None	None	None
RJE terminals emulated	2770,2780,3780,3774	None	None	None	None
IBM 3270 emulation	Yes	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	256K bytes	Std.: 2MB, opt.: 4MB	Standard	Std.: 2MB, opt.: 4MB	No
Disk pack/cartridge drives	Opt.: 74.5-298M bytes	No	No	Opt.: 20MB	No
Drum/fixed-head disk storage	11-44M bytes	No	No	No	No
Magnetic tape cassettes/cartridges	Cart. II; 15M bytes	Cass.: 1000 cps (optional)	Cassette; 1000 bps	Cassette; 1000 bps (optional)	Cassette; 1000 bps
Magnetic tape, 1/2-inch	Yes, 800/1600 bpi	No	No	No	No
Serial printer	To 180 cps	Std.: 60 cps	Std.: 1000 cps	Std.: 1000 cps	Std.: 1000 cps
Line printer	300-600 lpm	Opt.: 200 cps	Opt.: 200 cps	Opt.: 200 cps	Opt.: 200 cps
Data communications interface	Std.: 1200-9600 bps	Opt.: 1200-9600 bps	1200-9600 bps	1200-9600 bps	1200-9600 bps
CRT	2000 char.	Std.: 1920 char.	Alphanumeric	Std.: 1920 char.	Alphanumeric
Other supported peripheral units	Printer, magnetic tape drive, cassette/cartridge	Magnetic card, auto front-feed	Magnetic card, auto front-feed	Magnetic card, auto front-feed	Magnetic card, auto front-feed
SOFTWARE					
Assembler	No	Yes	Assembler	Yes	Assembler
Compilers	COBOL, TAL 2000	BASIC (Interpreter)	—	BASIC (Interpreter)	—
Operating system	Multi-tasking	Interactive	Interactive	Interactive	Interactive
Language implemented in firmware	No	Fully	Fully	Fully	Fully
Operating system implemented in firmware	No	Partially	Partially	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	25,000	12,950	13,350	14,950	9,950
Monthly maint. of basic configuration above for on-site contract, \$	238	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Discounts available	Quantity	—	—	—	—
Price of memory increment, \$	NA	—	650 (4K bytes)	—	650 (4K bytes)
Date of first delivery	May 1981	December 1980	January 1979	December 1980	January 1979
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	8-in. Winchester technology with imbedded servo technique; cartridge II used for backup; up to 6 remote workstations on-line concurrently; Omnivord word processing package available				

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MANUFACTURER AND MODEL	Perkin-Elmer Sixteen 10	Perkin-Elmer Sixteen 20	Perkin-Elmer Sixteen 30	Point 4 Data Corp. Point 4 Mark 3	Point 4 Data Corp. Point 4 Mark 4
WORD LENGTH, BITS	16 + 1	16 + 1	16 + 6	16	16
NO. WORKSTATIONS SUPPORTED	4	16	16	4	8
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	1.0/NA	0.825/NA	0.750/NA	.7/.2	.7/.2
Min./Max. capacity, words	16K/32K	32K/131K	16K/131K	32K/32K	64K/64K
Parity checking	Standard	Standard	No	No	No
Error correction	No	No	Standard	No	No
Storage protection	No	Optional	Standard	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	32K	32K	32K	32K	64K
Control storage	ROM	ROM	ROM	PROM	PROM
Add time, microseconds	1.0	0.825	0.750	.7	.7
Hardware multiply/divide	Optional	Optional	Standard	No	Standard
Hardware floating point	No	Optional	Optional	No	No
Hardware byte manipulation	Standard	Standard	Standard	No	Standard
Battery backup	Optional	Optional	Standard	No	Standard
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1M	1.21M	1.33M	600K	600K
No. of external interrupt levels	1-255	1-255	1-255	3	3
COMMUNICATIONS					
Maximum number of lines	—	—	—	4	8
Synchronous	—	—	—	—	Std.; 75-9600 bps
Asynchronous	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Opt.; 110-9600 bps	Opt.; 110-9600 bps
Protocols supported	—	—	—	—	Bisync
Network architectures supported	—	—	—	—	—
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	—	—
IBM 3270 emulation	—	—	—	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes, 1-4	Yes, 1-4	Yes, 1-4	No	No
Disk pack/cartridge drives	Both, 10-4800 MB	Both, 10-4800 MB	Both, 10-4800 MB	Any CMD/SMD (2) optional	Any CMD/SMD (2) optional
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	Cassette; opt. 110-9600 bps	Cassette; opt. 110-9600 bps
Magnetic tape, 1/2-inch	Yes, 36-120 KB	Yes, 36-120 KB	Yes, 36-120 KB	No	No
Serial printer	Yes, 30-180 cps	Yes, 30-180 cps	Yes, 30-180 cps	Any RS-232-C	Any RS-232-C
Line printer	Yes, 300-600 lpm	Yes, 300-600 lpm	Yes, 300-600 lpm	Any RS-232-C	Any RS-232-C
Data communications interface	Yes, to 19.2K bps	Yes, to 19.2K bps	Yes, to 19.2K bps	No	Std.; 75-9600 bps
CRT	24 x 80 char.	24 x 80 char.	24 x 80 char.	See Comments	See Comments
Other supported peripheral units	A/D and D/A, digital I/O	A/D and D/A, digital I/O	A/D and D/A, digital I/O	See Comments	See Comments
SOFTWARE					
Assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler and macro assembler	Assembler and macro assembler
Compilers	BASIC, extended FORTRAN IV	BASIC, extended FORTRAN IV	BASIC, extended FORTRAN IV	BUSINESS BASIC	BUSINESS BASIC, PASCAL
Operating system	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Real-time, time- sharing, multi-tasking	Real-time, time- sharing, multi-tasking
Language implemented in firmware	No	No	No	No	Partially
Operating system implemented in firmware	No	No	No	No	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	6,000 (8K words)	9,900 (16K words)	11,500 (16K words)	Contact vendor	Contact vendor
Monthly maint. of basic configura- tion above for on-site contract, \$	40	70	80	—	—
Discounts available	Quan., \$ vol., educat. See Comments	Quan., \$ vol., educat. See Comments	Quan., \$ vol., educat. See Comments	Blanket Staircase Ed.	Blanket Staircase Ed.
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	January 1979	March 1979	February 1979	April 1981	July 1981
Number installed to date	1000	600	200	NA	NA
COMMENTS	\$1,680 (16K words), \$2,100 (32K words)	\$2,100 (32K words), \$3,150 (64K words), \$4,725 (128K words)	\$2,000 (16K words), \$3,000 (32K words), \$4,500 (64K words)	Point 4 supports many peripherals via device handlers, but does not sup- ply these peripherals	Point 4 supports many peripherals via device handlers, but does not sup- ply these peripherals

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MANUFACTURER AND MODEL	Point 4 Data Corp. Point 4 Mark 5 (4/3)	Point 4 Data Corp. Point 4 Mark 5 (4/4)	Point 4 Data Corp. Point 4 Mark 8	Prime 150	Prime 250
WORD LENGTH, BITS	16	16	16	32	32
NO. WORKSTATIONS SUPPORTED	1-128 (8 recommended)	1-128 (8 recommended)	1-128 (8 recommended)	16	16
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	.4/.2	.4/.2	.4/.2	0.75/0.54	0.75/0.54
Cycle/access time, microseconds	32K/32K	64K/64K	32K/64K	256K/1M bytes	512K/1M bytes
Min./Max. capacity, words	Optional	Optional	Optional	Standard	Standard
Parity checking	No	No	No	Standard	Standard
Error correction	No	No	No	Standard	Standard
Storage protection	No	No	No	Standard	Standard
CENTRAL PROCESSOR	32K	64K	64K	64K bytes	64K
No. of directly addressable words	PROM	PROM	PROM	4K x 64	4 x 64
Control storage	.4	.4	.4	1.1	1.1
Add time, microseconds	No	No	Standard	Standard	Standard
Hardware multiply/divide	No	No	No	Standard	Standard
Hardware floating point	No	No	Standard	Standard	Standard
Hardware byte manipulation	Optional	Optional	Optional	Optional	Optional
Battery backup	Optional	Optional	Optional	Standard	Standard
Real-time clock or timer	Optional	Optional	Optional	Standard	Standard
INPUT/OUTPUT CONTROL	Std.; high-speed	Std.; high-speed	Std.; high-speed	Standard	Standard
Direct memory access channel	900K	900K	1M	2.5M bytes	2.5M bytes
Maximum I/O rate, words/sec.	16	16	16	64	64
No. of external interrupt levels	128	128	128	18	18
COMMUNICATIONS	—	—	—	9600 bps	9600 bps
Maximum number of lines	Opt.; 110-9600 bps	Opt.; 110-9600 bps	Opt.; 110-9600 bps	9600 bps	9600 bps
Synchronous	—	—	—	See Comments	See Comments
Asynchronous	—	—	—	Primenet	Primenet
Protocols supported	—	—	—	2780/3780, HASP	2780/3780, HASP
Network architectures supported	No	No	No	No	No
RJE terminals emulated	—	—	—	—	—
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT	See Comments	See Comments	See Comments	512K-2M bytes	512K-2M bytes
Floppy disk (diskette) drives	See Comments	See Comments	See Comments	Both; 12-2400M bytes	Both; 12-2400M bytes
Disk pack/cartridge drives	See Comments	See Comments	See Comments	Fixed; 1M bytes	Fixed; 1M bytes
Drum/fixed-head disk storage	See Comments	See Comments	See Comments	No	No
Magnetic tape cassettes/cartridges	Cassette; opt.	Cassette; opt.	Cassette; opt.	No	No
	110-9600 bps	110-9600 bps	110-9600 bps	To 488K bps	To 488K bps
Magnetic tape, 1/2-inch	See Comments	See Comments	See Comments	300 lpm	300 lpm
Serial printer	See Comments	See Comments	See Comments	To 1000 lpm	To 1000 lpm
Line printer	See Comments	See Comments	See Comments	To 56K bps	To 56K bps
Data communications interface	See Comments	See Comments	See Comments	80 char. x 25 lines	80 char. x 25 lines
CRT	See Comments	See Comments	See Comments	PT, card reader,	PT, card reader,
Other supported peripheral units	See Comments	See Comments	See Comments	printer/plotter,	printer/plotter,
				letter-qual. prntr.	letter-qual. prntr.
SOFTWARE	Assembler and	Assembler and	Assembler and	Macro & micro	Macro & micro
Assembler	macro assembler	macro assembler	macro assembler	assembler	assembler
Compilers	BUSINESS BASIC	BUSINESS BASIC	BUSINESS BASIC,	COBOL, RPG II,	COBOL, RPG II,
			PASCAL	BASIC, FORTRAN	BASIC, FORTRAN
Operating system	Real-time, time-	Real-time, time-	Real-time, time-	Multi-user, virtual	Multi-user, virtual
	sharing, multi-tasking	sharing, multi-tasking	sharing, multi-tasking	memory	memory
Language implemented in firmware	No	No	Partially	Partially	Partially
Operating system implemented in firmware	No	No	Partially	Partially	Partially
PRICING & AVAILABILITY	6,090	8,030	9,800	49,000 (256KB)	59,500 (512KB)
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	—	—	—	340	460
Monthly maint. of basic configuration above for on-site contract, \$	Blanket Staircase Ed.	Blanket Staircase Ed.	Blanket Staircase Ed.	Volume	Volume
Discounts available	—	—	—	15,000 (256KB)	15,000 (256KB)
Price of memory increment, \$	March 1979	March 1979	January 1981	February 1980	February 1980
Date of first delivery	500	1000	NA	NA	NA
Number installed to date	Point 4 supports many peripherals via device handlers, but does not supply these peripherals	Point 4 supports many peripherals via device handlers, but does not supply these peripherals	Point 4 supports many peripherals via device handlers, but does not supply these peripherals	Protocols supported include most IBM, Univac, Honeywell and ICL	Protocols supported include most IBM, Univac, Honeywell and ICL
COMMENTS					

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MANUFACTURER AND MODEL	Prime 450	Prime 550	Prime 650	Prime 750	Qantel Series 100
WORD LENGTH, BITS	16, 32	16, 32	16, 32	16, 32	8
NO. WORKSTATIONS SUPPORTED	32	63	63	63	2
MAIN STORAGE					
Storage type	MOS; bipolar cache	MOS; bipolar cache	MOS; bipolar cache	MOS; bipolar cache	MOS
Cycle/access time, microseconds	0.75/0.54	0.75/0.54	0.75/0.54	0.75/0.54	0.8
Min./Max. capacity, words	256K/1024K bytes	512K/2048K bytes	512K/4096K bytes	512K/8192K bytes	48K/64K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Standard	Standard	Standard	Standard	—
Storage protection	Std.; 3 levels	Std.; 3 levels	Std.; 3 levels	Std.; 3 levels	—
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	64K	64K	64K bytes
Control storage	4K x 64	4K x 64	5K x 64	7K x 64	ROM
Add time, microseconds	1.1	1.1	1.1	0.5	—
Hardware multiply/divide	Standard	Standard	Standard	Standard	—
Hardware floating point	Standard	Standard	Standard	Standard	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	Optional	Optional	No
Real-time clock or timer	Standard	Standard	Standard	Standard	—
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	2.5M bytes	2.5M bytes	2.5M bytes	8M bytes	—
No. of external interrupt levels	64	64	64	64	1
COMMUNICATIONS					
Maximum number of lines	Async. (32); Sync (4)	Async. (63); Sync (8)	Async. (63); Sync (8)	Async.(63); Sync. (8)	2
Synchronous	Std.; to 56K bps	Std.; to 56K bps	Std.; to 56K bps	Std.; to 56K bps	Opt.; to 9600 bps
Asynchronous	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Opt.; to 4800 bps
Protocols supported	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	Async, bisync
Network architectures supported	Primenet X.25	Primenet X.25	Primenet X.25	Primenet X.25	—
RJE terminals emulated	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	2780/3780
IBM 3270 emulation	Emulate & support	Emulate & support	Emulate & support	Emulate & support	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	512K-2M bytes	512K-2M bytes	512K-2M bytes	512K-2M bytes	1.3-2.6M bytes
Disk pack/cartridge drives	Both; 12-2400M bytes	Both; 12-2400M bytes	Both; 12-2400M bytes	Both; 12-2400M bytes	No
Drum/fixed-head disk storage	Fixed-head; 1M bytes	Fixed-head; 1M bytes	Fixed-head; 1M bytes	Fixed-head; 1M bytes	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	To 488K bps	To 488K bps	To 488K bps	To 488K bps	No
Serial printer	300 lpm	300 lpm	300 lpm	300 lpm	75-150 cps
Line printer	To 1000 lpm	To 1000 lpm	To 1000 lpm	To 1000 lpm	240-600 lpm
Data communications interface	To 56K bps	To 56K bps	To 56K bps	To 56K bps	To 9600 bps
CRT	80 char. x 25 lines	80 char. x 25 lines	80 char. x 25 lines	80 char. x 25 lines	Std.; 1728 char.
Other supported peripheral units	PT, card reader, printer/plotter, letter-qual. prntr.	PT, card reader, printer/plotter, letter-qual. prntr.	PT, card reader, printer/plotter, letter-qual. prntr.	PT, card reader, printer/plotter, letter-qual. prntr.	—
SOFTWARE					
Assembler	Macro & micro assembler	Macro & micro assembler	Macro & micro assembler	Macro & micro assembler	REAL Assembler
Compilers	BASIC, FORTRAN, COBOL, RPG II,	BASIC, FORTRAN, COBOL, RPG II,	BASIC, FORTRAN, COBOL, RPG II,	BASIC, FORTRAN, COBOL, RPG II,	RPG, QICBASIC
Operating system	Multi-user, virtual memory	Multi-user, virtual memory	Multi-user, virtual memory	Multi-user, virtual memory	Time-sharing
Language implemented in firmware	Partially	Partially	Partially	Partially	Partially
Operating system implemented in firmware	Partially	Partially	Partially	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	65,000 (450 QMB)	80,000 (550 HMB)	105,000 (650 HMB)	130,000 (750 HMB)	11,950
Monthly maint. of basic configuration above for on-site contract, \$	73,000 (450 HMB)	578 (550 HMB)	685 (650 HMB)	149,000 (750 1MB)	105
Discounts available	500 (450 QMB)	—	—	785 (750 HMB)	—
Price of memory increment, \$	590 (450 HMB)	—	—	965 (750 1M byte)	—
Date of first delivery	Volume	Volume	Volume	Volume	—
Number installed to date	—	40,000 (1M byte)	40,000 (1M byte)	40,000 (1M byte)	—
COMMENTS	1979	1979	1979	1979	May 1980
	NA	NA	NA	NA	NA
	Virtual memory management system permits addressing up to 32M bytes per user; 2K-byte cache memory std.; 2 to 1 memory interleaving std.	Virtual memory management system permits addressing up to 32M bytes per user; 2K-byte cache memory std.; 2 to 1 memory interleaving std.	Virtual memory management system permits addressing up to 32M bytes per user; 2K-byte cache memory std.; 2 to 1 memory interleaving std.	Virtual memory management system permits addressing up to 32M bytes per user; 16K-byte cache memory std.; 2 to 1 memory interleaving std.	

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MANUFACTURER AND MODEL	Qantel Series 200	Qantel Series 300	Qantel 210	Qantel 950	Qantel 960/965
WORD LENGTH, BITS	8	8	8	8	8
NO. WORKSTATIONS SUPPORTED	32	64	1	16	16
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	0.95	0.95	1.5	1.5	1.5
Cycle/access time, microseconds	64K/256K bytes	128K/1024K bytes	48K/64K bytes	16K/64K bytes	16K/64K, 64K/256K
Min./Max. capacity, words	Standard	Standard	Standard	Standard	Standard
Parity checking	—	—	No	No	No
Error correction	—	—	No	No	No
Storage protection	—	—	No	No	No
CENTRAL PROCESSOR	256K bytes	1024K bytes	64K bytes	48K bytes	64K/256K bytes
No. of directly addressable words	ROM	ROM	ROM; 26K bytes	ROM; 32K bytes	ROM; 32K bytes
Control storage	—	—	22	18	8
Add time, microseconds	—	—	No	No	No
Hardware multiply/divide	No	No	No	No	No
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	No	No	No	No	No
Battery backup	—	—	No	Optional	Optional
Real-time clock or timer	—	—	No	Optional	Optional
INPUT/OUTPUT CONTROL	Standard	Standard	No	Standard	Standard
Direct memory access channel	—	—	—	667K	909K
Maximum I/O rate, words/sec.	1	1	None	1	1
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS	2	2	1	1	1
Maximum number of lines	Opt.; to 9600 bps	Opt.; to 9600 bps	To 50K bps	110-50K bps	110-50K bps
Synchronous	Opt.; to 4800 bps	Opt.; to 4800 bps	To 38.4K bps	To 38.4K bps	To 38.4K bps
Asynchronous	Async, bisync	Async, bisync	Bisync	Async, bisync	Async, bisync
Protocols supported	—	—	—	—	—
Network architectures supported	2780/3780	2780/3780	—	—	—
RJE terminals emulated	Yes	Yes	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT	No	No	1.3-5.2M bytes	2.6M bytes	2.6M bytes
Floppy disk (diskette) drives	Cart.; 12M bytes	Cart.; 12M bytes	No	Cart.; 6-36M bytes	Cart.; 6-300M bytes
Disk pack/cartridge drives	pack; 20-200MB	pack; 20-200MB	—	—	—
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	Opt.; 800/1600 bpi	Opt.; 800/1600 bpi	No	36-72 KBS	36-72 KBS
Serial printer	150 cps	75-150 cps	45-120 cps	120 cps	55/120 cps
Line printer	240-600 lpm	300 lpm	300 lpm	300-600 lpm	50-600 lpm
Data communications interface	To 9600 bps	To 9600 bps	1200 bps	To 50K bps	To 50K bps
CRT	Std.; 1728 char.	Std.; 1728 char.	64 char. x 27 lines	64 char. x 27 lines	64 char. x 27 lines
Other supported peripheral units	—	—	None	None	None
SOFTWARE	REAL Assembler	REAL Assembler	Yes	Yes	Yes
Assembler	—	—	—	—	—
Compilers	RPG, QICBASIC	RPG, QICBASIC	QICBASIC	QICBASIC	QICBASIC
Operating system	Time-sharing	Time-sharing	Time-sharing	Time-sharing	Time-sharing
Language implemented in firmware	Partially	Partially	Partially	Partially	Partially
Operating system implemented in firmware	Partially	Partially	Partially	Partially	Partially
PRICING & AVAILABILITY	29,950	49,950	11,950	27,900	29,990/39,500
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	286	379	90	245	275/330
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	2,950 (32K bytes)	2,950 (32K bytes)	1,450 (16K bytes)	1,450 (8K bytes)	2,450 (16K bytes)
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	May 1980	May 1980	December 1977	1st qtr. 1975	NA
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	—	—	—	System 950 price includes 48K bytes, 6M bytes disk drive, 55 cps printer, and one CRT	Model 965 price includes 48K bytes, magnetic tape drive, 24M bytes fixed disk, 120 cps printer, and one CRT

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MANUFACTURER AND MODEL	Qantel 970/975	Qantel 1400	Qantel 1400-2	Qantel 1450	Qantel 1450-2
WORD LENGTH, BITS	8	8	8	8	8
NO. WORKSTATIONS SUPPORTED	32	64	64	64	64
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.8	1.1	1.1	0.8	0.8
Min./Max. capacity, words	64K/256K bytes	40K/128K bytes	48K/128K bytes	64K/1024K bytes	64K/1024K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	256K bytes	128K bytes	128K bytes	1024K bytes	1024K bytes
Control storage	ROM: 32K bytes	ROM: 32K bytes	ROM: 32K bytes	ROM: 32K bytes	ROM: 32K bytes
Add time, microseconds	4	8	8	4	4
Hardware multiply/divide	Standard	No	No	Standard	Standard
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	NA	No	No	—	—
Real-time clock or timer	Optional	Optional	Optional	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	No	No
Maximum I/O rate, words/sec.	375K	909K	909K	—	—
No. of external interrupt levels	1	1	1	1	1
COMMUNICATIONS					
Maximum number of lines	1	4	4	4	4
Synchronous	110-50K bps	110-50K bps	110-50K bps	110-50K bps	110-50K bps
Asynchronous	To 38.4K bps	To 38.4K bps	To 38.4K bps	To 38.4K bps	To 38.4K bps
Protocols supported	Async, bisync	Bisync	Bisync	Bisync	Bisync
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	—	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	2.6M bytes	2.6M bytes	2.6M bytes	2.6M bytes	2.6M bytes
Disk pack/cartridge drives	Cart.; 12-300 MB	Cart.; 12-48M bytes pack; 25-600 MB	Cart.; 12-48MB Fixed; 25-600 MB	Cart.; 12-300MB	Cart.; 25-300MB
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	36-72 KBS	36-72 KBS	36-72 KBS	36-72 KBS	36-72 KBS
Serial printer	55-120 cps	120 cps	120 cps	55 cps	55 cps
Line printer	50-600 lpm	300-600 lpm	300-600 lpm	300 lpm	300 lpm
Data communications interface	To 50K bps	Up to 50K bps	Up to 50K bps	Up to 50K bps	Up to 50K bps
CRT	64 char. x 27 lines	64 char. x 27 lines	64 char. x 27 lines	64 char. x 27 lines	64 char. x 27 lines
Other supported peripheral units	None	None	None	None	None
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes	Yes
Compilers	QIC (BASIC)	QICBASIC	QICBASIC	QICBASIC	QICBASIC
Operating system	Time-sharing	Time-sharing	Time-sharing	Time-sharing	Time-sharing
Language implemented in firmware	Partially	Partially	Partially	Partially	Partially
Operating system implemented in firmware	Partially	Partially	Partially	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	35,900/59,000	43,900	64,900	44,900	69,900
Monthly maint. of basic configuration above for on-site contract, \$	352/482	335	485	335	485
Discounts available	—	—	—	—	—
Price of memory increment, \$	2,950 (32K bytes)	1,450 (8K bytes)	1,450 (8K bytes)	2,950 (32K bytes)	2,950 (32K bytes)
Date of first delivery	NA	2nd qtr. 1977	2nd qtr. 1977	1st qtr. 1979	1st qtr. 1979
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Model 975 price includes 64K bytes, 25M byte sealed disk drive, magnetic tape drive, 50-100 lpm printer, and one CRT	System 1400 price includes 40K bytes, 12M bytes disk drive, 300 lpm printer, and one CRT; includes program and report generating packages	System 1400-2 price includes 48K bytes, 25M bytes disk drive, magnetic tape drive, 300 lpm printer, and two CRT's; includes program and report generating programs	System 1450 price includes 128K bytes, 12M bytes disk drive, 300 lpm printer, and one CRT	System 1450-2 price includes 128K bytes, 25M bytes disk drive, magnetic tape drive, 300 lpm printer, and two CRT's

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MANUFACTURER AND MODEL	Raytheon RDS-500	Raytheon RDS-7500	Roim 1602B (AN/UYK-19)	Roim 1603A (AN/UYK-12)	Roim 1606 (AN/UYK-19)
WORD LENGTH, BITS	16 + 2	16 + 2	16	16	16
NO. WORKSTATIONS SUPPORTED	—	—	2	2	16
MAIN STORAGE					
Storage type	Core or MOS	MOS	Core	Core	Core
Cycle/access time, microseconds	0.70/0.45	0.70/0.45	1.0	1.2	1.0
Min./Max. capacity, words	16K/64K	32K/128K	16K/64K	16K/32K	16K/1024K
Parity checking	Standard	Standard	No	No	No
Error correction	Standard (MOS)	Standard	No	No	No
Storage protection	—	—	No	No	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	64K	32K	64K
Control storage	No	No	ROM; 1K x 52 bits	—	ROM; 4K x 36 bits
Add time, microseconds	1.4	1.4	1.0	1.2	1.0
Hardware multiply/divide	Standard	Standard	Standard	Optional	Standard
Hardware floating point	Optional	Optional	Optional	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	No	No	No
Real-time clock or timer	Optional	Optional	Optional	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	2M	2M	666K	768K	1M
No. of external interrupt levels	16	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	—	128	—	—	—
Synchronous	—	Standard (128)	38.4K bps	38.4K bps	38.4K bps
Asynchronous	—	Standard (128)	19.2K bps	19.2K bps	19.2K bps
Protocols supported	—	PARS, Bisync, SDLC, 4100	—	—	—
Network architectures supported	—	SNA	—	—	—
RJE terminals emulated	—	—	—	—	—
IBM 3270 emulation	—	Yes	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	Yes	Yes	Yes
Disk pack/cartridge drives	Both; 2.56-1200M bytes	Both; 2.56-1200M bytes	Cartridge; 5M bytes	Cartridge; 5M bytes	Cartridge & Pack.; 20-190M bytes
Drum/ fixed-head disk storage	Fixed-head; 770K-3.08M bytes	No	Fixed-head; 4M bytes	Fixed-head; 4M bytes	Fixed-head; 0.5-4M bytes
Magnetic tape cassettes/cartridges	Cassette	Cassette	Cartridge	Cartridge	Cartridge
Magnetic tape, 1/2-inch	58.6K bps	58.6K bps	Optional	Optional	Optional
Serial printer	10-165 cps	10-165 cps	60 cps	60 cps	60 cps
Line printer	300-1250 lpm	300-1250 lpm	600 lpm	600 lpm	600 lpm
Data communications interface	14.2K bps	19.2K bps	Yes	Yes	Yes
CRT	1920 characters	1920 characters	Yes	Yes	Yes
Other supported peripheral units	Apollo array, plotters, A/D & D/A converters	—	Paper tape units, D/A & A/D, MIL-STD-1553, NTDS	Paper tape units, D/A & A/D, MIL-STD-1553, NTDS	Paper tape units, D/A & A/D converters, NTDS, 1553
SOFTWARE					
Assembler	Macro assembler	Macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	FORTRAN	FORTRAN	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN
Operating system	Batch, real-time, multiprogramming	Pre-emptive	BATCH, real-time	Batch, real-time	Batch, real-time
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	19,800 (32K Core)	17,100 (32K MOS)	32,200	18,000	46,700
Monthly maint. of basic configuration above for on-site contract, \$	5,400 (16K Core)	—	—	—	—
Discounts available	—	—	GSA, OEM, qty. 7,200 (16K words)	GSA, OEM, qty. 6,000 (16K words)	GSA, OEM, qty. 7,200 (16KW)
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	February 1973	1980	1977	1976	1978
Number installed to date	Over 800	NA	Approx. 500	100	100
COMMENTS	Apollo array processor can perform 22 specialized array operations	Multiprocessing system capability	Designed to meet Mil-E-5400 & Mil-E-16400 spec.; ATR chassis; micro-programmed militarized CPU	Designed to meet Mil-E-5400 & Mil-E-16400 spec.; ATR chassis; low-priced, faster version of previously offered Model 1603. Model compatible with DG Nova	Designed to meet Mil-E-16400; system used on Navy DPEWS (AN/SQ-32); same as 1666 except for floating-point capability

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MANUFACTURER AND MODEL	Rolm 1650 (AN/UYP-19)	Rolm 1664 (AN/UYP-19)	Rolm 1666 (AN/UYP-19)	Rolm MSE/14 MIL-SPEC Eclipse	Rolm MSE/25 MIL-SPEC Eclipse
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	2	2	16	48	48
MAIN STORAGE					
Storage type	Core	Core	Core	MOS/Core	Core
Cycle/access time, microseconds	1.0	1.0	1.0	.4/.4	1.0
Min./Max. capacity, words	16K/32K	16K/64K	16K/1024K	32K/1024K	32K/1024K
Parity checking	No	No	No	Standard (Core)	Standard
Error correction	No	No	No	Standard (MOS)	No
Storage protection	No	Optional	Standard	Standard	Optional
CENTRAL PROCESSOR					
No. of directly addressable words	32K	64K	64K	32K	32K
Control storage	ROM; 1K x 52 bits	ROM; 4K x 32 bits	ROM; 4K x 36 bits	PROM	ROM
Add time, microseconds	1.0	1.0	1.0	2	0.5
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Standard	Standard	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	No	Optional	No
Real-time clock or timer	Optional	Optional	Optional	Standard	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	666K	1M	1M	1M	620K
No. of external interrupt levels	16	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	38.4K bps	38.4K bps	38.4K bps	Opt.; 38.4K bps	38.4K bps
Asynchronous	19.2K bps	19.2K bps	19.2K bps	Std.; 19.2K bps	19.2K bps
Protocols supported	—	—	—	—	—
Network architectures supported	—	None	None	None	None
RJE terminals emulated	—	None	None	None	None
IBM 3270 emulation	—	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes	Yes	Yes	Opt.; 2.4M bytes	Yes
Disk pack/cartridge drives	Cartridge; 5M bytes	Cartridge; 5M bytes	Pack & Cartridge; 20-190M bytes	Pack & Cartridge; 20-536M bytes	Pack & Cartridge; 20-190M bytes
Drum/fixed-head disk storage	Fixed-head; 4M bytes	Fixed-head; 4M bytes	Fixed-head; 0.5-4.0M bytes	Fixed-head; 2 x 4M bytes	Fixed; 4M bytes
Magnetic tape cassettes/cartridges	Cartridge	Cartridge	Cartridge	Cartridge	Cartridge
Magnetic tape, 1/2-inch	Optional	Optional	Optional	Yes	Yes
Serial printer	60 cps	60 cps	60 cps	60 cps	Yes
Line printer	600 lpm	600 lpm	600 lpm	600 lpm	Yes
Data communications interface	Yes	Yes	Yes	Yes	Yes
CRT	Yes	Yes	Yes	Yes	Yes
Other supported peripheral units	PT, D/A & A/D units, NTDS, 1553	Paper tape units, D/A & A/D converters, NTDS, 1553	Paper tape units, D/A & A/D converters, NTDS, 1553	A/D & D/A, 1553A, NTDS	A/D, D/A, MIL-Std.-1553A, NTDS
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & Macro assembler	Macro assembler	Assembler & Macro assembler
Compilers	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN	FORTRAN, ALGOL, PL/1, DG/L, BASIC	ALGOL, BASIC, PL/1, FORTRAN
Operating system	Batch, real-time	Batch, real-time	Batch, real-time	Time-sharing, real-time	Time-sharing, real-time, batch
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	34,800	48,900	52,700	47,000	45,600
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	GSA, OEM, qty.	OEM, GSA, qty.	OEM, GSA, qty.	—	OEM, GSA, qty.
Price of memory increment, \$	7,200 (16K words)	7,200 (16K words)	7,200 (16K words)	12,000 (32K Core) 17,500 (64K MOS)	12,000 (32K words)
Date of first delivery	1976	1976	1977	NA	NA
Number installed to date	NA	100	40	NA	NA
COMMENTS	Designed to meet Mil-E-5400 & Mil-E-16400 specif., half ATR version of Rolm 1602B	Designed to meet Mil-E-5400 & Mil-E-16400 specif., ATR chassis, tri-processor militarized computer, upward-compatible with other Rolm computers	Designed to meet Mil-E-5400 & Mil-E-16400 specif.; Std. 64K-bit floating-point arithmetic; std. memory mgmt. for up to 1024K words; complete protection and security features	Designed to meet Mil-E-5400 & Mil-E-16400 specif.; single ATR chassis can house the CPU, FPU, 236K words semi., and 8 I/O slots	Includes 32K words memory, processor, and front panel

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MANUFACTURER AND MODEL	Roim MSE/800	Sperry Univac BC/7 600	Sperry Univac BC/7 700	Sperry Univac BC/7 800	Sperry Univac BC/7 900
WORD LENGTH, BITS	32	8	8	8	8
NO. WORKSTATIONS SUPPORTED	128	2	4	6	8
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	880 ns. (16 bytes)	1.0/0.5	1.0/0.5	1.0/0.5	0.67/0.33 (approx.)
Min./Max. capacity, words	256K/2048K	48K bytes/64K bytes	48K bytes/64K bytes	128K/128K bytes	262K/262K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Standard	No	No	No	No
Storage protection	Standard	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	4.3G	64K bytes	64K bytes	64K bytes	64K bytes
Control storage	RAM; 4K x 75	4K bytes	4K bytes	4K bytes	4K bytes
Add time, microseconds	0.22	106 (5 digits)	106 (5 digits)	106 (5 digits)	65 (5 digits)
Hardware multiply/divide	Standard	—	—	—	—
Hardware floating point	Standard	—	—	—	—
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	No	No	No
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	See Comments	1M bytes	1M bytes	1M bytes	1M bytes
No. of external interrupt levels	16	5	5	5	5
COMMUNICATIONS					
Maximum number of lines	128	2	2	2	2
Synchronous	No	2000-9600 bps	2000-9600 bps	2000-9600 bps	2000-9600 bps
Asynchronous	Opt.; 19.2K bps	No	No	No	No
Protocols supported	None	Bisync, sync	Bisync, sync	Bisync, sync	Bisync, sync
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	See Comments	See Comments	See Comments	See Comments
IBM 3270 emulation	No	Yes	Yes	Yes	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	—	2M-6M bytes	2M-4M bytes	2M-4M bytes	2M-4M bytes
Disk pack/cartridge drives	—	No	Cartridge; 5M-40M bytes	Cartridge; 10M-40M bytes	Cartridge; 10M-40M bytes
Drum/fixed-head disk storage	Fixed; 36M bytes	No	No	No	Opt.; 100M bytes
Magnetic tape cassettes/cartridges	—	No	No	No	No
Magnetic tape, 1/2-inch	Optional	No	20, 40 KBS	20, 40 KBS	20, 40 KBS
Serial printer	Optional	200 cps	200 cps	200 cps	200 cps
Line printer	Optional	180 lpm	180-640 lpm	180-640 lpm	180-640 lpm
Data communications interface	Optional	9600 bps	9600 bps	9600 bps	9600 bps
CRT	Optional	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	NTDS	Punched card reader	Punched card reader	Punched card reader	Punched card reader
SOFTWARE					
Assembler	Yes	No	No	No	No
Compilers	FORTRAN 77, PL/1, BASIC, COBOL	RPG II, ESCORT	RPG II, ESCORT	RPG II, ESCORT	RPG II, ESCORT
Operating system	Multiprogramming, virtual storage	Interactive, batch	Interactive, batch	Interactive, batch	Interactive, batch
Language implemented in firmware	No	No	No	No	No
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	268,100	17,162	21,800	34,900	40,900
Monthly maint. of basic configuration above for on-site contract, \$	—	169	161	252	287
Discounts available	OEM, quantity	—	—	—	—
Price of memory increment, \$	29,900 (256K bytes)	900 (16K bytes)	900 (16K bytes)	900 (16K bytes)	900 (14K bytes)
Date of first delivery	December 1981	April 1977	April 1977	July 1978	Second qtr. 1980
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	I/O rate for BMC is 16.16M bps (input), 14.54M bps (output); for DMA is 2.27M bps (input) 1.3M bps (output)	Supports the following RJE terminals: 2780/3780, HASP, 1004, 9300 NTR, DCT 1000/2000	Supports the following RJE terminals: 2780/3780, HASP, 1004, 9300 NTR, DCT 1000/2000	Supports the following RJE terminals: 2780/3780, HASP, 1004, 9300 NTR, DCT 1000/2000	Supports the following RJE terminals: 2780/3780, HASP, 1004, 9300 NTR, DCT 1000/2000

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MANUFACTURER AND MODEL	Sperry Univac V77-200	Sperry Univac V77-400	Sperry Univac V77-500	Sperry Univac V77-600	Sperry Univac V77-700
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	128	128	128	128	128
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time, microseconds	0.66/0.56	0.66/0.56	.6	0.66/0.56	.5/.75
Min./Max. capacity, words	8K/32K	8K/1024K	64K/512K	16K/1024K	128K/1024K
Parity checking	Optional	Optional	No	Optional	No
Error correction	No	No	Standard	Yes	Standard
Storage protection	Optional	Std. w/megamap	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	32K	32K	32K	32K	32K
Control storage	ROM; 512 x 24	ROM	WCS	WCS	WCS
Add time, microseconds	2.31	2.64	1.5	0.66-2.15	1.2
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	No	Optional	No	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional; 1.5 hrs.	Optional; 8 hrs.	Optional	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	319K	1.5M	1.66M	1.51M	1.66M
No. of external interrupt levels	8-64	8-64	8-64	8-64	8-64
COMMUNICATIONS					
Maximum number of lines	128	128	128	128	128
Synchronous	50KB	50KB	50KB	50KB	50KB
Asynchronous	9600 bps	9600 bps	9600 bps	9600 bps	9600 bps
Protocols supported	UDLC/SDLC, bisync	UDLC/SDLC, bisync	UDLC, SDLC, bisync	UDLC/SDLC, bisync	UDLC, SDLC, bisync
Network architectures supported	—	—	Univac DCA	Univac DCA	Univac DCA
RJE terminals emulated	HASP + 1004	HASP + 1004	HASP + 1004	HASP + 1004	HASP + 1004
IBM 3270 emulation	—	SDLC/BISYNC	SDLC/BISYNC	SDLC/BISYNC	SDLC/BISYNC
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes	Yes	Yes	Yes	Yes
Disk pack/cartridge drives	Both; 10M-40M bytes	Both; 10M-1.6B bytes	Both; 10M-1.6B bytes	Both; 10M-1.6B bytes	Both; 10M-1.6B bytes
Drum/fixed-head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	120 KBS	120 KBS	120KBS	120 KBS	120KBS
Serial printer	200 cps	200 cps	200 cps	200 cps	200 cps
Line printer	300-600 lpm	300-600 lpm	300-600 lpm	300-600 lpm	300-600 lpm
Data communications interface	50K bytes	50K bytes	50K bytes	50K bytes	50K bytes
CRT	Yes	Yes	Standard	Yes	Standard
Other supported peripheral units	IEEE-488 data acquisition	IEEE-488 data acquisition	IEEE-488 data acquisition	IEEE-488 data acquisition	IEEE-488 data acquisition
SOFTWARE					
Assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler
Compilers	FORTRAN IV, RPG II, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL
Operating system	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking
Language implemented in firmware	No	Optional	Optional	Optional	Optional
Operating system implemented in firmware	No	No	Optional	Optional	Optional
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	5,350 (8K words)	7,850 (8K words)	29,500 (64K words)	13,950 (16K words)	36,100 (128K words)
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	1,350 (8K words)	1,350 (8K words)	9,450 (128K words)	2,900 (16K words)	9,450 (128K words)
Date of first delivery	NA	NA	December 1980	December 1976	December 1980
Number installed to date	NA	NA	NA	NA	NA
COMMENTS			Price includes CRT console terminal; field-upgradeable to a V77-700 and V77-800		Price includes CRT console terminal; field-upgradeable to a V77-800

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MANUFACTURER AND MODEL	Sperry Univac V77-800	STC Systems System 4000	STC Systems System 5000	Tandem Computers T16/1403	Terak Corporation 8510/a
WORD LENGTH, BITS	16	16	16	16 + 1	16
NO. WORKSTATIONS SUPPORTED	128	3	40	256	8
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS RAM
Storage type	0.60	0.7/0.35	0.7/0.35	0.5/0.5	1.2/1.2
Cycle/access time, microseconds	64K/1024K	32K	32K/256K	384K/2M	64K/64K
Min./Max. capacity, words	No	Optional	Optional	No	Standard
Parity checking	Yes	No	No	Standard	—
Error correction	Standard	No	No	Standard	No
Storage protection					
CENTRAL PROCESSOR					
No. of directly addressable words	32K	256	256	128K	64K
Control storage	WCS	No	No	PROM; 4K x 32 bits	—
Add time, microseconds	0.45	0.7	0.7	0.5	3.5
Hardware multiply/divide	Standard	Optional	Optional	Standard	Standard
Hardware floating point	Optional	No	No	Optional	Standard
Hardware byte manipulation	Standard	No	No	Standard	Standard
Battery backup	Optional	Optional	Optional	Standard	No
Real-time clock or timer	Standard	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.66M	1.1M	1.1M	4MB/processor	—
No. of external interrupt levels	8-64	16	16	16	2
COMMUNICATIONS					
Maximum number of lines	128	—	—	256	8
Synchronous	50KB	Opt.; 1200 bps	Opt.; 1200 bps	Opt.; to 80K bps	Optional
Asynchronous	9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 50-19.2K bps	Std.; 19.2K bps
Protocols supported	UDLC/SDLC, bisync	Bisync	Bisync	—	Several
Network architectures supported	Univac DCA	—	—	NCP	DECnet
RJE terminals emulated	HASP + 1004	IBM 2780/3780	IBM 2780/3780	2780/3780,360/370	None
IBM 3270 emulation	SDLC/BISYNC	Yes	Yes	—	Optional
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes	No	No	No	Yes
Disk pack/cartridge drives	Both; 10M-1.6B bytes	Pack; 12-64M bytes	Pack; 12-320M bytes	Pack & cartridge; 64-240M bytes	No
Drum/fixed-head disk storage	No	No	No	Both; 64MB (removable), 1.5MB (fixed)	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	120 KBS	Yes, 60KBS	Yes, 60KBS	36-120 KBS	No
Serial printer	200 cps	Std.; 64 cps	Std.; 64 cps	200 cps	60, 180 cps
Line printer	300-600 lpm	Opt.; 300-900 lpm	Opt.; 300-900 lpm	300-1500 lpm	No
Data communications interface	50K bytes	Std.; 300-2400 bps	Std.; 300-2400 bps	50-80K bps	No
CRT	Yes	—	—	80 char. x 25 lines	1920 characters
Other supported peripheral units	IEEE-488 data acquisition	—	—	None	Plotters, digitizers
SOFTWARE					
Assembler	Assembler, macro assembler	Yes	Yes	Assembler, macro assembler	Assembler & Macro assembler
Compilers	FORTRAN IV, RPG II, COBOL, PASCAL	BASIC	BASIC	COBOL, TAL, FORTRAN	BASIC, FORTRAN, PASCAL
Operating system	Batch, real-time, multi-tasking	Real-time	Real-time	Multiprocessing, multiprog., virt.	Real-time
Language implemented in firmware	Optional	No	No	Partially	No
Operating system implemented in firmware	Optional	No	No	Partially	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	38,500 (128K words)	9,000	15,700	22,000	8,350
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	136	NA
Discounts available	—	—	—	—	Qty., educational
Price of memory increment, \$	9,450 (128K words)	3,500 (32K)	3,500 (32K)	7,200	NA
Date of first delivery	July 1979	1976	1980	May 1976	April 1977
Number installed to date	NA	200	20	250 + (processors)	Over 1300
COMMENTS		Sold only as an integral part of a turnkey system, which includes hardware, software, installation, training, and maintenance	Sold only as an integral part of a turnkey system, which includes hardware, software, installation, training, and maintenance	Multiprocessor system containing from 2 to 16 CPU's for fault-tolerance; all system components are dual-ported, CPU's have dual buses	Packaged system includes CRT, keyboard, graphic, processor (full memory), etc.; Full DEC "Q" bus and RT/11 software compatibility

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MANUFACTURER AND MODEL	Texas Instruments 990/4	Texas Instruments 990/5	Texas Instruments 990/10	Texas Instruments 990/12
WORD LENGTH, BITS	16 + 1	16 + 1	16 + 6	16 + 6
NO WORKSTATIONS SUPPORTED	See Comments	See Comments	See Comments	See Comments
MAIN STORAGE				
Storage type	MOS	MOS	MOS	MOS/cache
Cycle/access time, microseconds	0.67/0.67	0.50/0.50	0.67/0.67	.74, .15/.50, .15
Min./Max. capacity, words	4K/28K	16K/32K	64K/1,048K	128K/1,048K
Parity checking	Standard	Standard	No	No
Error correction	No	No	Standard	Standard
Storage protection	No	No	Standard	Standard
CENTRAL PROCESSOR				
No. of directly addressable words	32K	32K	32K	32K
Control storage	No	No	No	No
Add time, microseconds	4.7	3.5	3.6	.552
Hardware multiply/divide	Standard	Standard	Standard	Standard
Hardware floating point	No	No	No	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	Optional	No
Real-time clock or timer	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL				
Direct memory access channel	No	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.5M	1M	3M	3M
No. of external interrupt levels	—	16	16	16
COMMUNICATIONS				
Maximum number of lines	See Comments	See Comments	See Comments	See Comments
Synchronous	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps
Asynchronous	Standard	Standard	Standard	Standard
Protocols supported	Bisync	Bisync	Bisync	Bisync
Network architectures supported	—	—	—	—
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	No	No	Yes	Yes
PERIPHERAL EQUIPMENT				
Floppy disk (diskette) drives	242-968K bytes	242K-4M bytes	242K-4M bytes	242K-4M bytes
Disk pack/cartridge drives	No	10M-200M bytes	10M-800M bytes	10M-800M bytes
Drum/fixed-head disk storage	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No
Magnetic tape, 1/2-inch	No	30-60 KBS	30-60 KBS	30-60 KBS
Serial printer	180 cps	180 cps	180 cps	180 cps
Line printer	300-600 lpm	300-600 lpm	300-600 lpm	300-600 lpm
Data communications interface	75-9600 bps	75-9600 bps	75-9600 bps	75-9600 bps
CRT	1920 char.	1920 char.	1920 char.	1920 char.
Other supported peripheral units	PROM programmer, A/D & D/A converters	PROM programmer, A/D & D/A converter	Prom programmer A/D & D/A converters	Prom programmer A/D & D/A converters
SOFTWARE				
Assembler	Yes	Yes	Assembler & Macro assembler	Assembler & Macro assembler
Compilers	FORTRAN	FORTRAN, BASIC	FORTRAN, BASIC, COBOL, PASCAL, RPG II	FORTRAN, BASIC, COBOL, PASCAL, RPG II
Operating system	Real-time, multi-task	Real-time, multi-task	Real-time, multi-task	Real-time, multi-task
Language implemented in firmware	No	No	No	No
Operating system implemented in firmware	No	No	No	No
PRICING & AVAILABILITY				
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	2,685 (8K bytes RAM)	4,400 (32K bytes)	16,060 (64K words)	32,750 (128K words)
Monthly maint. of basic configuration above for on-site contract, \$	66	66	137	245
Discounts available	—	—	—	—
Price of memory increment, \$	2,275 (16K words)	800 (32K bytes)	6,500 (128K words)	6,500 (128K words)
Date of first delivery	March 1976	April 1979	March 1976	September 1979
Number installed to date	NA	NA	NA	NA
COMMENTS	Based on TI's TMS 9900 microprocessor; num. of workstations & lines are a function of application	Based on TI's TMS 9900 microprocessor; num. of workstations & lines are a function of application & memory sizes	MSI implementation of 990 instruction set; Disk Oper. Sys.; num. of workstations & lines are a function of application & memory sizes	SCHOTTKY implementation of 990 instruction set; num. of workstations & line are a function of application & memory sizes

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MANUFACTURER AND MODEL	Ultimate 4303A1	Ultimate 4303B	Ultimate 4303C	Ultimate 4303D
WORD LENGTH, BITS	16	16	16	16
NO. WORKSTATIONS SUPPORTED	7	64	64	64
MAIN STORAGE Storage type Cycle/access time, microseconds Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 6 32K/128K Standard Optional Standard	MOS 6 32K/1024K Standard Optional Standard	MOS 6 32K/1024K Standard Optional Standard	MOS 6 32K/1024K Standard Optional Standard
CENTRAL PROCESSOR No. of directly addressable words Control storage Add time, microseconds Hardware multiply/divide Hardware floating point Hardware byte manipulation Battery backup Real-time clock or timer	128K WCS; 2K x 64 bits NA Standard No Standard Optional Standard	1024K WCS; 2K x 64 bits NA Standard No Standard Optional Standard	1024K WCS; 2K x 64 bits NA Standard No Standard Optional Standard	1024K WCS; 2K x 64 bits NA Standard No Standard Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 3M 64	Standard 3M 64	Standard 3M 64	Standard 3M 64
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported	7 Opt.; 9600 bps Std.; 9600 bps Bisync, 2780/3780	64 Opt.; 9600 bps Std.; 9600 bps Bisync, 2780/3780	64 Opt.; 9600 bps Std.; 9600 bps Bisync, 2780/3780	64 Opt.; 9600 bps Std.; 9600 bps Bisync, 2780/3780
Network architectures supported RJE terminals emulated IBM 3270 emulation	— 2780/3780 No	— 2780/3780 No	— 2780/3780 No	— 2780/3780 No
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives	No Std.; 13M-80M bytes	No Std.; 80-640M bytes	No Std.; 80-640M bytes	No Std.; 288-2304M bytes
Drum/fixed-head disk storage	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No
Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	No Opt.; 150 lpm Opt.; 900 lpm 9600 bps Std.; 80 x 24 char. —	No Opt.; 150 lpm Opt.; 900 lpm 9600 bps Std.; 80 x 24 char. —	Standard; 800 bpi Opt.; 150 lpm Opt.; 900 lpm 9600 bps Std.; 80 x 24 char. —	Standard; 800 bpi Opt.; 150 lpm Opt.; 900 lpm 9600 bps Std.; 80 x 24 char. —
SOFTWARE Assembler	Yes	Yes	Yes	Yes
Compilers	BASIC	BASIC	BASIC	BASIC
Operating system	Multi-user, time-sharing Partially Fully	Multi-user, time-sharing Partially Fully	Multi-user, time-sharing Partially Fully	Multi-user, time-sharing Partially Fully
Language implemented in firmware Operating system implemented in firmware	— Fully	— Fully	— Fully	— Fully
PRICING & AVAILABILITY Price of CPU, power supply, frt panel, and minimum memory in chassis, \$ Monthly maint. of basic configuration above for on-site contract, \$ Discounts available Price of memory increment, \$	29,750 395 — 6,500 (64K)	39,400 465 — 6,500 (64K)	60,400 555 — 6,500 (64K)	79,000 640 — 6,500 (64K)
Date of first delivery Number installed to date	April 1979 235 (all sys.)	April 1979 235 (all sys.)	April 1979 235 (all sys.)	April 1979 235 (all sys.)
COMMENTS	Price includes OS, 16/16MB-disk drive, 4 ports, 64K bytes of main memory	Price includes OS, 80/16MB-disk drive, 4 ports, and 64K bytes of main memory	Price includes OS, 80/16MB-disk drive, 4 ports, 64K bytes of main memory, and an 800-bpi magnetic tape drive	Price includes OS, 288M-byte disk drive, 4 ports, 64K bytes of main memory, and an 800-bpi magnetic tape drive

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MANUFACTURER AND MODEL	Ultimate 5303E	Wang 2200 Series	Xerox Diablo 3000	Xerox Diablo 3200
WORD LENGTH, BITS	16	8-bit byte	8 + parity	8 + parity
NO WORKSTATIONS SUPPORTED	64	4-8	5	9
MAIN STORAGE	MOS	MOS	MOS	MOS
Storage type	.6	0.6	.41/.25	.488/.30
Cycle/access time, microseconds	32K/1024K	16K/256K bytes	32K/64K	24K/64K
Min./Max. capacity, words	Standard	No	Standard	Standard
Parity checking	Optional	No	No	No
Error correction	Standard	No	No	No
Storage protection				
CENTRAL PROCESSOR				
No. of directly addressable words	1024K	No	64K	64K
Control storage	WCS; 2K x 64 bits	ROM; 48K words	ROM; 2K	ROM; 1K
Add time, microseconds	NA	13	16.7 (6 digits)	23.9 (6 digits)
Hardware multiply/divide	Standard	Standard	No	No
Hardware floating point	No	Standard	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard
Battery backup	Optional	No	No	No
Real-time clock or timer	Standard	Optional	Standard	Standard
INPUT/OUTPUT CONTROL				
Direct memory access channel	Standard	No	Standard	Standard
Maximum I/O rate, words/sec.	3M	100K	1.5M	1M
No. of external interrupt levels	64	None	8	8
COMMUNICATIONS				
Maximum number of lines	64	9	1	9
Synchronous	Opt.; 9600 bps	Up to 9600 bps	Opt.; to 9600 bps	Opt.; up to 9600 bps
Asynchronous	Std.; 9600 bps	Up to 9600 bps	Opt.; to 9600 bps	Opt.; up to 9600 bps
Protocols supported	Bisync, 2780/3780	Bisync	None	None
Network architectures supported	—	—	None	None
RJE terminals emulated	2780/3780	—	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	No	—	No	No
PERIPHERAL EQUIPMENT				
Floppy disk (diskette) drives	No	262-786K bytes	1M-2.5M bytes	1M-5M byte
Disk pack/cartridge drives	Std.; 288-2304M bytes	Cartridge 12-20M bytes	No	Cartridge; 10-20M bytes
Drum/fixed-head disk storage	No	No	No	No
Magnetic tape cassettes/cartridges	No	Cassette; 326 bps	No	No
Magnetic tape, 1/2-inch	Standard; 800 bpi	10 KBS	No	No
Serial printer	Opt.; 150 lpm	200 cps	30 to 200 cps	40, 45, or 200 cps
Line printer	Opt.; 900 lpm	600 lpm	No	No
Data communications interface	9600 bps	To 9600 bps	To 9600 bps	Up to 9600 bps
CRT	Std.; 80 x 24 char.	64 char. x 16 lines	1920 characters	1920 characters
Other supported peripheral units	—	Paper tape reader, paper tape punch, card punch, plotter	—	—
SOFTWARE				
Assembler	Yes	No	Global Assembler	Global Assembler
Compilers	BASIC	BASIC, BASIC-2	DACL & ABL*, Business BASIC	DACL & ABL, Business BASIC
Operating system	Multi-user, time-sharing	None	Batch, interactive	Batch, interactive, time-sharing
Language implemented in firmware	Partially	Fully	No	No
Operating system implemented in firmware	Fully	NA	No	No
PRICING & AVAILABILITY				
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	98,000	9,000 (16K bytes)	15,950 (w/printer)	18,950 (w/printer)
Monthly maint. of basic configuration above for on-site contract, \$	740	55	On-call only	On-call only
Discounts available	—	—	—	—
Price of memory increment, \$	6,500 (64K)	4,000 (32K bytes)	Various	Various
Date of first delivery	April 1979	November 1977	October 1979	December 1976
Number installed to date	235 (all sys.)	25,000+ (all mod.)	NA	NA
COMMENTS	Price includes OS, 288M-byte disk drive, 4 ports, 64K bytes of main memory, an 800-bpi magnetic tape drive, and cache memory		*DACL & ABL compiler languages are a high-level English-like language source statement compiler	Diablo systems are manufactured by Xerox and distributed worldwide; in the U.S. it is distributed by Shasta General Systems