

All About Minicomputers



The 8510/A from Terak Corporation features a DEC-compatible Q bus, RT/11 software compatibility, and supports DEC's network architecture. The 8510/A offers 64K words of memory, floppy disk storage, serial printers, 8 communications lines and asynchronous communications to 19.2K bps. With one CRT, keyboard, and graphics capability, the 8510/A sells for \$7,850.

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 Minicomputer Specifications 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 246 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 immediately following this one. It is called "All About Small Business Computers" (70C-010-30a). 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.

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-010-40 "User Ratings of Minicomputers and Small Business Computers". 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 246 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 November and December 1979; 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. 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.

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



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- ▷ 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.

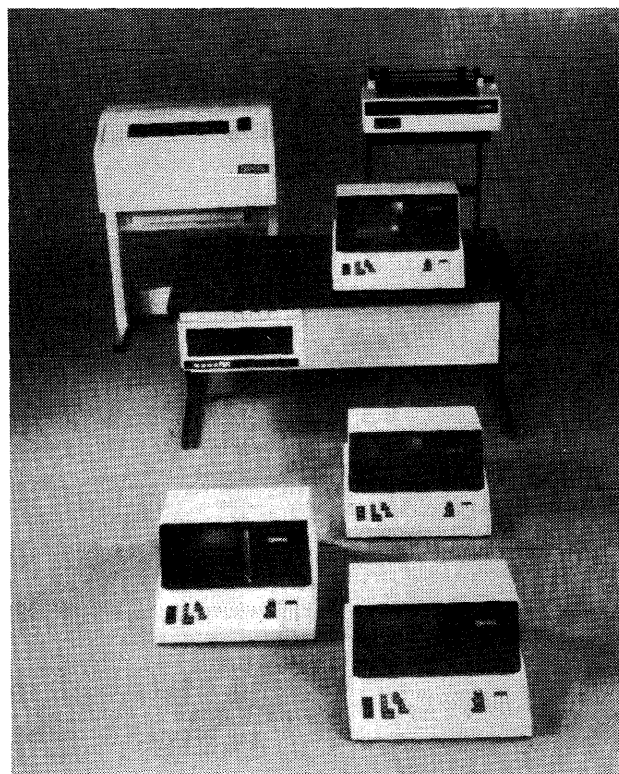
Error correction is a rather new feature which is beginning to appear in some of the recent minicomputer offerings. This feature involves appending five or six check bits to each word of memory. The check bits, called a Hamming code, and special algorithms allow a system to detect and correct single-bit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



Qantel's line of 8-bit minicomputer systems ranges from the single-station 210 to the 1450-2 system that can support up to 64 workstations, 1024K bytes of memory, and 1200 million bytes of disk storage. Also available are floppy disk drives, magnetic tape units, serial printers, and line printers with speeds up to 600 lpm. Basic system prices range from \$11,950 to \$69,900.

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 ▷

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▷ 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.

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

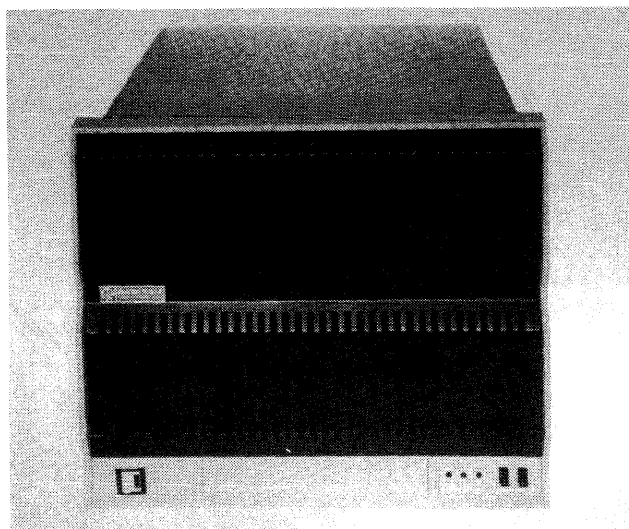
A *direct memory access channel* (DMA) permits direct transfer of I/O data between main storage and a peripheral controller. When a DMA channel is used, the I/O data bypasses the computer's main hardware registers, and the I/O operation proceeds independently of program control once it has been initiated 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 ▷

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Dataram Corporation's BM-2 combines DEC's LSI-11 processor with up to 4 million bytes of Dataram's bulk storage. With 64K bytes of main memory and 512K bytes of bulk storage, the BM-2 sells for \$11,645.

▷ 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.

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 ▷

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▷ 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 “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.



The System 730 from Basic Four represents the high-end of Basic Four's line of small business computers. The basic System 730 is priced at \$95,000 and includes 96K bytes of memory, 150 million bytes of disk storage, a 300 lpm printer, and four VDT's. The system can be expanded to include up to 256K bytes of memory and 300 million bytes of disk storage, and support up to 32 VDT's.

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.

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. ▷

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➤ *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).

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

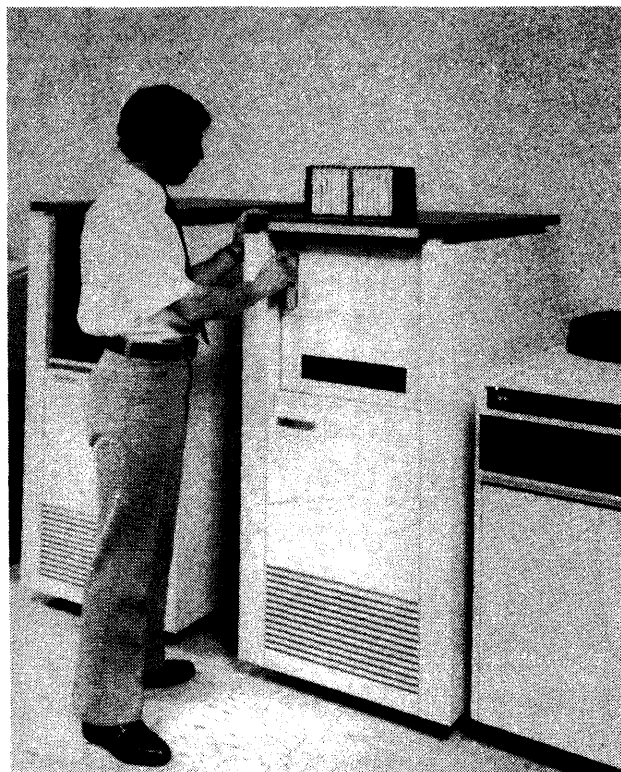
A critically important area to be evaluated is *software*—the programming packages and languages used to program the computer and thereby direct its operations. It is important that you carefully investigate the available software. This investigation should include the operating systems, programming 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.



The Model 5000 from BTI is a packaged system for use in a time-sharing environment. The BTI 5000 can support up to 32 workstations and features automatic, remote computer-to-computer fault diagnosis, which can be carried out even if the customer's system has halted. With 29 megabytes of disk storage, battery backup, and a cartridge tape drive, the BTI 5000 sells for \$29,950.

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, 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 TRANs-lator), *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 ➤

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▷ 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.

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 November, 1979. 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.

Anderson-Jacobson, Inc., 521 Charcot Avenue, San Jose, California 95131. Telephone (408) 263-8520.

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) 842-4777.

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.

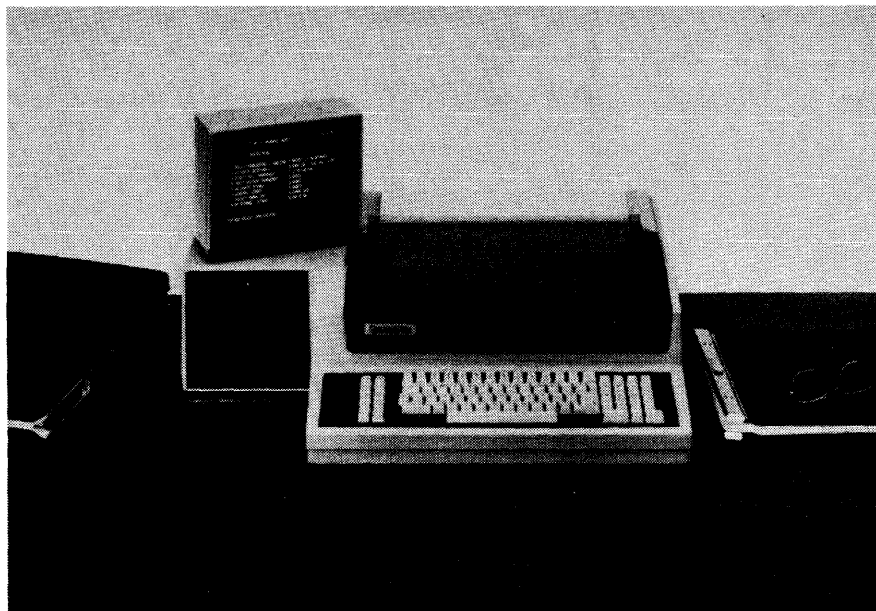
CDA (Computer Data Access), Inc., 1373 Broad Street, Clinton, New Jersey 07011. Telephone (201) 473-4700.

Century Computer Corporation, 2339 Stanwell Circle, Concord, California 94520. Telephone (415) 798-8000.

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

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

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The F-85 from Durango Systems Inc., supports 64K bytes of memory, up to 24 million bytes of cartridge disk storage, and up to 5 workstations. A basic single-station F-85 with 64K bytes of main memory, two 473K-byte diskette drives, CRT, keyboard, and 165 cps printer is priced at \$12,983. The F-85 is an integrated desktop small business system that is available with a variety of packaged application software.

▷ **Computer Design Systems, Inc.**, 8085 Wayzata Boulevard, Minneapolis, Minnesota 55426. 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.

Computervision Corporation, 201 Burlington Road, Route 62, Bedford, Massachusetts 01730. Telephone (617) 275-1800.

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

Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284. Telephone (512) 690-7000.

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 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, 19447 Prunridge Avenue, Cupertino, California 95014. Telephone (408) 725-8111.

Honeywell Information Systems, Inc., 200 Smith Street, Waltham, Massachusetts 02154. Telephone (617) 890-8400.

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

Jacquard Systems, 1639 11th Street, Santa Monica, California 90404. Telephone (450-6784).

MCM Computers Ltd., P.O. Box 310, 133 Dalton Street, Kingston, Ontario, Canada K7L 4W2. Telephone (613) 544-9860.

Melcom Business Systems, Inc., 2200 West Artesia Boulevard, Suite 101, Compton, California 90220. Telephone (213) 979-6055.

Microdata Corporation, 17481 Red Hill Avenue, Irvine, California 92705. Telephone (714) 540-8341.

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, Main Street, Norwich, Vermont 05055. Telephone (802) 649-5183.

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

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

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▷ **Olivetti Corporation of America**, 500 Park Avenue, New York, New York 10022. Telephone (212) 371-5500.

Perkin Elmer Computer Systems Division, 2 Crescent Place, Oceanport, New Jersey 07757. Telephone (201) 229-6800.

Point 4 Computer Corporation, 2659 McCabe Way, Irvine, California 92714. Telephone (714) 556-4242.

Prime Computer, Inc., 40 Walnut Street, Wellesley Hills, Massachusetts 02181. Telephone (617) 237-6990.

Qantel Corporation, 3525 Breakwater Avenue, Hayward, California 94545. Telephone (415) 783-3410.

Raytheon Data Systems Company, 1415 Boston-Providence Turnpike, Norwood, Massachusetts 02062. Telephone (617) 762-6700.

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, PA 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.

Systems Engineering Laboratories, Inc., 6901 West Sunrise Boulevard, Fort Lauderdale, Florida 33313. Telephone (305) 587-2900.

Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, California 95014. Telephone (408) 996-6000.

Terak Corporation, 14405 North Scottsdale Road, Scottsdale, Arizona 85254. Telephone (602) 991-1580.

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

Wang Laboratories, Inc., 836 North Street, Tewksbury, Massachusetts 08176. Telephone (617) 459-5000.

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

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

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MANUFACTURER AND MODEL	Anderson Jacobson 1500	Applied Data Processing Resource/100	Applied Systems Corporation ASC/80	Basic Four System 200	Basic Four System 410
WORD LENGTH, BITS	8	16	8, 16	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	4	16	—	2	8
MAIN STORAGE					
Storage type	Core, MOS	Core	MOS	MOS	MOS
Cycle/access time	1.0/0.8	0.8/0.4	1.0/0.5	0.60/0.40	0.60/0.40
Min./Max. capacity, words	64K/64K	65K/256K	4K/128K	40K/64K bytes	40K/128K bytes
Parity checking	No	No	Optional	Standard	Standard
Error correction	No	No	Optional	No	No
Storage protection	No	No	Optional	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	256K	64K	64K bytes	128K bytes
Control storage	ROM	No	PROM; 64K max.	ROM; 1K x 16 bits	ROM; 1K x 16 bits
Add time, microseconds	4.0	.80	1.0	7.4	7.4
Hardware multiply/divide	No	Optional	Optional	No	No
Hardware floating point	No	Optional	Optional	No	No
Hardware byte manipulation	Standard	No	Standard	Standard	Standard
Battery backup	No	Optional	Optional	Standard	Standard
Real-time clock or timer	No	Optional	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Optional	Standard	Standard
Maximum I/O rate, words/sec.	606K	1.1M	50K	1M	1M
No. of external interrupt levels	15	16	8 optional	8	8
COMMUNICATIONS					
Maximum number of lines	8	15	16, 32	1	8
Synchronous	No	No	Opt.; to 50K bps	Opt., 9600 bps	Opt., 9600 bps
Asynchronous	Std.; 300-9600 bps	Std.; 1200 baud	Opt.; to 9600 bps	Std., 9600 bps	Std., 9600 bps
Protocols supported	None	2780	IBM-Bisync; DECnet (RPQ)	Bisync	Bisync
Network architectures supported	None	No	—	BFBIN	BFBIN
RJE terminals emulated	None	2780	—	2780/3780	2780/3780
IBM 3270 emulation	No	No	—	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	640K-2.56M bytes	No	.24M-2M bytes	No	No
Disk pack/cartridge drives	Cart.; 10M-20M bytes	Both; 10MB, 320MB	Optional	Fixed; 10-20M bytes	Fixed; 14-42MB bytes
Drum/fixed head disk storage	No	No	Optional; 10-100M bytes	No	No
Magnetic tape cassettes/cartridges	No	No	A/R optional	Std.; 2.3m bytes	Std.; 9.2MB
Magnetic tape, 1/2-inch	No	120K	Optional	10 KBS	10 KBS
Serial printer	30-960 cps	Yes; 120-180 cps	30/180 cps	120 cps; 160 cps Opt.	120 cps; 160 cps opt.
Line printer	125-300 lpm	Yes; 300-600 lpm	A/R optional	Opt. 150 cpm	150, 300, 600 lpm
Data communications interface	300-9600 cps	Yes; 19.2K	To 19.2K bps	1200 bps	1200 bps
CRT	1920 characters	Yes; 1998 char.	64 x 16 std.; 80 x 24	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	No	None	Plotters, graphic CRT, A/D-D/A I/O	—	—
SOFTWARE					
Assembler	Yes	Yes	Yes; macro assembler optional	No	No
Compilers	BASIC	BASIC	BASIC, FORTRAN, PASCAL, PI/M	Business BASIC	Business BASIC
Operating system	Multiprogramming	Time-sharing	Optional	Multi-user interactive	Multi-user
Language implemented in firmware	No	No	Optional	No	No
Operating system implemented in firmware	Partially	No	Optional	Partially	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	18,150 (32K bytes)	Contact vendor	1,900 (basic system)	24,990 (40 Kbytes)	32,500 (40Kbytes)
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	260	280
Discounts available	—	—	—	—	—
Price of memory increment, \$	1,800 (32K bytes)	—	250 (8K bytes)	2,000 (16K bytes)	2,880 (32K bytes)
Date of first delivery	July 1977	June 1976	1977	1978	1978
Number installed to date	Over 200	NA	NA	9000 (all models)	900 (all models)
COMMENTS		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	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	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

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MANUFACTURER AND MODEL	Basic Four System 610	Basic Four System 730	BRD Dolphin	BRD Porpoise	BTI 5000
WORD LENGTH, BITS	8-bit byte	8-bit byte	8-bit byte	8-bit byte	16
NO. WORKSTATIONS SUPPORTED	16	32	1	1	32
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS and core
Storage type	0.60/0.40	0.60/0.40	0.60	0.60	0.60
Cycle/access time	64K/192K bytes	96K/256K bytes	4K/32K bytes	4K/32K bytes	64K/64K bytes
Min./Max. capacity, words	Standard	Standard	Standard	Standard	Standard
Parity checking	No	No	No	No	Yes, with MOS
Error correction	No	No	No	No	Standard
Storage protection					
CENTRAL PROCESSOR	64K	64K	4K to 8K	4K to 8K	NA
No. of directly addressable words	ROM; 1K x 16 bits	ROM; 1K x 16 bits	EPROM; 14K	EPROM; 12K	PROM; 98K bits
Control storage	7.4	7.4	5.0	5.0	20
Add time, microseconds	No	No	Standard	Standard	Standard
Hardware multiply/divide	No	No	No	No	Standard
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	Standard	Standard	No	No	Standard
Battery backup	Standard	Standard	No	No	Standard
Real-time clock or timer					
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Standard
Direct memory access channel	1M	1M	1M	1M	616K
Maximum I/O rate, words/sec.	8	8	None	None	NA
No. of external interrupt levels					
COMMUNICATIONS	16	32	1	1	32
Maximum number of lines	Opt., 9600 bps	Opt., 9600 bps	No	No	No
Synchronous	Std., 9600 bps	Std., 9600 bps	Std.; 1200 bps	Std.; 300 bps	Std.; to 9600 bps
Asynchronous	Bisync	Bisync	Programmable	Programmable	Asynch
Protocols supported					
Network architectures supported	BFBIN	BFBIN	—	—	No
RJE terminals emulated	2780/3780	2780/3780	—	—	No
IBM 3270 emulation	No	No	—	—	No
PERIPHERAL EQUIPMENT	No	No	1.2MB; dual dr. std.	622KB; dual dr. std.	No
Floppy disk (diskette) drives	Pack; 35 M-300M	Pack; 150-300M bytes	No	No	Non-remov. pack, 29MB to 392MB
Disk pack/cartridge drives					No
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Opt.; 9.2 bytes	Opt.; 9.2MB	No	No	Cart; 10MB
Magnetic tape, 1/2-inch	10 KBS	10 KBS	No	No	Optional
Serial printer	80, 120, 160 cps	80, 120, 160 cps	45-200 cps	30-55 cps	No
Line printer	150, 300, 600 lpm	150, 300, 600 lpm	No	No	300, 600, 900 lpm
Data communications interface	1200 bps	1200 bps	300-1200 bps	300 bps	9600 bps; asynch
CRT	80 char. x 24 lines	80 char. x 24 lines	24 x 80	24 x 80	24 x 80, char.
Other supported peripheral units	—	—	No	No	None
SOFTWARE	No	No	B.A.L.	B.A.L.	No
Assembler					
Compilers	Business BASIC	Business BASIC	ALPHABASE	ALPHABASE	BASIC
Operating system	Multi-user	Multi-user	Real-time	Real-time	Time-sharing
Language implemented in firmware	No	No	B.A.L./fully	B.A.L./fully	Partially
Operating system implemented in firmware	Partially	Partially	Fully	Fully	Partially
PRICING & AVAILABILITY	51, 400 (64K bytes)	95,000 (96K bytes)	\$18,000 to \$25,000	\$10,000 to \$15,000	29,950
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	424	766	No	No	345
Monthly maint. of basic configuration above for on-site contract, \$	—	—	Educ. (15%)	Educ. (15%)	Quantity
Discounts available	2,240 (32KB)	2,240 (32KB)	\$400 (4K bytes)	\$400 (4K bytes)	None
Price of memory increment, \$					
Date of first delivery	1978	1978	July 1977	January 1978	August 1978
Number installed to date	9000 (all models)	9000 (all models)	125	25	650 (all models)
COMMENTS	Price includes 64KB memory, 35MB disc 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 disc drives & packs w/op. sys., 300 lpm printer and four VDT's (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	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 supported; price is for minimum system (ES) configuration

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MANUFACTURER AND MODEL	BTI 8000	Burroughs B80	Burroughs B90	Burroughs B720/B730	Burroughs B770 Series
WORD LENGTH, BITS	16	8-bit byte	8-bit byte	64	16
NO. WORKSTATIONS SUPPORTED	128	4	8	9	—
MAIN STORAGE					
Storage type	Core	MOS	MOS	MOS	Core, MOS
Cycle/access time	0.67	1.0/0.5	—	1.0/0.5	1/0.4, 0.63
Min./Max. capacity, words	256K/8M bytes	60K/128K bytes	64K/512K bytes	32K/96K bytes	32K/64K
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	Standard	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	—	—	—	—	—
Control storage	PROM	ROM; 4K bytes	ROM; 4K bytes	ROM; 3.5K bytes	RAM; 32K bytes
Add time, microseconds	3.5	—	—	0.43	—
Hardware multiply/divide	Standard	—	—	No	—
Hardware floating point	Standard	No	No	No	No
Hardware byte manipulation	Standard	Standard	—	Standard	—
Battery backup	Standard	—	—	No	—
Real-time clock or timer	Standard	—	—	No	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	4 to 32	—	Standard	Standard	Standard
Maximum I/O rate, words/sec.	10M	—	—	2M bytes	2M bytes
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS					
Maximum number of lines	128	4	2	22	—
Synchronous	No	To 9600 bps	To 9600 bps	To 9600 bps	To 9600 bps
Asynchronous	Std.; to 19,200 bps	To 9600 bps	To 9600 bps	To 9600 bps	To 9600 bps
Protocols supported	Asynch	BDLC	BDLC, async, bisync	—	—
Network architectures supported	No	—	BNA	—	—
RJE terminals emulated	No	None	—	IBM 3780	IBM 3780
IBM 3270 emulation	No	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	243K-6M bytes	243K-6M bytes	243K-1.5M bytes	243K bytes
Disk pack/cartridge drives	Pack; 33MB to 8,000MB	Cartridge; 4.6-27.6M bytes	Cartridge; 4.6-9.2M bytes	Cartridge; 4.6-27.6M bytes	Cartridge; 4.6-27.6M bytes
Drum/fixed head disk storage	No	No	Fixed; 9.4 to 37.6M bytes	No	No
Magnetic tape cassettes/cartridges	No	Cassette; 1 KBS	Cassette; 1 KBS	Cassette; 1 KBS	Cassette; 1 KBS
Magnetic tape, 1/2-inch	200 KBS (9-TK)	No	No	10 KBS	10 KBS
Serial printer	No	60, 180 cps	90, 120 cps	60 cps	No
Line printer	300, 600, 900 lpm	160, 250 lpm	64-650 lpm	85-400 lpm	85-750 lpm
Data communications interface	19.2 bps; asynch	9600 bps	To 9600 bps	9600 bps	9600 bps
CRT	24 x 80; char.	80 char. x 24 lines	28 lines x 80 char.	80 char. x 24 lines	No
Other supported peripheral units	None	—	—	Card punch, card reader/punch	Up to 2 data communications processors; reader/punch
SOFTWARE					
Assembler	Assembler	No	No	No	Assembler
Compilers	BASIC, FORTRAN, COBOL, PASCAL	COBOL, RPG, NDL, MPL	COBOL, RPG, MGP	COBOL, RPG, AEL	COBOL, RPG, NDL, MPL
Operating system	Time-sharing, batch	Interactive	Multiprogramming	Real-time	Batch, real-time
Language implemented in firmware	No	Fully	Fully	Fully	Fully
Operating system implemented in firmware	Partially	Fully	Fully	Fully	Fully
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	86,750	18,030	7,900	Contact vendor	Contact vendor
Monthly maint. of basic configuration above for on-site contract, \$	650	—	56	—	—
Discounts available	Quantity	Leases	Leases	Leases	Leases
Price of memory increment, \$	9,000 (128K bytes)	—	1,050 (64K byte)	—	—
Date of first delivery	April 1980	April 1976	December 1979	March 1973	1974
Number installed to date	NA	Over 4000	NA	Over 3000	—
COMMENTS					
	Packaged system for interactive and multistream batch workload; variable resource bus architecture accommodates up to 8 processors, together with multiple memory modules and peripheral processors	Offers the technology of Burroughs larger computers	Growth path to the Burrough's L Series.	System price includes console printer; AEL and COBOL or RPG programs can run concurrently	Systems and communications processors; not all models allow all features presented

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MANUFACTURER AND MODEL	Burroughs B800 Series	Burroughs B1700 Series	Burroughs B1720 Series	Burroughs B1800 Series	Burroughs B1900
WORD LENGTH, BITS	64, 16	8-bit byte	64	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	4-10	—	—	32	32
MAIN STORAGE	MOS; bipolar	MOS	MOS; bipolar	MOS	MOS; bipolar
Storage type	1.0/0.5	1.5/1.0	1.0/0.67	1.7-2.0	0.25
Cycle/access time	32K/150K bytes	24K/128K bytes	48K/256K bytes	96K/1024K bytes	128K/2M bytes
Min./Max. capacity, words	Standard	Standard	Standard	Standard	No
Parity checking	No	No	No	No	Standard
Error correction	Standard	Standard	Standard	Standard	Standard
Storage protection	—	—	—	—	—
CENTRAL PROCESSOR	—	—	—	—	—
No. of directly addressable words	RAM; to 48K	No	ROM; to 8K bytes	ROM; 4K bytes	Cache; 8K bytes
Control storage	—	—	—	—	—
Add time, microseconds	—	—	—	—	—
Hardware multiply/divide	No	No	No	No	—
Hardware floating point	—	—	—	—	—
Hardware byte manipulation	—	No	No	—	—
Battery backup	Standard	No	No	Standard	—
Real-time clock or timer	—	—	—	—	—
INPUT/OUTPUT CONTROL	Standard	Optional	Optional	—	—
Direct memory access channel	2M bytes	—	—	—	—
Maximum I/O rate, words/sec.	—	—	—	—	—
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS	7	4	4	32	32
Maximum number of lines	To 9600 bps	To 9600 bps	To 9600 bps	Opt.; to 50,000 bps	Opt.; to 50,000 bps
Synchronous	To 9600 bps	To 9600 bps	To 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps
Asynchronous	BDLC	Bisync	Bisync	Bisync, BDLC, BNA	BDLC, Bisync
Protocols supported	—	—	—	—	—
Network architectures supported	IBM 3780	HASP, IBM/360;/3	HASP, IBM/360;/3	HASP, IBM 360/370	BNA
RJE terminals emulated	No	No	No	—	HASP, IBM 360/370
IBM 3270 emulation	—	—	—	—	No
PERIPHERAL EQUIPMENT	2M bytes	No	No	486K bytes	243K-6M bytes
Floppy disk (diskette) drives	Both; 4.6-130.4M bytes	Both; 2.3-697.6M bytes	Both; 2.3-697.6M bytes	Both; 4.6-697M bytes	Pack; 1608M bytes
Disk pack/cartridge drives	Fixed-head; 9.4-65.6M bytes	Fixed-head; 1.9M bytes	Fixed-head; 1.9-70M bytes	No	No
Drum/fixed head disk storage	Cassette; 3 KBS	Cassette; 1 KBS	Cassette; 1 KBS	Cassette; 1 KBS	Cassette; 1 KBS
Magnetic tape cassettes/cartridges	10 KBS	10-120 KBS	10-120 KBS	10-120 KBS	20-120 KBS
Magnetic tape, 1/2-inch	120 cps	No	No	No	No
Serial printer	160-750 lpm	85-1040 lpm	85-1040 lpm	400-1500 lpm	85-1500 lpm
Line printer	9600 bps	9600 bps	9600 bps	9600 bps	To 50,000 bps
Data communications interface	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	Card units, MICR
CRT	Card punch; card reader/punch; DDES	Card punch/reader units	Card punch/reader units	Card punch/reader units	—
Other supported peripheral units	—	—	—	—	—
SOFTWARE	No	No	No	No	No
Assembler	COBOL, RPG, NDL, MPL	COBOL, FORTRAN, RPG, BASIC, UPL, NDL	COBOL, FORTRAN, RPG, BASIC, UPL, NDL	COPOL, RPG, MPL, NDL	BASIC, COBOL, MIL, SDL, RPG, FORTRAN 77
Compilers	Batch, real-time	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Operating system	Fully	Fully	Fully	Fully	Partially
Language implemented in firmware	Fully	Fully	Fully	Fully	Partially
Operating system implemented in firmware	—	—	—	—	—
PRICING & AVAILABILITY	35,045 (32K bytes)	Contact vendor	Contact vendor	Contact vendor	71,500
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	198	—	—	—	410
Monthly maint. of basic configuration above for on-site contract, \$	Leases	—	—	—	—
Discounts available	1,020 (8K bytes)	—	—	—	5,750 (262K bytes)
Price of memory increment, \$	Second qtr. 1978	Third qtr. 1972	Second qtr. 1973	May 1977	First qtr. 1980
Date of first delivery	NA	NA	NA	Over 350	NA
Number installed to date	—	—	—	—	—
COMMENTS	—	—	4K to 8K bipolar storage is available for control memory	—	—

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MANUFACTURER AND MODEL	Burroughs L9000 Series	Cado Systems Corporation System 20	Cado Systems Corporation System 20/IV	Cado Systems Corporation System 40	Cado Systems Corporation System 40/IV
WORD LENGTH, BITS	64	8-bit byte	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	None	1	2	2	2
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	1.5/1.2	2.5/0.75	1.3/0.4	2.5/0.75	1.3/0.4
Cycle/access time	4K/48K bytes	6K/10K bytes	20K/52K bytes	5K/9K bytes	20K/52K bytes
Min./Max. capacity, words	Standard	No	Standard	No	Standard
Parity checking	No	No	No	No	No
Error correction	Standard	No	No	No	No
Storage protection	—	—	—	—	—
CENTRAL PROCESSOR	—	10K	52K	9K	52K
No. of directly addressable words	RAM; 8K bytes	PROM; 1-2K, 1-1K	PROM; 4K	ROM; 2K	PROM; 4K
Control storage	—	6.0 (5 digits)	3.9 (5 digits)	6.0 (5 digits)	3.9 (5 digits)
Add time, microseconds	—	No	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
Battery backup	—	No	Standard	No	No
Real-time clock or timer	—	No	Standard	No	Standard
INPUT/OUTPUT CONTROL	—	Standard	Standard	Standard	Standard
Direct memory access channel	—	1M bps	1M bps	1M bps	1M bps
Maximum I/O rate, words/sec.	—	None	3	None	3
No. of external interrupt levels	—	—	—	—	—
COMMUNICATIONS	—	—	—	—	—
Maximum number of lines	—	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps
Synchronous	—	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps
Asynchronous	—	—	—	—	—
Protocols supported	—	—	—	—	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	IBM 2770, 2780/ 3780	IBM 2770, 2780/ 3780	IBM 2770, 2780/ 3780	IBM 2770, 2780/ 3780
IBM 3270 emulation	—	No	No	No	No
PERIPHERAL EQUIPMENT	—	—	—	—	—
Floppy disk (diskette) drives	No	1.2 to 3.6M bytes	1.2 to 3.6M bytes	1.2 to 3.6M bytes	1.2 to 3.6M bytes
Disk pack/cartridge drives	No	Cart.; 9.5 to 19M bytes	Cart.; 9.5 to 19M bytes	Cart.; 9.5 to 19M bytes	Cart.; 9.5 to 19M bytes
Drum/fixed head disk storage	No	Fixed media; 15M bytes	Fixed media; 15M bytes	Fixed media; 15M bytes	Fixed media; 15M bytes
Magnetic tape cassettes/cartridges	Cassette; 1 KBS	No	No	No	No
Magnetic tape, 1/2-inch	10 KBS	NA	NA	NA	NA
Serial printer	60, 90, 120, 150 cps	150 cps	150 cps	45 cps	45 cps
Line printer	90-250 lpm	No	3000 lpm	300 lpm	300 lpm
Data communications interface	9600 bps	9600 bps	9600 bps	9600 bps	9600 bps
CRT	32 char. x 8 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	Mag. ledger card reader	None	None	None	None
SOFTWARE	—	—	—	—	—
Assembler	Assembler	No	No	No	No
Compilers	COBOL	Basic (CADOL)	Basic (CADOL)	Basic (CADOL)	Basic (CADOL)
Operating system	—	Real-time	Real-time, Multi-task	Real-time	Real-time, multi-task
Language implemented in firmware	Fully	Partially	Partially	Partially	Partially
Operating system implemented in firmware	—	Partially	Partially	Partially	Partially
PRICING & AVAILABILITY	—	—	—	—	—
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	17,490	13,995	19,845	17,500	25,075
Monthly maint. of basic configura- tion above for on-site contract, \$	—	—	—	130	—
Discounts available	Leases	Quantity	Quantity	Quantity	Quantity
Price of memory increment, \$	—	895 (4K bytes)	1,800 (32K bytes)	895 (4K bytes)	1,800 (32K bytes)
Date of first delivery	June 1975	January 1978	June 1978	April 1976	June 1978
Number installed to date	—	200+	60+	600+	60+
COMMENTS	Six models L 9300, L 9400, and L 9500 with 60-cps printer, L 9700, L9800, and L 9900 with 90-cps printer, L 9500 and L 9900 have mag ledger capability	—	—	—	—

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MANUFACTURER AND MODEL	Cascade Data Concept II	Cascade Data Concept III	Cascade Data Concept IV	CDA Inc. DG IT Series	CDA Inc. DG MP/100 Series
WORD LENGTH, BITS	16	16	8	16	16
NO. WORKSTATIONS SUPPORTED	16	16	1 per application	5	16
MAIN STORAGE Storage type Cycle/access time Min./Max. capacity, words Parity checking Error correction Storage protection	Core 1.0/0.35 16K/64K Standard No No No	MOS 0.5/0.5 32K/64K No No No	MOS 0.6/0.2 16K/60K No No No	MOS .96/.50 32K/32K No No No	MOS .96/.50 32K/32K 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	32K No 8.8 Standard No Standard Optional	64 No 7.5 (word) No No Standard Standard	64K bytes PROM; to 2K bytes 2.0 (byte) Optional Standard Standard No	1024 No .84 Optional No No Optional Standard	1024 No .84 Optional No No Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 413K 0	Standard 413K 0	Optional 750K 0	Standard 2M bytes 16	Standard 2M bytes 16
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported	— Standard Standard —	— Standard Standard —	— Standard Standard —	5 Optional (1) Optional (4) Optional	16 Optional (6) Optional (16) Optional
Network architectures supported RJE terminals emulated IBM 3270 emulation	None None No	None None No	None None No	NA 2780/3780 Yes	NA 2780/3780 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 Cartridge; 40MK bytes No No 30-60 KBS 55 cps 125-600 lpm 9600 bps 80 char. x 24 lines Paper tape reader and punch	1.2M bytes Cartridge; 40M bytes No No 30-60 KBS 55 cps 125-600 lpm 9600 bps 80 char. x 24 lines Paper tape reader and punch, card reader	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	630K bytes Cartridge; 10-20M bytes No No No (1) 80, 160 cps No Yes Yes	630K bytes Cartridge; 10-20M bytes No No No (2) 80, 160 cps No Yes Yes
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Macro assembler RPG Batch, real-time, time-sharing No No	Macro assembler RPG Batch, real-time, time-sharing No No	Macro assembler, BASIC No Batch, real-time Partially Partially	Assembler and macro assembler ALGOL, BASIC, FORTRAN Real-time No No	Assembler and macro assembler ALGOL, BASIC, FORTRAN 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	22,200 (32K bytes) — — 1,200 (16K bytes) January 1970 300	26,900 (16K bytes) — — 2,700 (32K bytes) November 1977 50	16,900 (32K bytes) — — 1,500 (16K bytes) September 1978 25	Contact vendor 173 Quantity NA March 1979 10	Contact vendor 175 Quantity NA April 1979 5
COMMENTS	Operating system provides 2 partitions; system price includes 32KB CPU, 5MB disk, console CRT, and keyboard	Operating system provides 45 parti- tions; system price includes 32KB CPU, 5MB disk, and 2,000 char. display	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	Turnkey systems for automotive parts distribution using Data General package hardware featuring MicroNova CPU; expandable	Turnkey systems for automotive parts distribution using Data General package hardware featuring MP/100 CPU; expandable

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MANUFACTURER AND MODEL	CDA Inc. DG Nova Series	Century Computer 300	Century Computer 400	Century Computer 700	Century Computer 900
WORD LENGTH, BITS	16	8, 16	8, 16	8, 16	8, 16
NO. WORKSTATIONS SUPPORTED	16	4	8	20	32
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	.40/.50	.4/.2	.4/.2	.4/.2	.4/.2
Min./Max. capacity, words	64K/128K	32K/64K bytes	64K/256K bytes	96K/256K bytes	160K/512K bytes
Parity checking	No	No	No	No	No
Error correction	No	Standard	Standard	Standard	Standard
Storage protection	Optional	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	1024	64K bytes	64K bytes	64K bytes	64K bytes
Control storage	No	4K x 48	4K x 48	4K x 48	4K x 48
Add time, microseconds	.40	1.4 (16 bits)	1.4 (16 bits)	1.4 (16 bits)	1.4 (16 bits)
Hardware multiply/divide	Optional	Standard	Standard	Standard	Standard
Hardware floating point	No	Standard	Standard	Standard	Standard
Hardware byte manipulation	No	Standard	Standard	Standard	Standard
Battery backup	Optional	No	No	No	No
Real-time clock or timer	Standards	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	2M bytes	1.6M bytes	1.6M bytes	1.6M bytes	1.6M bytes
No. of external interrupt levels	16	15	15	15	15
COMMUNICATIONS					
Maximum number of lines	16	4	8	20	32
Synchronous	Optional (16)	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps
Asynchronous	Optional (16)	Std.; 19,200 bps	Std.; 19,200 bps	Std.; 19,200 bps	Std.; 19,200 bps
Protocols supported	Optional	Bisync	Bisync	Bisync	Bisync
Network architectures supported	NA	—	—	—	—
RJE terminals emulated	2780/3780	—	—	—	—
IBM 3270 emulation	Yes	No	No	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	630K bytes	No	No	No	No
Disk pack/cartridge drives	Cart; 10-20M bytes Pack; 96M bytes	Both; (10) 320K bytes	Both; (10) 320K bytes	Both; (10) 640K bytes	Both; (10) 1200K 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	36 KBS	36 KBS	36 KBS	36 KBS
Serial printer	(8) 80, 160 cps	165 cps	165 cps	165 cps	165 cps
Line printer	No	150 lpm	150 lpm	150 lpm	150 lpm
Data communications interface	Yes	9600 cps	9600 bps	9600 bps	9600 bps
CRT	Yes	1920 characters	1920 characters	1920 characters	1920 characters
Other supported peripheral units	—	—	—	—	—
SOFTWARE					
Assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler	Assembler and macro assembler
Compilers	ALGOL, BASIC FORTRAN	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, \$	Contact vendor	16,500	26,500	34,000	42,500
Monthly maint. of basic configura- tion above for on-site contract, \$	350	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Discounts available	Quantity	OEM	OEM	OEM	OEM
Price of memory increment, \$	6,000 (128K)	—	—	—	—
Date of first delivery	October 1979	June 1975	June 1975	June 1975	June 1975
Number installed to date	1	NA	NA	NA	NA
COMMENTS	Turnkey systems for automotive parts distribution using Data General package hardware featuring Nova CPU; expandable	May be upgraded to next size model as the customer needs more capacity	Additional work- stations available	Additional work- stations available	Additional work- stations available

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MANUFACTURER AND MODEL	Compal 8100	Compal 8200	Compal 9000	Computer Automation Naked Milli LSI-3/05	Computer Automation Naked Mini LSI-2 Series
WORD LENGTH, BITS	8	8	16	16	16 + 2
NO. WORKSTATIONS SUPPORTED	1	1	15	1	1
MAIN STORAGE					
Storage type	MOS	MOS	MOS	Core, MOS	Core, MOS
Cycle/access time	1.6/0.4	1.6/0.4	.96/.16	0.98-1.6/0.5-0.8	0.85-1.2/0.4-0.6
Min./Max. capacity, words	56K/56K	56K/56K	32K/64K	512/8K	8K/512K
Parity checking	No	No	No	No	Optional
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	32K	128	32K
Control storage	No	No	No	ROM; 512 x 24 bits	ROM; 512 x 56 bits
Add time, microseconds	3.0	5.6	2.4	6.25 (2 digits)	4.12, 2.06
Hardware multiply/divide	No	No	Standard	No	Standard
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Yes	Yes	Yes	Standard	Standard
Battery backup	No	No	Optional	Optional	Optional
Real-time clock or timer	Optional	Optional	Standard	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	No	No	Yes	Standard	Standard
Maximum I/O rate, words/sec.	250K bytes	250K bytes	3072K bytes	250K	1M
No. of external interrupt levels	8	9	16	1	3
COMMUNICATIONS					
Maximum number of lines	3	3	16	4	4
Synchronous	Std.; 110-9600 bps	Std.; 110-9600 bps	Opt.; 1200-9600 bps	Opt.; 9600 bps	Opt.; 9600 bps
Asynchronous	Std.; 110-9600 bps	Std.; 110-9600 bps	Std.; 110-9600 bps	Opt.; 9600 bps	Opt.; 9600 bps
Protocols supported	Async, Bisync	Async, Bisync	Async, Bisync	—	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	2780/3780	2780/3780	2780/3780	—	—
IBM 3270 emulation	No	No	No	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Std.; 630K-1.2M bytes	Std.; 630K-1.2M bytes	Opt.; 315-630K bytes	243-972K bytes	243-972K bytes
Disk pack/cartridge drives	No	No	Cartridge; 10-20M bytes	Cartridge; 4.92-19.68M bytes	Cartridge; 4.92-19.68M bytes
Drum/fixed head disk storage	No	Opt.; 9-27M bytes	Opt.; 12.5-25M bytes	No	No
Magnetic tape cassettes/cartridges	Opt. cassette	No	Both optional	No	No
Magnetic tape, 1/2-inch	No	No	Optional	20 KBS	20 KBS
Serial printer	150 cps	150 cps	60-180 cps	100, 165 cps	100, 165 cps
Line printer	No	No	240-900 lpm	No	No
Data communications interface	110-9600 bps	110-9600 bps	110-9600 bps	To 9600 bps	To 9600 bps
CRT	1024 characters	1920 characters	1920 character	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	—	—	—	Paper tape units	Paper tape units
SOFTWARE					
Assembler	Assembler and macro assembler	Asembler and macro assembler	Assembler and macro assembler	Macro assembler	Macro assembler
Compilers	BASIC, COBOL, FORTRAN, PASCAL	BASIC, COBOL, FORTRAN, PASCAL	BASIC, FORTRAN, PASCAL	FORTRAN	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	Partially	Partially	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	10,995	11,995	19,995	825 (Alpha)	2,540 (2/10 Alpha)
Monthly maint. of basic configuration above for on-site contract, \$	55	60	167	—	—
Discounts available	None	None	None	Quantity	Quantity
Price of memory increment, \$	NA	NA	1,850 (32K bytes)	—	—
Date of first delivery	October 1976	November 1979	September 1979	January 1975	July 1973
Number installed to date	400	NA	1	NA	NA
COMMENTS	Price includes CPU, disk, CRT, and printer; Compal specializes in complete turnkey business systems	Price includes turnkey computer systems with one application software package	Price includes turnkey computer systems with one application software package	ROM/EPROM & RAM/ROM/PROM are available in combination; ROM, PROM, EROM available in max. capacities of 8K, 2K, & 4K words, respectively	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 Scout Naked Mini 4/04	Computer Automation Syfa System 200	Computer Automation Syfa System 300	Computer Automation Syfa System 1000
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	4	1	4	8	32
MAIN STORAGE					
Storage type	Core, MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.55i-0.85/0.3-0.4	1.0/786	0.7/0.5	0.7/0.5	0.7/0.5
Min./Max. capacity, words	4K/64K	16K/64K words	64K/64K bytes	64K/304K bytes	64K/304K bytes
Parity checking	Optional	No	Standard	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	32K	32K	32K
Control storage	None	Up to 32K bytes	ROM; 512 x 56 bits	ROM; 512 x 56 bits	ROM; 512 x 56 bits
Add time, microseconds	1.5-3.0	3.40	4.12, 2.06	4.12, 2.06	4.12, 2.06
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Optional	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	Optional	Optional	Optional
Real-time clock or timer	Standard	Standard	Optional	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Optional	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	115K	3.8M	NA	NA	NA
No. of external interrupt levels	4	3	NA	NA	NA
COMMUNICATIONS					
Maximum number of lines	8	1 per interface	5	9	34
Synchronous	No	No	Std.; 4800 bps	Std.; 4800 bps	Opt.; 9600 bps
Asynchronous	Opt.; 50-19,200 bps	Opt.; 19.2K bps	Std.; 9600 bps	Std.; 9600 bps	Std.; 9600 bps
Protocols supported	—	No	Bisync	Bisync	Bisync, SDLC
Network architectures supported	—	DDCMP	—	—	SNA
RJE terminals emulated	—	No	IBM 3780	IBM 3780	IBM 3780, 3790
IBM 3270 emulation	—	No	Optional	Optional	Optional
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	(4) 243K-972K bytes	(1-4) 1M-4M bytes	No	No	No
Disk pack/cartridge drives	Both; 5-1200M bytes	No	Both; (8) 1760M bytes	Both; (8) 1760M bytes	Both; (8) 1760M 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	20 KBS	No	No	No	Yes
Serial printer	No	—	150 cps	150 cps	Opt.; 150 cps
Line printer	60-165 lpm	Yes	Optional	Optional	Std.; 600 lpm
Data communications interface	To 9600 bps	19.2K bytes	Yes	Yes	Yes
CRT	80 char. x 24 lines	80 char. x 24 lines	Yes, 2	Yes, 2	Yes, 8
Other supported peripheral units	Paper tape units; A/D & D/A converters	A/D & D/A, relay digital I/O	—	—	—
SOFTWARE					
Assembler	Assembler & Macro assembler	Assembler	No	No	No
Compilers	FORTRAN, BASIC	FORTRAN IV, COBOL	SYBOL	SYBOL	SYBOL
Operating system	Batch, real-time	Real-time	Time-sharing	Time-sharing	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, \$	995 (4/10 Alpha)	1,010 (32KB RAM)	29,950	36,000	102,500
Monthly maint. of basic configuration above for on-site contract, \$	4,080 (4/90 Alpha)	NA	349	369	840
Discounts available	—	—	—	—	—
Price of memory increment, \$	Quantity	Quantity	No	No	No
Date of first delivery	—	625 (32K bytes)	NA	—	—
Number installed to date	June 1977	Quantity	NA	NA	1976
	NA	NA	NA	NA	250
COMMENTS	All processors include powerfail, auto restart, auto load, and real-time clock capabilities as standard features	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	Basic configuration includes 64K bytes, 32MB disk, two CRT's, five slot chassis, 150 cps printer, 3780 communications	Basic configuration includes 64K bytes, 32MB disk, two CRT's, nine slot chassis, 150 cps printer, power supply, 3780 communications	Basic configuration include 128K bytes, 8 port multiplexer, nine slot chassis, power supply, eight CRT's, two 32MB disk, 600 lpm printer, 3780 communications

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MANUFACTURER AND MODEL	Computer Designed Systems Adviser IV/700	Computer Designed Systems Adviser IV/800	Computer Designed Systems Adviser IV/900	Computer Hardware Inc. 2130	Computer Hardware Inc. 3230
WORD LENGTH, BITS	16 + 2	16 + 2	32 + 4	16	16
NO. WORKSTATIONS SUPPORTED	32	32	128	32	32
MAIN STORAGE Storage type Cycle/access time Min./Max. capacity, words Parity checking Error correction Storage protection	Core, MOS .50, .80/.04 16K/512K Optional Optional Optional	Core, MOS .50, .80/.04 16K/512K Optional Optional Optional	MOS .35, .68/.03 32K/1024K Optional Optional Optional	MOS, core 0.8/0.25 8K/2,000K Standard Optional Standard	MOS 1.6/0.25 8K/64K 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	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	256K ROM; 16K x 56 bits 0.4 Standard Optional Standard Optional Standard	64K No 1.6 Standard Optional No No Optional	64K No 2.7 Standard Optional No No Optional
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 1.6M 1-125	Standard 1.6M 1-125	Standard 2.91 M	Standard 1.25M 8	Standard 1.25M 8
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	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	128 Opt.; 9600 bps Opt.; 9600 bps 2780, 3780, SNA/ SDLC SNA-opt. 2780/3780 Optional	32 Opt.; 50-9600 bps Opt.; 50-9600 bps Bisync None IBM 2780/3780 No	32 Opt.; 50-9600 bps Opt.; 50-9600 bps Bisync None IBM 2780/3780 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	No Both; 2.4G bytes No No 120 KBS 200 cps 300-1200 lpm To 9600 bps 80 x 24 A/D-D/A conv., plotters, graphics	No Both; 2.4G bytes No No 120 KBS 200 cps 300-1200 lpm To 9600 bps 80 x 24 A/D-DA conv., plotters, graphics	No Both; 4.8G bytes No 120 KBS 200 cps 300-1200 lpm To 9600 bps 80 x 24 A/D-D/A conv., plotters, graphics	No Pack; 1600M bytes No — Yes No 300, 600 lpm To 4800 bps; synch. 80 char. x 24 lines Card, PT, plotter	No Pack; 1600M bytes No — Yes No 300, 600 lpm To 4800 bps; synch. 80 char. x 24 lines Card, PT, plotter
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	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	Macro-assembler PASCAL, COBOL, BASIC, FORTRAN Batch, real-time, multi-task, interactive Partially Partially	Assembler & macro assembler COBOL, FORTRAN, RPG Batch, time-sharing No No	Assembler & macro assembler COBOL, FORTRAN, RPG Batch, 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	59,000 (64K) 5,400 Quantity 18,000 (64K) October 1977 NA	82,000 (64K) 5,400 Quantity 18,000 (64K) October 1977 NA	100,000 (64K) 5,400 Quantity 18,000 (64K) November 1978 NA	32,000 (16K bytes) Contact vendor Contact vendor 1,500 (16K bytes) June 1974 NA	15,000 (16K bytes) Contact vendor Contact vendor 1,500 (16K bytes) April 1976 NA
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	Single source responsibility, virtual mem., turnkey, interactive, direct processing system		

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MANUFACTURER AND MODEL	Computer Hardware Inc. 4210	Computer Hardware Inc. 4250	Computer Hardware Inc. 4800	Computer Talk Model 400	Computer Talk Model 407
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	4	16	4	256	256
MAIN STORAGE Storage type Cycle/access time Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.47/0.3 4K/26K Standard No Optional	MOS 0.47/0.3 4K/1024K Standard Optional Optional	Bipolar dynamic — 16K/128K Standard Optional No	MOS 0.5, 0.3/0.3, 0.15 4K/512K Optional Optional See comments	MOS 0.5, 0.3/0.3, 0.15 4K/512K Optional Optional See comments
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 No 4.662 Standard No Standard No Optional	64K PROM; 11,520 bits 3.5 Standard No Standard No Optional	32K No — Standard No Standard No Standard	32K; 512K PROM; 768 words 1.0 Standard Standard Standard Standard Standard with date	32K; 512K PROM; 768 words 1.0 Standard Standard Standard Standard Standard with date
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard — 8	Standard — 16	Standard — 7	Standard 1M 1-256	Standard 1M 1-256
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	4 Opt.; 50-9600 bps Opt.; 50-9600 bps Bisync	16 Opt.; 50-9600 bps Opt.; 50-9600 bps Bisync	4 Opt.; 50-9600 bps Std.; 50-9600 bps Bisync	256 Opt.; 50-9600 bps Std.; 50-9600 bps Async, Bisync, SDLC	256 Opt.; 50-9600 bps Opt.; 50-9600 bps Async, Bisync, SDLC
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	Yes No No — No 30-180 cps 300 lpm 9600 bps 80 char. x 24 lines None	Yes Cart.; 3M or 10M bytes No — No 30-180 cps 300 lpm 9600 bps 80 char. x 24 lines None	1-4M bytes No No Cassette; 10 ips No 84 lpm 19.2K bps 1920 characters —	110K-10,240K bytes Both; 1.2M-1 billion bytes Moving-head; 2.5M 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; 2.5M 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
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Assembler FORTRAN Real-time No No	Macro assembler BASIC, COBOL, FORTRAN Real-time No No	2-pass BASIC, COBOL, FORTRAN Real-time No 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
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	13,200 Contact vendor Contact vendor 960 (8K bytes) October 1977 NA	37,800 Contact vendor Contact vendor 2,160 (16K bytes) January 1978 NA	8,850 Contact vendor Contact vendor 1,500 (32K bytes) October 1979 NA	24,950 (4K MOS) 168 Volume 1,100 (4K bytes) May 1975 NA	31,500 (4K MOS) — Volume 1,100 (4K bytes) January 1978 NA
COMMENTS	Price includes CPU, two 250K bytes diskettes, cassette, 60 cps printer, oper- ating system, and time system appli- cation	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 appli- cation	Price includes 64K bytes memory, 84 lpm printer, 40 char. display key- board, two 5-inch diskettes (328K bytes), two RS232 operating system, BASIC, Assembler, and time/attendance application.	Storage protection std. by memory par- tition 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 ex- panded to 2.5M bytes, 300-lpm x 132 printer and mini-floppy disk for I/O

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MANUFACTURER AND MODEL	Computer Talk Model 408	Computervision Corporation CGP-100	Control Data Cyber 18 Series	Data General Eclipse C/150	Data General Eclipse C/350
WORD LENGTH, BITS	16	16	16 + 2	16 + 5	16 + 5
NO. WORKSTATIONS SUPPORTED	256	—	—	64	64
MAIN STORAGE	MOS	MOS	MOS	Core, MOS	Core, MOS
Storage type	0.5, 0.3/0.3, 0.15	0.7/0.4	.75/0.3	0.8, 0.5, 0.7/0.4	0.8, 0.7/0.5
Cycle/access time	4K/512K	32K/512K	16K/256K bytes	64K/512K	32K/1024K
Min./Max. capacity, words	Optional	Standard	Standard	No	No
Parity checking	Optional	None	Optional	Standard	Standard
Error correction	See comments	Optional	Standard	Standard	Standard
Storage protection					
CENTRAL PROCESSOR	32K; 512K	32K	64K	32K	32K
No. of directly addressable words	PROM; 768 words	PROM; 60 x 512W	ROM/RAM; 8K	ROM; 2K x 56 bits	ROM; 2K x 56 bits
Control storage	1.0	0.9	0.95	0.6	0.6
Add time, microseconds	Standard	Standard	Standard	Standard	Standard
Hardware multiply/divide	Standard	Optional	No	No	Standard
Hardware floating point	Standard	No	Standard	Standard	Standard
Hardware byte manipulation	Standard	No	No	Standard	Standard
Battery backup	Standard	No	No	Standard	No
Real-time clock or timer	Standard with date	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Standard
Direct memory access channel	1M	0.7M	1.2M	1.25M	1.25M/5.0M
Maximum I/O rate, words/sec.	1-256	16	16	16	16
No. of external interrupt levels					
COMMUNICATIONS	256	—	—	—	—
Maximum number of lines	Opt.; 50-9600 bps	—	Opt.; 4800 bps	Opt.; 56000 bps	Opt.; 56000 bps
Synchronous	Opt.; 50-9600 bps	—	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps
Asynchronous	Async., Bisync.,	—	None	Bisync., X.25	bisync., X.25
Protocols supported	SDLC	—	—	—	—
Network architectures supported	None	—	None	X.25	X.25
RJE terminals emulated	Most RJE terminals	—	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP
IBM 3270 emulation	Yes	—	No	Yes	Yes
PERIPHERAL EQUIPMENT	110K-10240K bytes	256K-4M bytes	280K-560K bytes	315K-2.5M bytes	315K-2.5M bytes
Floppy disk (diskette) drives	Both; 1.2M-1 billion bytes	Pack; 1.2 billion bytes	Both; 4-1440M bytes	Pack & cartridge; 10-1520M bytes	Pack & cartridge; 10-1520M bytes
Disk pack/cartridge drives	Moving-head; 2.5M bytes	No	No	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes
Drum/fixed head disk storage	100 cps; 50 KBS	No	No	No	No
Magnetic tape cassettes/cartridges	50-120 KBS	30-75 KBS	80K bps	10-72 KBS	10-72 KBS
Magnetic tape, 1/2-inch	10-200 cps	165 cps	180 cps	10-180 cps	10-180 cps
Serial printer	300 lpm	340 lpm	300, 600, 900 lpm	240-900 lpm	240-900 lpm
Line printer	50-9600; 56K	9600 bps	Up to 9600 bps	56,000 bps	56,000 bps max.
Data communications interface	96 char. x 32 lines	80 char. x 24 lines	1920 characters	80 char. x 24 lines	80 char. x 24 lines
CRT	Digitizers, plotters, factory automation equipment	Graphic displays, plotters, digitizers	Opt. digital & analog subsystems	Modular digital & analog data control & acq. subsys. opt.	Modular digital & analog data control & acq. subsys. opt.
Other supported peripheral units					
SOFTWARE	Assembler and macro assembler	Assembler	Macro assembler	Assembler & macro assembler	Assembler & macro assembler
Assembler	BASIC, FORTRAN, APL	FORTTRAN, TPL, PEP	FORTTRAN, COBOL, RPG	COBOL,IDEA,RPG II, FORTRAN, PL/1	COBOL,IDEA,RPG II, FORTRAN, PL/1
Compilers	Batch, real-time, time-sharing	Multi-sharing, multi-tasking	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Operating system	Partially	No	No	No	No
Language implemented in firmware	Partially	No	No	No	No
PRICING & AVAILABILITY	30,500 (4K MOS)	Contact vendor	13,700-15,300	28,500 (128K bytes)	49,500 (128K bytes)
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	—	—	—	225	330
Monthly maint. of basic configuration above for on-site contract, \$	Volume	—	Quantity	Various type	Various types
Discounts available	1,100 (4K bytes)	Contact vendor	3,000 (16K words)	6,000 (64K bytes)	6,000 (64K MOS)
Price of memory increment, \$	January 1978	November 1977	May 1976	February 1979	October 1978
Date of first delivery	NA	100+	NA	100 over	300
Number installed to date					
COMMENTS	Expanded Model 400 with additional features: disk expanded to 2.5M bytes, 300-lpm x 132 printer and mini-cassette for I/O	Extensive 3-D interactive CAD/CAM design application software; 24-slot high-resolution chassis; micro-diagnostic and bootstrap diagnostic facilities; 100-amp power supply; desk console	System includes RPG System 3 compatibility; AUTRAN package available for process control; comm. package available for IBM 2780/3780, HASP, and CDC 200 UT	Includes X.25 Networking, AZ-text, word processing, ANSI '74, virtual COBOL	Includes virtual COBOL ANSI '74, highest Level 2 implementation; std. features include extended floating-point functions, plus a commercial instruction set

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MANUFACTURER AND MODEL	Data General Eclipse M/600	Data General Eclipse S/130	Data General Eclipse S/140	Data General Nova 4C	Data General Nova 4S
WORD LENGTH, BITS	16 + 5	16 + 5	16 + 5	16	16
NO. WORKSTATIONS SUPPORTED	64	64	64	64	64
MAIN STORAGE					
Storage type	Core, MOS	Core, MOS	MOS	MOS	MOS
Cycle/access time	0.8/0.5	0.8, 0.5, 0.7/0.4	0.2/0.4	.40	—
Min./Max. capacity, words	32K/1024K	16K/512K	64K/512K	16K/32K	16K/32K
Parity checking	No	No	No	No	No
Error correction	Standard	Standard	Standard	No	No
Storage protection	Standard	Standard	Standard	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	32K	64K	32K	1K	1K
Control storage	ROM; 2K x 56 bits	PROM/RAM; 224 B	ROM; 2K x 56 bits	No	No
Add time, microseconds	0.6	0.6	0.2	0.2	0.2
Hardware multiply/divide	Standard	Standard	Standard	Optional	Optional
Hardware floating point	Standard	No	Optional	No	Optional
Hardware byte manipulation	Standard	Optional	Standard	Standard	Standard
Battery backup	No	Optional	Standard	Optional	Optional
Real-time clock or timer	Standard	Standard	Standard	Optional	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1.25M/5.0M	1.25M	1.25M	1M	1M
No. of external interrupt levels	16	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	—	—	—	128	128
Synchronous	Opt.; 56000 bps	Opt.; 56000 bps	Opt.; 56,000 bps	Opt.; (32) 56K bps	Opt.; (32) 56K bps
Asynchronous	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; (128) 19200 bps	Opt.; (128) 19200 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	XODIAC, IBM BSC	XODIAC, IBM BSC
RJE terminals emulated	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP	2780/3780, HASP II	2780/3780, HASP II
IBM 3270 emulation	Yes	Yes	Yes	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	315K-2.5M bytes	315K-2.5M bytes	315K-2.5M bytes	Yes	Yes
Disk pack/cartridge drives	Pack & cartridge 10-6080M bytes	Pack & cartridge; 10-15 20M bytes	Pack & cartridge; 10-1520M bytes	Yes	Yes
Drum/fixed head disk storage	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Fixed-head; 1-16M bytes	Yes	Yes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	10-72 KBS	10-72 KBS	10-72K bps	Yes	Yes
Serial printer	10-180 cps	10-180 cps	10-180 cps	Yes	Yes
Line printer	240-900 lpm	240-900 lpm	240-900 lpm	Yes	Yes
Data communications interface	56,000 bps max.	56,000 bps	56,000 bps	Yes	Yes
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	Yes	Yes
Other supported peripheral 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.	Digital & analog, data control sub- system	Digital & analog, data control sub- system
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Yes	Yes
Compilers	COBOL,IDEA,RPG II, FORTRAN, PL/1	FORTRAN, BASIC, ALGOL, PL/1	COBOL,IDEA,RPG II, BASIC, FORTRAN	BASIC, FORTRAN, ALGOL	BASIC, FORTRAN, ALGOL
Operating system	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Real-time, RDOS, multi-tasking	Real-time, RDOS, 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, \$	80,000 (256K bytes)	16,500 (128K bytes)	16,500 (128K bytes)	2,800 (32K bytes)	5,800 (32K bytes)
Monthly maint. of basic configura- tion above for on-site contract, \$	470	105	105	45	56
Discounts available	Various type	Various type	Various types	—	—
Price of memory increment, \$	8,000 (256K bytes)	4,500 (32K core)	5,000 (128K bytes)	—	2,200 (32K bytes)
Date of first delivery	April 1978	February 1975	NA	NA	NA
Number installed to date	250	1000+ (all models)	NA	NA	NA
COMMENTS	Includes virtual COBOL ANSI '74, highest Level 2 im- plementation; I/O processor with 64KB for handling low- speed character- oriented data move- ment	256 56-bit words of writable control store optionally available	X.25 Networking, AZ-text, word processing		

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MANUFACTURER AND MODEL	Data General Nova 4X	Datapoint 1100	Datapoint 1150	Datapoint 1170	Datapoint 1500
WORD LENGTH, BITS	16	8-bit byte	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	64				
MAIN STORAGE	MOS	MOS	MOS	MOS	MOS
Storage type	—	1.6/0.6	0.8/0.3	0.8/0.3	0.65/0.3
Cycle/access time	64K/128K	4K/16K bytes	24K/32K bytes	48K/56K bytes	32K/64K bytes
Min./Max. capacity, words	No	No	Standard	Standard	Standard
Parity checking	No	No	Standard	Standard	Standard
Error correction	No	No	Standard	Standard	Standard
Storage protection	No	No	Standard	Standard	No/
CENTRAL PROCESSOR	1K	16K bytes	24K bytes	48K bytes	60K bytes
No. of directly addressable words	No	No	ROM; 4K bytes	ROM; 4K bytes	ROM; 4K bytes
Control storage	0.2	4.8	1.4	1.4	1.8
Add time, microseconds	Optional	No	No	No	No
Hardware multiply/divide	Optional	No	No	No	No
Hardware floating point	Standard	Standard	No	Standard	—
Hardware byte manipulation	Optional	No	No	No	No
Battery backup	Standard	Optional	No	No	No
Real-time clock or timer					
INPUT/OUTPUT CONTROL	Standard	No	No	No	No
Direct memory access channel	1M	195K	114K	114K	250K
Maximum I/O rate, words/sec.	16	—	—	—	—
No. of external interrupt levels					
COMMUNICATIONS	128	—	—	—	—
Maximum number of lines	Opt.: (32) 56K bps	—	—	—	—
Synchronous	Opt.:(128)19,200 bps	—	—	—	Up to 9600 bps
Asynchronous	Bisync, X.25	—	—	—	Bisync
Protocols supported					
Network architectures supported	XODIAC, IBM BSC	—	—	—	—
RJE terminals emulated	2780/3780, HASP II	—	—	—	IBM 3780
IBM 3270 emulation	No	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes	256K-1M bytes	512K-1M bytes	512K-1M bytes	512K bytes
Disk pack/cartridge drives	Yes	No	No	No	No
Drum/fixed head disk storage	Yes	No	No	No	No
Magnetic tape cassettes/cartridges	No	Cassette, 352 cps	No	No	No
Magnetic tape, 1/2-inch	Yes	9.6-20 KBS	9.6-20 KBS	9.6-20 KBS	No
Serial printer	Yes	120	80-160 cps	80-160 cps	80-160 cps
Line printer	Yes	300, 600 lpm	300, 600 lpm	300, 600 lpm	No
Data communications interface	Yes	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 4800 bps
CRT	Yes	80 char. x 12 lines	80 char. x 12 lines	80 char. x 12 lines	80 char. x 24 lines
Other supported peripheral units	Digital & analog, data control sub-system	—	—	—	—
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes	No
Compilers	BASIC, FORTRAN, ALGOL	BASIC, RPG PLUS, SCRIBE, DATABUS, DATA FORM	DATABUS, MULTI-FORM, BASIC, RPG-PLUS	DATABUS, MULTI-FORM, DATA-SHARE, RPGPLUS	DATABUS, DATA-FORM, RPGPLUS, DATASHARE
Operating system	Real-time, RDOS, multitasking	Batch	Batch	Batch, time-sharing	Batch, stand-alone
Language implemented in firmware	No	No	No	No	Multi-tasking
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	10,400 (128K bytes)	—	14,480	15,980	6,550
Monthly maint. of basic configuration above for on-site contract, \$	78	—	76	78	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	5,000 (128K bytes)	—	125 (8K bytes)	125 (8K bytes)	—
Date of first delivery	NA	January 1974	August 1976	July 1977	October 1977
Number installed to date	NA	NA	NA	NA	NA
COMMENTS			Price includes 24K bytes and two diskette drives	Price includes 48K bytes and two diskette drives	Price includes 64K bytes and 1M byte dual diskette

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MANUFACTURER AND MODEL	Datapoint 1800	Datapoint 2200	Datapoint 5500	Datapoint 6600	Dataram BM-1
WORD LENGTH, BITS	8-bit byte	8-bit byte	8-bit byte	8-bit byte	16
NO. WORKSTATIONS SUPPORTED					
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	Core, MOS
Cycle/access time	0.63	1.6/0.4	0.89/0.3	0.6/0.2	1.2/1.2
Min./Max. capacity, words	64K/64K bytes	4K/16K bytes	48K/48K bytes	120K/120K bytes	120K/120K bytes
Parity checking	Standard	No	Standard	Standard	No
Error correction	Standard	No	Standard	Standard	No
Storage protection	Standard	No	Standard	Standard	No
CENTRAL PROCESSOR					
No. of directly addressable words	60K bytes	16K bytes	48K bytes	120K bytes	128K
Control storage	ROM/RAM; 4KB/60KB	No	ROM; 4K bytes	ROM; 4K bytes	ROM, 1K; PROM, 1K
Add time, microseconds	3.8	4.8	1.4	1.15	3.5
Hardware multiply/divide	No	No	No	Standard	Optional
Hardware floating point	—	No	No	No	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No; auto restart	No	No	No	No
Real-time clock or timer	Standard	Optional	Optional	No	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	No	No	No	Standard
Maximum I/O rate, words/sec.	Instr.-dependent	195K	114K	125K	833K
No. of external interrupt levels	4	—	—	—	Variable
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	—	—	—	—	—
Asynchronous	—	—	—	—	—
Protocols supported	Bisync, TTY	—	—	—	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	—	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	1M bytes (dual-den.)	256K-1M bytes	256K-1M bytes	No	No
Disk pack/cartridge drives	No	Both; 2.4-50M bytes	Both; 2.4-200M bytes	Both; 2.5-200M bytes	No
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	Cassette; 352 cps	Cassette; 352cps	Cassette; 352 cps	No
Magnetic tape, 1/2-inch	560-1600 bpi; 7&9 trk.	9.6-20 KBS	9.6-20 KBS	9.6-20 KBS	No
Serial printer	80-160 cps	120 cps	120 cps	80-160 cps	No
Line printer	300, 600, 900 lpm	300, 600 lpm	300, 600 lpm	300, 600 lpm	No
Data communications interface	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	Up to 9600 bps	No
CRT	80 char. x 24 lines	80 char. x 12 lines	80 char. x 12 lines	80 char. x 12 lines	No
Other supported peripheral units	Single-density disk storage, serial printers, belt printers	—	—	—	1-megabyte BULK-CORE storage is standard
SOFTWARE					
Assembler	Macro assembler	Yes	Yes	Yes	Assembler, Macro assembler
Compilers	COBOL, BASIC, RPG-PLUS, DATABUS, DATASHARE	BASIC, RPG PLUS, SCRIBE, DATABUS, DATAFORM	BASIC, RPG PLUS, SCRIBE DATABUS, DATAFORM	BASIC, RPG PLUS, SCRIBE, DATABUS, DATAFORM	NA
Operating system	Batch, interactive, real-time, virtual	Batch, time-sharing	Batch, time-sharing	Batch, time-sharing	Batch, real-time
Language implemented in firmware	No	No	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, \$	10,550	Contact vendor	Contact vendor	Contact vendor	8,795 (64KB memory + 256KB bulk core)
Monthly maint. of basic configuration above for on-site contract, \$	103	—	—	—	NA
Discounts available	—	—	—	—	Quantity 660 (32KB)
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	August 1978	April 1972	December 1974	July 1977	November 1978
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Price includes 64K bytes, 1M byte dual diskette, one CRT, and one communications interface				

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MANUFACTURER AND MODEL	Dataram BM-2	Digital Equipment PDP-8/A	Digital Equipment PDP-11/03	Digital Equipment PDP-11/04	Digital Equipment PDP-11/34A
WORD LENGTH, BITS	16	12	16	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	—	—	—	—	—
MAIN STORAGE					
Storage type	Core, MOS	Core; MOS	Core, MOS	Core, MOS	Core, MOS
Cycle/access time	1.2/1.2	1.2, 1.5; 2.4, 0.6	1.2	0.98; 0.725/0.51	0.98; 0.725/0.51
Min./Max. capacity, words	8K/128K bytes	8K/128K	4K/32K	16K/32K	16K/124K
Parity checking	No	No	No	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	128K	256	32K	32K	32K
Control storage	ROM, 1K; PROM, 1K	—	ROM; PROM; 1K	—	—
Add time, microseconds	3.5	3.0-3.8	3.5	3.17	2.03
Hardware multiply/divide	Optional	Optional	Optional	Optional	Optional
Hardware floating point	Optional	Optional	Optional	Optional	Optional
Hardware byte manipulation	Standard	No	Standard	Standard	Standard
Battery backup	No	Optional	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.	833K	74K	833K	2048K	—
No. of external interrupt levels	Variable	1-64	Variable	Variable	Variable
COMMUNICATIONS					
Maximum number of lines	—	20	—	—	—
Synchronous	—	No	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
Protocols supported	—	—	DDCMP, DNA	DDCMP, DNA	DDCMP, DNA
Network architectures supported	—	—	DECnet	DECnet	DECnet
RJE terminals emulated	—	Any RS-232C	Control Data, Univac	Control Data, Univac	Control Data, Univac
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	128-2M (6-bit)	256-512 bytes	256-512K bytes	256-512K bytes
Disk pack/cartridge drives	No	Cartridge, 3.2-12.8M (6-bit)	No	Cart. & pack; 2.5-1048M bytes	Cart. & pack; 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	No	Cassette; 562 cps	No	Cassette; 562 cps	Cassette; 562 cps
Magnetic tape, 1/2-inch	No	10-36 KBS	No	10-72 KBS	10-72 KBS
Serial printer	No	180 cps	180 cps	30-180 cps	30-180 cps
Line printer	No	230 lpm	No	230-1200 lpm	230-1200 lpm
Data communications interface	No	110-71K bps	50-56,000 bps	50-56,000 bps	50-56,000 bps
CRT	No	—	—	—	—
Other supported peripheral units	4-megabyte BULK SEMI is standard	A/D converter, paper tape reader, paper tape punch	Serial line and parallel line controllers	Paper tape reader; paper tape punch	Paper tape reader; paper tape punch
SOFTWARE					
Assembler	Assembler, macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	BASIC, FORTRAN	BASIC, DIBOL, ALGOL, FOCAL	BASIC, FORTRAN	BASIC, FORTRAN, FOCAL	BASIC, FORTRAN, COBOL, FOCAL
Operating system	Batch, real-time	Batch, real-time, time-sharing	Batch, real-time	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, \$	11,645 (64KB mem. + 512KB BULK SEMI)	3,960-11,000 (8K)	1,995 (8K MOS)	3,995 (16K MOS)	9,050 (32K MOS)
Monthly maint. of basic configuration above for on-site contract, \$	NA	44-99	37	54	87
Discounts available	Quantity	—	—	—	—
Price of memory increment, \$	660 (32KB)	1,850 (8K bytes)	625 (8K bytes)	1,700 (16K bytes)	2,200 (32K bytes)
Date of first delivery	December 1979	September 1974	NA	July 1975	March 1976
Number installed to date	NA	Over 40,000	Over 29,000	Over 9100	Over 750
COMMENTS		Also available in packaged version called Datasystem 310	Packaged version of LSI-11 micro-computer; instruction set equivalent to PDP-11/40	Successor to PDP-11/05 and 11/10; upgradable to PDP-11/34 status	Uses similar technology to PDP-11/04; includes memory management for greater addressing capability; packaged version called Datasystem 530 is also available

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MANUFACTURER AND MODEL	Digital Equipment PDP-11/35 & 11/40	Digital Equipment PDP-11/44	Digital Equipment PDP-11/60	Digital Equipment PDP-11/70	Digital Scientific 4030/40
WORD LENGTH, BITS	16 + 2	16 + 2	16 + 2	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	—	—	—	—	—
MAIN STORAGE					
Storage type	Core	MOS/cache	Core, MOS	Core	Core
Cycle/access time	0.98/0.36	0.48, 0.96/0.48	0.98/—	0.98/0.36	0.9/0.5
Min./Max. capacity, words	8K/124K	256K/1M bytes	32K/256K	64K/1024K	8K/128K
Parity checking	Optional	No	Standard	Standard	Standard
Error correction	No	Standard	Standard (MOS)	No	No
Storage protection	Optional	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	32K	32K	32K	32K	64K
Control storage	No	No	RAM; 1K words	—	ROM; 4K words
Add time, microseconds	1.07	0.87	2.2	0.30-1.20	2.9
Hardware multiply/divide	Optional	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Standard	Standard	Standard	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	No
Battery backup	No	Optional	No	No	No
Real-time clock or timer	Optional	Standard	Standard	Standard	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	2M	1M	—	2.9M	1M
No. of external interrupt levels	Variable	4	Variable	Variable	6, 16
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	Up to 1M bps	Up to 1M bps	Up to 1M bps	Up to 1M bps	—
Asynchronous	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	IBM 1130/1800
RJE terminals emulated	Control Data, Univac	Control Data, Univac	Control Data, Univac	Control Data, Univac	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	256-512K bytes	256-512K bytes	256-512 bytes	256-512 bytes	Yes
Disk pack/cartridge drives	Cart. & pk.; 2.5-1408M bytes	Both; 2.5-1408M bytes	Cart. & pk.; 2.5-1408M bytes	Cart. & pk.; 2.5-1408M bytes	Both; 1-160M bytes
Drum/fixed head disk storage	Fixed-head; 512-8M bytes	Fixed-head; 512K-8M bytes	Fixed-head; 512-8M bytes	Fixed-head; 512-8M bytes	Fixed; 1-2M bytes
Magnetic tape cassettes/cartridges	Cassette; 562 cps	Cassette; 562 cps	Cassette; 562 cps	Cassette; 562 cps	No
Magnetic tape, 1/2-inch	10-72 KBS	10-72 KBS	10-72 KBS	10-72 KBS	30, 60 KBS
Serial printer	30-180 cps	30-180 cps	30-180 cps	30-180 cps	180 cps
Line printer	230-1200 lpm	230-1200 lpm	230-1200 lpm	230-1200 lpm	300 to 1000 lpm
Data communications interface	50-56,000 bps	50-56,000 bps	50-56,000 bps	50-56,000 bps	Up to 19,200 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	Paper tape reader, paper tape punch	Paper tape units	Paper tape reader, paper tape punch	Paper tape reader, paper tape punch	Paper tape reader/punch, XY plotter, digital/analog I/O
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	BASIC, FORTRAN, COBOL, FOCAL	BASIC, FORTRAN, COBOL, APL, CORAL	BASIC, FORTRAN, COBOL	BASIC, FORTRAN, COBOL, FOCAL	COBOL, RPG II, APL, BASIC, FORTRAN
Operating system	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Real-time, inter., time-sharing	Real-time, inter., time-sharing	Real-time, time-sharing, multiprog. Partially
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	23,900 (256K bytes)	35,700 (32K core)	63,000 (128K core)	33,850 (4030); 42,285 (4040)
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	2,200 (32K core)	6,000 (256K bytes)	6,650 (64K core)	18,590 (128K core)	4,000 (8KB core)
Date of first delivery	NA	June 1980	June 1977	NA	1970
Number installed to date	NA	NA	—	NA	Over 240 (both models)
COMMENTS	PDP-11/35 is an OEM version of the PDP-11/40; packaged version is called Datasystem 350 based on PDP-11/40	Optional CIS processor & 1M byte memory increment (\$20,000) available; enhanced main-table features and an intellignet console subsystem	Includes user-accessible microprogramming; error-correcting memory	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 Datasystem 570	Also features process-control monitoring

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MANUFACTURER AND MODEL	Digital Scientific 5010	Digital Scientific 5020	Digital Scientific 5030	Digital Systems Galaxy/3	Digital Systems Galaxy/5
WORD LENGTH, BITS	16 + 2	16 + 2	16 + 2	8 to 20	8 to 20
NO. WORKSTATIONS SUPPORTED	—	16	32	15	60
MAIN STORAGE	MOS	Core, MOS	Core, MOS	MOS	MOS
Storage type	0.5/0.3	0.9; 0.5/0.5; 0.3	0.9; 0.5/0.5; 0.3	.50/.50	.50/.50
Cycle/access time	4K/32K	8K/64K	64K/1M	96K/128K bytes	128K/1024K bytes
Min./Max. capacity, words	Standard	Standard	Standard	Standard	Standard
Parity checking	No	No	No	Standard	Standard
Error correction	Standard	Standard	Standard	Optional	Optional
Storage protection					
CENTRAL PROCESSOR	32K	32K	64K	128K	1024K
No. of directly addressable words	PROM	PROM	PROM	PROM; 512 x 40	PROM; 1024 x 40
Control storage	1.44	1.44	1.44	.30	.30
Add time, microseconds	Standard	Standard	Standard	Standard	Standard
Hardware multiply/divide	Optional	Optional	Optional	No	No
Hardware floating point	No	No	No	Standard	Standard
Hardware byte manipulation	No	No	No	Optional	Optional
Battery backup	Optional	Optional	Optional	Standard	Standard
Real-time clock or timer					
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Standard
Direct memory access channel	2M	1M-2M	1M-2M	200K	200K
Maximum I/O rate, words/sec.	6	6	6	15	60
No. of external interrupt levels					
COMMUNICATIONS	—	—	—	15	120
Maximum number of lines	—	2	2	Std.; to 15,000 bps	Std.; to 15,000 bps
Synchronous	—	16	32	Std.; to 9,600 bps	Std.; to 9,600 bps
Asynchronous	—	3780, Bisync, HASP	3780, Bisync, HASP	Programmable	Programmable
Protocols supported					
Network architectures supported	IBM 1130	No	No	None	None
RJE terminals emulated	—	2780, 3780, 3740	2780, 3780, 3740	None	None
IBM 3270 emulation	—	No	No	No	No
PERIPHERAL EQUIPMENT	Yes	Yes	Yes	No	No
Floppy disk (diskette) drives	Cart.; 1-5M	Both; 1-160M bytes	Both; 1-160M bytes	Cartridge; 27M bytes/drive	Pack; 80M bytes/drive
Disk pack/cartridge drives					
Drum/fixed head disk storage	No	Fixed; 1-2M bytes	Fixed; 1-2M bytes	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	30, 60 KBS	30, 60 KBS	30, 60 KBS	1600 bpi	1600 bpi
Serial printer	180 cps	180 cps	180 cps	No	No
Line printer	300, 600 lpm	300, 600 lpm	300, 600 lpm	300, 600, 900 lpm	300, 600, 900 lpm
Data communications interface	Up to 19,200 bps	Up to 19,300 bps	Up to 19,200 bps	110 to 9600 bps	110 to 9600 bps
CRT	24 x 80 char.	24 x 80 char.	24 x 80 char.	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	Paper tape I/O, plotter	Paper tape reader/punch, XY plotter	Paper tape reader/punch, XY plotter	15 port async., multiplexer, 360/370 interface	15 port async., multiplexer, 360/370 interface
SOFTWARE	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Yes	Yes
Assembler	COBOL, RPG II, BASIC, FORTRAN	COBOL, RPG II, APL, BASIC, FORTRAN	COBOL, RPG II, APL, BASIC, FORTRAN	RPG II, BASIC/5, PL/G, COBOL	RPG II, BASIC/5, PL/G, COBOL
Compilers	Batch	Batch, time-sharing	Batch, time-sharing, multiprogramming	Time-sharing	Time-sharing
Operating system					
Language implemented in firmware	No	No	Partially	Partially	Partially
Operating system implemented in firmware	No	No	No	Partially	Partially
PRICING & AVAILABILITY	18,000	24,500	39,600	28,700	44,930
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	—	222	433	200	315
Monthly maint. of basic configuration above for on-site contract, \$	—	Quantity	Quantity	On request	On request
Discounts available	1,000 (4KB MOS)	1,800/2,000 (8KB)	1,800/2,000 (8KB)	3,400 (32K bytes)	6,200 (64K bytes)
Price of memory increment, \$					
Date of first delivery	NA	NA	NA	June 1979	August 1976
Number installed to date	NA	NA	NA	5	30
COMMENTS	Intelligent RJE or local batch for applications requiring high-speed calculations; expandable to Model 5020	Up to 8 concurrent users in a mixed conversation and batch mode; expandable to Model 5030	Up to 32 concurrent users in a mixed conversation and batch mode	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	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

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MANUFACTURER AND MODEL	Dimis, Inc. Total 100 (70)	Dimis, Inc. Total 100 (30)	Display Data Corporation In * Sight	Durango System Inc. F-85	Four-Phase IV/40
WORD LENGTH, BITS	16	16	8	8-bit byte	24
NO. WORKSTATIONS SUPPORTED	50	27	32	5	16
MAIN STORAGE	MOS	MOS	Core; semiconductor	MOS	MOS
Storage type	250/250	250/250	1.00/0.35	0.50/0.25	2.0
Cycle/access time	128K/4096K	128K/512K	32K/128K	64K/64K	24K/96K bytes
Min./Max. capacity, words	Standard	Standard	—	Standard	Standard
Parity checking	Standard	Standard	—	No	No
Error correction	Standard	Standard	—	No	No
Storage protection	Standard	Standard	—	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	—	64K bytes	96K bytes
Control storage	No	No	—	EROM; 2-8K	ROM; 1K x 48 bits
Add time, microseconds	0.2	0.3	4.6	1.33	16
Hardware multiply/divide	Standard	Standard	—	No	Standard
Hardware floating point	Standard	Standard	—	No	Standard
Hardware byte manipulation	Standard	Standard	—	Standard	Standard
Battery backup	Optional	Optional	—	Optional	—
Real-time clock or timer	Standard	Standard	—	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	—	Standard	No
Maximum I/O rate, words/sec.	4-8M	2-8M	—	750K	125K
No. of external interrupt levels	To 128	To 128	—	8	8
COMMUNICATIONS					
Maximum number of lines	32	32	32	5	16
Synchronous	Optional	Optional	No	Opt.; (1) to 9600 bps	Up to 9600 bps
Asynchronous	Std.; to 9600 bps	Std.; to 9600 bps	Std.; 9600 bps	Opt.; (4) to 9600 bps	Up to 2400 bps
Protocols supported	Programmable	Programmable	Async, X3.25	Bisync	—
Network architectures supported	—	—	None	—	—
RJE terminals emulated	No	No	None	2780/3780	IBM 360/370
IBM 3270 emulation	No	No	No	No	Under COBOL
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Optional	Optional	No	473K-1890K bytes	354K bytes
Disk pack/cartridge drives	Both; 4-200M bytes	Both; 4-200M bytes	Cart.; 80M bytes	Cart.; 12-24M bytes	Cart.; 2.5-10M bytes
Drum/fixed head disk storage	Optional	Optional	No	No	10-20M bytes
Magnetic tape cassettes/cartridges	No	No	Opt.; 10, 20 KBS	No	No
Magnetic tape, 1/2-inch	No	No	—	No	No
Serial printer	Optional	Optional	Std.; 120 cps	165 cps; 9 pin	55 cps
Line printer	600 lpm	600 lpm	Opt.; 15-600 lpm	No	120-1000 lpm
Data communications interface	36 KBS	36 KBS	—	Up to 9600 bps	Up to 9600 bps
CRT	24 x 80 char.	24 x 80 char.	Std.; 24 x 80 char.	24 lines x 80 char.	80 char. x 24 lines
Other supported peripheral units	A/D, D/A converters, discrete I/O and memory	A/D, D/A converters, discrete I/O and memory	None	—	None
SOFTWARE					
Assembler	Assembler and macro assembler	Assembler and macro assembler	Yes	No	Yes
Compilers	FORTRAN	FORTRAN	No	Star BASIC	COBOL, RPG
Operating system	Batch, real-time	Batch, real-time	—	Batch, real-time, multiprogramming	IDOS, DOS
Language implemented in firmware	No	No	Fully	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, \$	153,000	98,000	29,600	12,983	37,440 (24K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	—	—	297	107	166
Discounts available	—	—	Quantity	—	—
Price of memory increment, \$	36,000 (512K bytes)	10,500 (128K bytes)	—	NA	—
Date of first delivery	December 1978	June 1974	January 1974	December 1978	June 1973
Number installed to date	15	18*	1,000	NA	10,000 (all sys.)
COMMENTS	Three CRT's standard; package includes staff & mgmt., training & conversion support	Three CRT's standard; package includes staff & mgmt., training & conversion support; *includes compatible Mod-comp II	Specialists in complete turnkey systems, support, forms, & maintenance for selected businesses	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 CRT's. 2.5-megabyte disk drive, and bisynch communications controller

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MANUFACTURER AND MODEL	Four-Phase IV/50	Four-Phase IV/90	Four-Phase IV/70	Functional Automation F6401	Functional Automation F6420
WORD LENGTH, BITS	24	24	24	64	8, 32
NO. WORKSTATIONS SUPPORTED	24	32	32	0	8
MAIN STORAGE Storage type Cycle/access time Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 2.0 24K/94K bytes Standard No No	MOS 0.8 96K/384K bytes Standard Standard No	MOS 2.0 24K/96K bytes Standard No No	MOS 0.25/0.25 32K/2048K words Optional Optional Standard	MOS 0.5/0.5 256K/16,384K Optional 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	96K bytes ROM; 1K x 48 bits 16 Standard Standard Standard — Standard	96K bytes ROM; 1K x 48 bits 12 Standard Standard Standard — Standard	96K bytes ROM; 1K x 48 bits 16 Standard Standard Standard — Standard	16,384K bytes ROM/PROM 0.25 No No Standard Optional No	16,384K bytes ROM/EPROM 3.0 No No No Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	No 125K 8	No 125K 8	No 125K 8	Standard 2.66M bps None	No 8-9600 baud None
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	24 Up to 9600 bps Up to 2400 bps — IBM 360/370 Under COBOL	32 Up to 9600 bps Up to 2400 bps Bisync, SDLC — IBM 360/370 Under COBOL	32 Up to 9600 bps Up to 2400 bps — IBM 360/370 Under COBOL	1 Std.; 8M bps No FABUS — FABUS None No	8 Std.; 8M bps Std.; 8-19,200 bps FABUS — FABUS None 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	354K bytes Cart.; 2.5M-10M bytes 12.5M bytes No No 55 cps 120-1000 lpm 9600 bps 80 char. x 24 lines None	354K bytes Pack & Cartridge; 2.5M-270M bytes 10-20M bytes No 10, 60 KBS 55 cps 120-1000 lpm Up to 9600 bps 80 char. x 24 lines None	354K bytes Pack & cartridge; 2.5M-270M bytes 10-20M bytes No 10, 60 KBS 55 cps 120-1000 lpm Up to 9600 bps 80 char. x 24 lines None	— — — — — — — —	— — — Cart.; 9600 baud — — 300 lpm (8) 19,200 bps 3,168 chars.
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Yes COBOL, RPG IDOS, DOS No No	Yes COBOL, RPG IDOS, DOS No No	Yes COBOL, RPG IDOS, DOS No No	Assembler/loader None Real-time Partially Fully	Yes FASL Real-time, multi-user 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	69,330 349 (approx.) — — April 1976 10,000 (all sys.)	1,930/month (42 month lease) — — — July 1977 10,000 (all sys.)	72,315 (48K bytes) — — — February 1971 10,000 (all sys.)	30,902 — — Quantity, 20% — 1980 0	20,402 — — Quantity, 20% — November 1979 3
COMMENTS		System price also includes 12 CRT's 2.5-megabyte disk drive, and 9-track magnetic tape drive	System price also includes 12 CRT's 2.5-megabyte disk drive, and 9-track magnetic tape drive	Interfaces with other computers in modular system; intended for OEM market	Interfaces via FABUS to other computers in network; intended for OEM market

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MANUFACTURER AND MODEL	Functional Automation F6440	General Robotics Polaris	General Robotics Gemini	General Robotics Tristar	General Robotics Pegasus
WORD LENGTH, BITS	8, 32	16	16	16	16
NO. WORKSTATIONS SUPPORTED	1	Variable	Variable	Variable	Variable
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.5/0.5	0.45/0.30	0.45/0.30	0.45/0.30	0.45/0.30
Min./Max. capacity, words	256K/16,384K	32K/32K	32K/32K	32K/32K	32K/32K
Parity checking	Optional	No	No	No	No
Error correction	Optional	No	No	No	No
Storage protection	Standard	No	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	16,384K bytes	32K	32K	32K	32K
Control storage	ROM/EPROM	PROM; 512 x 16	PROM; 512 x 16	PROM; 512 x 16	PROM; 512 x 16
Add time, microseconds	3.0	3.5	3.5	3.5	3.5
Hardware multiply/divide	No	Standard	Standard	Standard	Standard
Hardware floating point	No	Standard	Standard	Standard	Standard
Hardware byte manipulation	No	Standard	Standard	Standard	Standard
Battery backup	Optional	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.	1.25M bps	833K	833K	833K	833K
No. of external interrupt levels	None	Variable	Variable	Variable	Variable
COMMUNICATIONS					
Maximum number of lines	2	Variable	Variable	Variable	Variable
Synchronous	Std.; 8M bps	Optional	Optional	Optional	Optional
Asynchronous	Std.; 300/9600 bps	Standard	Standard	Standard	Standard
Protocols supported	FABUS	—	—	—	—
Network architectures supported	FABUS	DECnet	DECnet	DECnet	DECnet
RJE terminals emulated	None	IBM 2780	IBM 2780	IBM 2780	IBM 2780
IBM 3270 emulation	No	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	—	1M byte	2.5M bytes	3.8M bytes	Optional
Disk pack/cartridge drives	Pack; 80/640M bps	Optional	Optional	Optional	Optional
Drum/fixed head disk storage	—	No	No	No	No
Magnetic tape cassettes/cartridges	Cart.; 9600 baud	No	No	No	No
Magnetic tape, 1/2-inch	—	No	No	No	No
Serial printer	—	110 cps	Optional	Optional	Optional
Line printer	—	No	No	No	No
Data communications interface	300/9600 bps	Optional	Optional	Optional	Optional
CRT	3,168 chars.	480 characters	Optional	Optional	Optional
Other supported peripheral units	—	None	None	None	None
SOFTWARE					
Assembler	Yes	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	FASL	FORTRAN, BASIC, APL, DIBOL	FORTRAN, BASIC, APL, DIBOL	FORTRAN, BASIC, APL, DIBOL	FORTRAN, BASIC, APL, DIBOL
Operating system	Real-time	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	Partially	No	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, \$	24,280	12,000	9,500	11,000	17,000
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	Quantity, 20%	OEM	Yes	Yes	Yes
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	1980	January 1978	January 1978	June 1978	November 1977
Number installed to date	NA	100	100	200	150
COMMENTS	Interfaces via FABUS to other computers in network; intended for OEM market	Complete desktop LSI-11 computer system with keyboard, screen, printer, CPU, and disks in self-contained unit	Based on the DEC LSI-11	Based on the DEC LSI-11	Based on the DEC LSI-11

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MANUFACTURER AND MODEL	Harris Slash 6	Harris 100	Harris 500	Harris 800	Hewlett-Packard General Systems Division HP 250
WORD LENGTH, BITS	24, 48	24, 48	24, 48	24, 48	16
NO. WORKSTATIONS SUPPORTED	—	Appl. dependent	Appl. dependent	Appl. dependent	6
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.45/0.30	0.45/0.30	0.40/0.29	0.40/0.29	0.833
Min./Max. capacity, words	48K/768K bytes	192K/768K bytes	192K/3072K bytes	384K/3072K bytes	32K/64K bytes
Parity checking	No	No	No	No	Standard
Error correction	Standard	Standard	Standard	Standard	No
Storage protection	Standard	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	96K bytes	96K bytes	3072K bytes	3072K bytes	2K
Control storage	No	No	No	No	—
Add time, microseconds	0.6	0.6	NA	NA	1.6
Hardware multiply/divide	Standard	Standard	Standard	Standard	No
Hardware floating point	Optional	Optional	Optional	Optional	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	Optional	No	No
Real-time clock or timer	Optional	Optional	Optional	Optional	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Optional	Optional	Optional	Optional	Standard
Maximum I/O rate, words/sec.	To 19M bps	To 19M bps	To 19M bps	To 19M bps	1.2M bytes
No. of external interrupt levels	8-24	8-24	16-48	16-72	2.0
COMMUNICATIONS					
Maximum number of lines	—	32	64	128	5
Synchronous	—	Opt.; 56K bps	Opt.; 56K bps	Opt.; 56K bps	No
Asynchronous	—	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 19.2K bps	Opt.; 110-9600 bps
Protocols supported	—	Async, bisync	Async, bisync	Async, bisync	None
Network architectures supported	—	None	None	None	None
RJE terminals emulated	—	See Comments	See Comments	See Comments	None
IBM 3270 emulation	—	Yes	Yes	Yes	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	No	3 x 3.6M bytes
Disk pack/cartridge drives	Opt.; 10.8M-4.86 bytes	Opt./; 40M-4.86 bytes	Opt.; 40M-4.8G bytes	Opt.; 40M-4.8G bytes	Fixed; 10M bytes Cartridge; 10M 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	469K bps	469K bps	469K bps	469K bps	No
Serial printer	180 cps	180 cps	180 cps	180 cps	30, 180 cps
Line printer	240-900 lpm	240-900 lpm	240-900 lpm	240-900 lpm	400 lpm
Data communications interface	56K bps	56K bps	56K bps	56K bps	Up to 9600 bps
CRT	1920 characters	1920 characters	1920 characters	1920 characters	80 char. x 24 lines
Other supported peripheral units	Printer/plotters	Printer/plotters	Printer/plotters	Printer/plotters	—
SOFTWARE					
Assembler	Macro assembler	Macro assembler	Macro assembler	Macro assembler	No
Compilers	FORTRAN IV, BASIC, FORGO, SNOBOL	FORTRAN IV & 77, APL, COBOL, RPG II	FORTRAN IV & 77, APL, COBOL, RPG II	FORTRAN IV & 77, APL, COBOL, RPG II	Business BASIC
Operating system	Real-time, batch	Real-time, batch time-sharing	Batch, real-time, time-sharing	Batch, real-time, time-sharing	Interactive 1 Interpretive
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, \$	17,900 (48K bytes)	45,000 (192K bytes)	99,500 (192K bytes)	155,200 (384K bytes)	17,000
Monthly maint. of basic configuration above for on-site contract. \$	—	Special quote	Special quote	Special quote	90
Discounts available	—	Yes	Yes	Yes	OEM, volume
Price of memory increment, \$	2,400 (48K bytes)	2,400 (48K bytes)	28,800 (1.9M bytes)	28,800 (1.9M bytes)	1,050 (32K bytes)
Date of first delivery	December 1976	First qtr. 1977	First qtr. 1979	First qtr. 1980	September 1978
Number installed to date	NA	NA	NA	NA	NA
COMMENTS		RJE terminals emulated; 2780/3780, HASP workstation, UT-200, U-1004	RJE terminals emulated; 2780/3780, HASP workstation, UT-200, U-1004	RJE terminals emulated; 2780/3780, HASP workstation UT-200, U-1004	

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MANUFACTURER AND MODEL	Hewlett-Packard General Systems Division HP 300 Model A	Hewlett-Packard General Systems Division HP 300 Model B	Hewlett-Packard HP 1000 M Series	Hewlett-Packard HP 1000 E Series	Hewlett-Packard HP 1000 F Series
WORD LENGTH, BITS	16	16	16 + 1	16 + 1	16 + 1
NO. WORKSTATIONS SUPPORTED	16	16	56	56	56
MAIN STORAGE Storage type Cycle/access time Min./Max. capacity, words Parity checking Error correction Storage protection	MOS 0.5/0.43 128K/512M bytes Standard Standard Standard	MOS 0.5/0.43 128K/512M bytes Standard Standard Standard	MOS 0.65 32K/1024K bytes Standard Optional Optional	MOS 0.60, 0.35 32K/1024K bytes Standard Optional Optional	MOS 0.35 32K/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	64M ROM; 6K x 32 1.98 Standard Standard Standard Standard Standard	2K ROM/RAM; 4K 1.9 Standard Firmware Standard Optional Optional	2K ROM/RAM; 16K 0.91 Standard Firmware Standard Optional Optional	2K ROM/RAM; 16K 0.91 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	Standard 1.2M bytes 0.5	Optional 616K 50	Optional 1140K 50	Optional 1140K 50
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 None None No	16 No Opt.; to 9600 bps None None None No	56 Opt.; to 500K bps Opt.; to 2.5M bps Bisync, WASP DS/1000-3000 IBM 2780 No	56 Opt.; to 500K bps Opt.; to 2.5M bps Bisync, WASP DS/1000-3000 IBM 2780 No	56 Opt.; to 500K bps Opt.; to 2.5M bps Bisync, WASP DS/1000-3000 IBM 2780 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	1M byte Opt.; 80-480M bytes Std.; 12M bytes No No 180 cps 400 lpm 9600 bps 80 char. x 24 lines Integrated display systems with windows & soft keys	1M byte Opt.; 20-360M bytes No No No 180 cps 400 lpm 9600 bps 80 char. x 24 lines Integrated display systems with windows & soft keys	0.5-2M bytes Both; to 960M bytes No Yes 20-72 KBS 180 cps 300-600 lpm 300-2.5M bps Graphic devices, meas. & control processor	0.5-2M bytes Both; 960M bytes No Yes 20-72 KBS 180 cps 300-600 lpm 300-2.5M bps Graphic devices, meas. & control processor	0.5-2M bytes Both; to 960M bytes No Yes 20-72 KBS 180 cps 300-600 lpm 300-2.5M bps Graphic devices, meas. & control processor
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	SL/300 BASIC, RPG Batch, multi-task, multiprogramming Partially Partially	SL/300 BASIC, RPG Batch, multi-task, multiprogramming Partially Partially	Assembler & micro assembler FORTRAN, BASIC Real-time, DBMS, time-sharing No No	Assembler & micro assembler FORTRAN, BASIC Real-time, DBMS, time-sharing Partially Partially	Assembler & micro assembler FORTRAN, BASIC Real-time, DBMS, time-sharing 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	35,000 160 OEM, volume 2,500 (64K words) December 1978 NA	45,000 225 OEM, volume 2,500 (64K words) December 1978 NA	6,950 (64K bytes) 71 OEM & end-user qty. 1,400 (32K bytes) May 1974 NA	8,700 (64K bytes) 74 OEM & end-user qty. 1,400 (32K bytes) November 1976 NA	11,750 (64K bytes) 102 OEM & end-user qty. 1,700 (16K bytes) July 1978 NA
COMMENTS			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	HP1000 Model 20 & Model 40 packaged systems include E-Series; DS/1000 & DATACAP/1000 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 transcendental; optional vector instruction set provides high performance matrix operations

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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	Honeywell Level 6 Model 23	Honeywell Level 6 Model 33
WORD LENGTH, BITS	16	16	16	16 + 2	16 + 2, + 6
NO. WORKSTATIONS SUPPORTED	32	32	64	12	No practical limit
MAIN STORAGE Storage type Cycle/access time 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 1.0 16K/64K words Standard No No	MOS 0.65 or 0.55 16K/64K words Standard Optional 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 32 bits — Standard Standard Standard Standard Standard	32K (64K bytes) ROM; 10K x 32 bits — Standard Standard Standard Standard Standard	32K (64K bytes) ROM; 10K x 32 bits — Standard Standard Standard Standard Standard	64K ROM; 1K x 48 bits 3.5 Standard No Standard Optional Standard	64K ROM; 512 x 56 bits 1.9 Standar No Standard Optional Standard
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard 1M 105	Standard 1M 105	Standard 2.86M 124	Standard 900KW 64	Standard 3MW 64
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported Network architectures supported RJE terminals emulated IBM 3270 emulation	Sync.; 2 Opt.; (2) 56K bps Std.; (4) 9600 bps Bisync HP-DSN 2780/3780 No	Sync.; 7 Opt.; (7) 56K bps Std.; (8) 9600 bps Bisync HP-DSN 2780/3780 No	Sync.; 9 Opt.; (2) 2.5M bps Std.; (16) 2400 bps Bisync HP-DSN HASP2,JES 2-3,ASP No	12 (any mixture) Opt.; 50-9600 bps Opt.; 50-9600 bps Bisync, VIP, TTY — 2780/3780, HASP, Yes	160 (any mixture) Opt.; 50-72,000 bps Opt.; 50-19,200 bps Bisync, VIP, HDLC, TTY — 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	1.18M bytes Cart.; 20M bytes pack; 50, 120M bytes No 110K bps 75K bps 180 cps 400 lpm 56K bps 1920 characters Graphics terminal, 4-color plotter	1.18M bytes Cart.; 20M bytes pack; 50, 120M bytes No 110K bps 75K bps 180 cps 400 lpm 56K bps 1920 characters Graphics terminal, 4-color plotters	No Pack; 50, 120M bytes No 110K bps 75K bps 180 cps 400-1000 lpm 56K bps 1920 characters PT, graphic terminal, 4-color plotters	4 x 256/512K Cart.; 4 x 26/80MB No No No 120, 160 cps 300, 600, 900 lpm 50-9600 bps 960,1920,2000 char. —	4 x 256/512K Cart.; 8x10/26/80MB pack; 8x67/256MB No No 25-120 KBS 120, 160 cps 300, 600, 900 lpm 50 bps/72KB 960,1920,2000 char. MICR
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction Partially Partially	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction Partially Partially	No COBOL, RPG, SPL, BASIC, FORTRAN Batch, time-sharing, transaction Partially Partially	Assembler and macro preprocessor COBOL, FORTRAN, RPG Multiprogramming, trans. processing No No	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	28,525 (256K bytes) 360 Quantity, OEM 5,000 (256K bytes) October 1979 3,500 (all sys.)	37, 275 (256K bytes) 395 Quantity, OEM 5,000 (256K bytes) October 1978 3,500 (all sys.)	75,875 (256K bytes) 534 Quantity, OEM 3,750 (256K bytes) June 1978 3,500 (all sys.)	4,800 52 Yes 1,500 (16K words) 1978 NA	7,275 77 Yes 875 (8K words) 1976 NA
COMMENTS	Entry level HP3000 system; operates as a stand-alone system or as a station in a dis- tributed processing network	Mid-range; for use in organizations where several func- tional areas require efficient local pro- cessing; communi- cation with other systems as well as terminals through- out the organization	Top-line; highest performance of all HP3000's; simulta- neously handle transaction pro- cessing, data communication, on- line program devel- opment and batch processing		Field upgradable to all higher models; replaces 34 & 36 which are no longer actively marketed

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MANUFACTURER AND MODEL	Honeywell Level 6 Model 43	Honeywell Level 6 Model 47	Honeywell Level 6 Model 53	Honeywell Level 6 Model 57	Honeywell Level 62
WORD LENGTH, BITS	16 + 2, + 6	16 + 2, + 6	16 + 2, + 6	16 + 2, + 6	8-bit byte
NO. WORKSTATIONS SUPPORTED	No practical limit	No practical limit	No practical limit	No practical limit	—
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.65 or 0.55	0.65 or 0.55	0.65 or 0.55	0.65 or 0.55	1.0/0.5
Min./Max. capacity, words	16K/1024K words	16K/1024K words	16K/1024K	16K/1024K	96K/992K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Optional	Optional	Optional	Optional	Yes
Storage protection	Optional	Optional	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	1024K	1024K	1024K	1024K	992K bytes
Control storage	ROM; 1K x 64 bits	ROM; 1K x 64 bits	ROM; 1K x 64 bits	ROM; 1K x 64 bits	ROM; to 30K bytes
Add time, microseconds	1.0	1.0	0.7	0.7	Varies
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Optional	Optional	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	Optional	Optional	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.	3MW	3MW	3M	3M	1.587M
No. of external interrupt levels	64	64	64	64	1-14
COMMUNICATIONS					
Maximum number of lines	160 (any mixture)	160 (any mixture)	160 (any mixture)	160 (any mixture)	Async (4); sync (2)
Synchronous	Opt.; 50-72,000 bps	Opt.; 50-72,000 bps	Opt.; 50-72,000 bps	Opt.; 50-72,000 bps	Up to 9600 bps
Asynchronous	Opt.; 50-19,200 bps	Opt.; 50-19,200 bps	Opt.; 50-19,200 bps	Opt.; 50-19,200 bps	Up to 19,200 bps
Protocols supported	Bisync, VIP, HDLC TTY	Bisync, VIP, HDLC TTY	Bisync, HDLC, VIP	Bisync, HDLC, VIP	Bisync, HDLC
Network architectures supported	—	—	—	—	—
RJE terminals emulated	2780-3780, HASP, Yes	2780/3780, HASP Yes	2780/3780, HASP Yes	2780/3780, HASP Yes	—
IBM 3270 emulation	Yes	Yes	Yes	Yes	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	4 x 256/512K Cart.; 8x10/26/80MB pack; 8x67/256MB	4 x 256/512K Cart.; 8x10/26/80MB pack; 8x67/256MB	4 x 256/512K Cart.; (8)10/26/80MB pack; (8) 67/256MB	4 x 256/512K Cart.; (8)10/26/80MB pack; (8) 67/256MB	256/512K bytes Pack; 40-1,800M bytes
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	700 bps
Magnetic tape, 1/2-inch	25-120 KBS	25-120 KBS	25-120 KBS	25-120 KBS	10-60 KBS
Serial printer	120, 160 cps	120, 160 cps	120, 160 cps	120, 160 cps	30/120 cps
Line printer	300, 600, 900 lpm	300, 600, 900 lpm	300, 600, 900 lpm	300, 600, 900 lpm	100-1600 lpm
Data communications interface	50 bps/72KB	50 bps/72KB	50bps/72KB	50 bps/72KB	To 9600 bps
CRT	960, 1920, 2000 char.	960, 1920, 2000 char.	960, 1920, 2000 char.	960, 1920, 2000 char.	80 char. x 12 lines
Other supported peripheral units	MICR	MICR	MICR	MICR	Card punch
SOFTWARE					
Assembler	Assembler and macro preprocessor	Assembler and macro preprocessor	Assembler and macro assembler	Assembler and macro assembler	No
Compilers	COBOL, FORTRAN, RPG	COBOL, FORTRAN, RPG	COBOL, FORTRAN, RPG	COBOL, FORTRAN, RPG	COBOL, FORTRAN, RPG
Operating system	Multiprogramming, time-sharing	Multiprogramming, time-sharing	Multiprogramming, time-sharing	Multiprogramming, 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	Partially
PRICING & AVAILABILITY					
Price of CPU, power supply, frt panel, and minimum memory in chassis, \$	10,325	22,275	22,175	46,975	33,192
Monthly maint. of basic configura- tion above for on-site contract, \$	114	227	174	334	160
Discounts available	Yes	Yes	Yes	Yes	—
Price of memory increment, \$	875 (8K words)	2,250 (32K words)	875 (8K words)	2,250 (32K words)	3,315 (32K bytes)
Date of first delivery	1977	1978	1978	1978	November 1974
Number installed to date	NA	NA	NA	NA	Over 1000
COMMENTS	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	Writable control store optional; in- cludes high-speed commercial instruc- tions (decimal arith- metic, etc.)	CPU is available with four different performance levels

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MANUFACTURER AND MODEL	IBM Series/1	IBM System/3	IBM System/32	IBM System/34	IBM System/38
WORD LENGTH, BITS	16	8-bit byte	8-bit byte	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	Variable	—	—	64 (remote)	40
MAIN STORAGE					
Storage type	MOS	Core, MOS	MOS	MOS	MOS
Cycle/access time	2.1, 0.8, 0.6	1.52	0.6/0.250	0.6	1.1, 0.6
Min./Max. capacity, words	16K/256K bytes	8K/512K bytes	16K/32K bytes	32K/128K bytes	512K/1536K bytes
Parity checking	Standard	Standard	Standard	Standard	No
Error correction	No	Std. (Model 15)	No	No	Standard
Storage protection	Model 4955 only	Std. (Model 15)	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	64K bytes	32K bytes	32K bytes	512K bytes
Control storage	No	No	ROM; 4K bytes	—	4K-8K words
Add time, microseconds	NA	24.32	150.8 (5 digits)	68.5 (5 digits)	—
Hardware multiply/divide	No	No	No	No	NA
Hardware floating point	Optional	No	No	No	NA
Hardware byte manipulation	Standard	Standard	Standard	Standard	NA
Battery backup	Optional	No	—	—	NA
Real-time clock or timer	Optional	Optional	No	—	NA
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	—	658K	889K	—	2.5M bytes
No. of external interrupt levels	256	5 (Model 8, 10, 12) 8 (Model 15)	4	—	NA
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	4 (remote)
Synchronous	Up to 56,000 bps	Up to 50,000 bps	Up to 7200 bps	Up to 9600 bps	Up to 9600 bps
Asynchronous	Up to 9600 bps	—	—	—	—
Protocols supported	Async, Bisync	Bisync	SDLC	SNA/SDLC	SDLC
Network architectures supported	SNA	—	—	—	—
RJE terminals emulated	2780, 3870, HASP	360/370, HASP II	—	System/34	System/370
IBM 3270 emulation	Yes	Yes	—	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	492-606K bytes	243K bytes/drive	243-303K bytes	303K bytes	24M bytes
Disk pack/cartridge drives	Non-removable cart.; 9.3-258M bytes	Both; 2.5-506M bytes	Non-removable cart.; 3.2-13.7M bytes	Non-removable cart.; 8.6-27.1M bytes	Non-removable pack; 2.673M 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	No	20-80 KBS	No	No	800 bpi
Serial printer	120 cps	85, 115 cps	40-80 cps	No	40, 80, 120 cps
Line printer	80 to 414 lpm	100-1100 lpm	50-155 lpm	160, 300 lpm	44-650 lpm
Data communications interface	To 9600 bps	Up to 50K bps	Up to 7200 bps	Up to 4800 bps	—
CRT	24 x 80 char.	40 char. x 12 lines	40 char. x 6 lines	960 or 1920 char.	960 or 1920 char.
Other supported peripheral units	Sensor I/O	MICR reader/sorter, optical mark reader	Magnetic card reader	Punched card input	Card unit
SOFTWARE					
Assembler	Macro assembler	No	Macro assembler	Yes	No
Compilers	FORTRAN, PL/1, COBOL	BASIC, RPG II, COBOL, FORTRAN	RPG II, FORTRAN	RPG II, FORTRAN	RPG III
Operating system	Real-time, multi- tasking	Batch, time-sharing	Batch (one-program)	Interactive	Interactive, batch
Language implemented in firmware	Partially	No	No	Partially	No
Operating system implemented in firmware	Partially	No	Partially	Partially	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	4,360	11,310 (8K bytes)	23,490	26,300	70,210
Monthly maint. of basic configura- tion above for on-site contract, \$	76	43	160	145	341
Discounts available	—	—	—	Educational (10%)	—
Price of memory increment, \$	1,170 (16K bytes)	2,950 (4K bytes)	878 (8K bytes)	1,175 (16K bytes)	5,000 (256K bytes)
Date of first delivery	—	December 1970	March 1975	December 1977	August 1979
Number installed to date	NA	54,000 +	15,000 +	6,000 (estimated)	NA
COMMENTS	Offered on a purchase-only basis; eleven dif- ferent CPU models	Six different model lines currently avail- able	Entry-level business computer; strong emphasis on packaged applica- tions 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	Most powerful computer offered by IBM's General Systems Division, available in 48 packaged models

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MANUFACTURER AND MODEL	IBM 5100	IBM 5100	IBM 8100	Jacquard J100	Jacquard J500
WORD LENGTH, BITS	8-bit byte	8-bit byte	8-bit byte	16	16
NO. WORKSTATIONS SUPPORTED	1	1	24	16	NA
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.533/0.330	0.53/0.33	0.8, 1.5	1.5/3.0	.50
Min./Max. capacity, words	16K/64K bytes	16K/64K bytes	256K/512K bytes	48K/64K	64K/64K
Parity checking	Standard	Standard	Standard	No	No
Error correction	No	No	No	No	No
Storage protection	No	No	Standard	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	64K bytes	256K bytes	256	256
Control storage	ROM; 180K x 9 bits	ROM; 18K x 9 bits	—	ROM; 512 words	PROM; 28K bytes
Add time, microseconds	1000 (approx.)	1000 (approx.)	—	8.0	5.28
Hardware multiply/divide	Standard	Standard	Standard	No	No
Hardware floating point	Standard	Standard	Standard	No	No
Hardware byte manipulation	Standard	Standard	Standard	No	No
Battery backup	No	No	No	No	No
Real-time clock or timer	No	No	Optional	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	500K	500K	—	500K	750K
No. of external interrupt levels	3	3	8	1	1
COMMUNICATIONS					
Maximum number of lines	—	1	19	19	2
Synchronous	—	1200 to 4800 bps	600 to 19,200 bps	Opt.; to 4800 bps	Std.; to 9600 bps
Asynchronous	—	134-5,300 bps	—	Opt.; to 4800 bps	Std.; to 9600 bps
Protocols supported	—	—	SDLC, BSC, SNA	Async, Bisync	Async, Bisync
Network architectures supported	—	—	—	None	None
RJE terminals emulated	—	IBM/370, 2741	Most IBM	2780/3780	2780/3780
IBM 3270 emulation	—	No	Yes	Yes	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	303K-4.8M bytes	Up to 962K bytes	(2) 256K bytes	(2) 256K, 512K bytes
Disk pack/cartridge drives	No	No	Up to 320M bytes	Both; 12-320M bytes	Cartridge; 12-96M bytes
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cartridge; 2.85 KBS	Cartridge; 2.85 KBS	20-160 KBS	No	No
Magnetic tape, 1/2-inch	No	No	—	10-72K bps	No
Serial printer	80, 120 cps	80, 120 cps	40-120 cps	45 cps	45 cps
Line printer	No	No	120-400 lpm	300 lpm	300 lpm, 150 cps
Data communications interface	Up to 300 bps	Up to 9600 bps	Up to 19,200 bps	Up to 4800 bps	Up to 9600 bps
CRT	64 char. x 16 lines	64 char. x 16 lines	Up to 3440 char.	1920 characters	1920 characters
Other supported peripheral units	RS232C interface available for non-IBM peripherals	RS232C, IEEE interfaces available for non-IBM peripherals	RS232C, V.35 interfaces available	—	—
SOFTWARE					
Assembler	No	No	Yes	Yes	Yes
Compilers	BASIC, APL	BASIC, APL	COBOL, FORTRAN	BASIC, Data-Rite	BASIC, Data-Rite
Operating system	Batch (one-program)	Batch (one-program)	Batch, interactive	Time-sharing	Time-sharing
Language implemented in firmware	Fully	Fully	No	No	No
Operating system implemented in firmware	Fully	Fully	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	6,285	8,475 (16K bytes)	24,000	19,900	10,200
Monthly maint. of basic configuration above for on-site contract, \$	63.50	45	122	172	92
Discounts available	—	Educational (10%)	—	Qty., dollar vol, educ.	Qty., dollar vol., educ.
Price of memory increment, \$	1,175 (16K bytes)	1,175 (16K bytes)	2,250 (128K bytes)	2,400 (16K bytes)	NA
Date of first delivery	September 1975	February 1978	August 1979	August 1975	NA
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	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	Price includes 256K bytes, 1M byte diskette storage, 29M bytes disk storage, 8 I/O hardware interrupt levels, and instructions set	Includes dual floppy disk	Includes dual floppy disk, disk controller, printer & controller, two communications controllers

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MANUFACTURER AND MODEL	MCM Computers MCM/800	MCM Computers MCM/900	Melcom Business Systems Inc. Mitsubishi 8018	Melcom Business Systems Inc. Mitsubishi 8038	Microdata Reality Series 2000
WORD LENGTH, BITS	8 + 1	8	8	16	16
NO. WORKSTATIONS SUPPORTED	1	1	5	27	8
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	Core
Cycle/access time	1.2	0.3	0.5/0.32	0.6/0.26	1.0
Min./Max. capacity, words	4Kbytes/16K bytes	8K bytes/24K bytes	48K/96K bytes	128K/512K bytes	16K/64K bytes
Parity checking	No	No	Standard	Standard	No
Error correction	No	No	No	No	No
Storage protection	No	No	No	Standard	No
CENTRAL PROCESSOR					
No. of directly addressable words	16K	24K	64K bytes	64K bytes	58K bytes
Control storage	ROM; 32K bytes	ROM; 40K bytes	ROM; 1.5K bytes	ROM; 12K bytes	No
Add time, microseconds	—	—	900 (12 digits)	37.75 (5 digits)	—
Hardware multiply/divide	No	No	Standard	Standard	Standard
Hardware floating point	Standard	Standard	No	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Standard	No	No	No	No
Real-time clock or timer	No	No	No	Standard	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	No	No	No	Std.; high-speed	Standard
Maximum I/O rate, words/sec.	—	—	40K bps	3.3M bps	40,000 bytes
No. of external interrupt levels	None	None	1	1	—
COMMUNICATIONS					
Maximum number of lines	1	1	1	32	8
Synchronous	No	No	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps
Asynchronous	Up to 1200 bps	Standard	Opt.; 200-9600 bps	Opt.; 300-9600 bps	No
Protocols supported	None	Standard	BSC	BSC	bisync
Network architectures supported	None	No	—	—	—
RJE terminals emulated	None	No	—	—	HASP, 360/370
IBM 3270 emulation	No	No	—	—	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	250K-2M bytes	250K-1M bytes	512K-2M bytes	256K-2M bytes	No
Disk pack/cartridge drives	No	Cartridge	Cart.; 10-40M bytes	Both; 10-40M bytes	Cart.; to 20 M bytes
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette, 810 cps	No	Cassette; 6K bps	Cassette; 6K bps	No
Magnetic tape, 1/2-inch	No	No	No	20-40K bytes	20-40 KBS
Serial printer	45 cps	45-180 cps	120 cps	200 cps	120-165 cps
Line printer	No	300 lpm	110 lpm	110/600 lpm	150, 300, 600 lpm
Data communications interface	To 1200 bps	To 4800 bps	200-9600 bps	300-19,200 bps	To 9600 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	1024 characters	2,000 characters	80 char. x 24 lines
Other supported peripheral units	GP interface; programmable	GP1B interface; programmable	Auto ledger/feed, PT reader/punch	Auto ledger/feed, PT reader/punch	None
SOFTWARE					
Assembler	No	No	Yes	Yes	Yes
Compilers	No	No	BASIC, COBOL	BASIC, COBOL, RPG, Progress	ENGLISH, DATA/BASIC, PROC
Operating system	Virtual memory, interactive	Virtual memory	Batch real-time, multi-user	Batch, real-time, multi-user	Interactive, multi-user
Language implemented in firmware	Fully	Fully interpretive	Fully	No	Partially
Operating system implemented in firmware	Fully	Fully	Fully	Partially	Fully
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	9,200 (8K bytes)	8,700	18,900	43,000	32,500
Monthly maint. of basic configuration above for on-site contract, \$	1,600 (8K bytes)	—	128	287	290
Discounts available	—	—	—	—	—
Price of memory increment, \$	—	—	800 (8K bytes)	5,000 (128K bytes)	3,500 (16K bytes)
Date of first delivery	July 1976	October 1978	February 1979	November 1979	December 1977
Number installed to date	150 +	—	12,000 + (all models)	12,000 + (all models)	NA
COMMENTS	MSI implementation of MCM/700 CPU; provides 8 to 10 times the performance levels of the MCM/700; features virtual storage capacity of up to 256K bytes using cassette tape or diskette; system price also includes an integral cassette drive, display, keyboard, and RS-232 interface	The MCM/900 CPU is four times faster than the MCM/800 CPU; it features APL firmware & virtual memory oper. sys. and is MCM 800-compatible	Includes CPU (48K bytes), serial printer, keyboard/CRT, dual floppy drive	Includes CPU (128K bytes), serial printer, keyboard/CRT, 10M byte cartridge disk	Packaged systems includes 16KB core memory, magnetic tape, 10MB disk drive, 165 cps printer, and 1 CRT

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MANUFACTURER AND MODEL	Microdata Reality Series 4000	Microdata Reality Series 6000	Microdata Reality Series 8000	Modular Computer Systems Inc. Classic 7810/3140	Modular Computer Systems Inc. Classic 7830/7835
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	32	32	32	32	96
MAIN STORAGE					
Storage type	Core	Core, MOS	Core, MOS	MOS	MOS
Cycle/access time	1.0	1.0, 0.8	1.0, 0.8	.6/.6	.125/.250
Min./Max. capacity, words	16K/64K bytes	32K/128K bytes	128K/512K bytes	64K/128K bytes	128K/2048K bytes
Parity checking	No	Standard (MOS)	Standard (MOS)	Standard	Standard
Error correction	—	—	—	No	Standard
Storage protection	—	—	—	Optional	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	58K bytes	122K bytes	504K bytes	128K bytes	2048K bytes
Control storage	No	No	No	No	No
Add time, microseconds	—	—	—	.90	.30
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Optional	Optional	No	Optional/Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	No	Optional	Optional
Real-time clock or timer	No	No	No	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	40,000 bytes	40,000 bytes	40,000 bytes	500K bytes	5,124.8 K bytes
No. of external interrupt levels	—	—	—	Up to 128	Up to 128
COMMUNICATIONS					
Maximum number of lines	32	32	32	256 FDx	256 FDx
Synchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; 48-230.4K bps	Opt.; 48-230.4K bps
Asynchronous	No	No	No	Opt.; 50-19.2K bps	Opt.; 50-19.2K bps
Protocols supported	Bisync	Bisync	Bisyn	SDLC/HDLC, Bisync	SDLC/HDLC, Bisync
Network architectures supported	—	—	—	MAXNET	MAXNET
RJE terminals emulated	HASP, 360/370	HASP, most IBM	HASP, 360/370	HASP, 2780/3780,	HASP, 2780/3780,
IBM 3270 emulation	No	No	No	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	315-630K bytes	315-630K bytes
Disk pack/cartridge drives	Cart.; to 40M bytes	Cart.; to 40M bytes	Cart.; to 40M bytes	Both; 2.5-256M	Both; 2.5-256M bytes
Drum/fixed head disk storage	Fixed; to 50 M bytes	Fixed; to 200M bytes	Fixed; to 514M 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	20-40KBS	20-40KBS	20-40KBS	(7) 36-409.6K bytes	(7) 36-409.6K bytes
Serial printer	120-165 cps	120-165 cps	120-165 cps	(4) 30-440 cps	(4) 30-440 cps
Line printer	150, 300, 600 lpm	150, 300, 600 lpm	150, 300, 600 lpm	(5) 280-1000 lpm	(5) 280-1000 lpm
Data communications interface	To 9600 bps	To 9600 bps	To 9600 bps	50-200K bps	50-200K bps
CRT	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	24 x 80 char.	24 x 80 char.
Other supported peripheral units	None	None	None	A/D & D/A converts, card inputs, others	A/D & D/A converts, card inputs, others
SOFTWARE					
Assembler	Yes	Yes	Yes	Assembler and macro assembler	assembler and macro assembler
Compilers	ENGLISH, DATA/ BASIC, PROC.	ENGLISH, DATA/ BASIC, PROC.	ENGLISH, DATA/ BASIC, PROC.	COBOL, FORTRAN, CORAL 66, TOTAL,	COBOL, FORTRAN, CORAL 66, TOTAL,
Operating system	Interactive, multi- user	Interactive, multi- user	Interactive, multi- user	Batch, real-time, time-sharing	Batch, real-time, time-sharing
Language implemented in firmware	Partially	Partially	Partially	No	No
Operating system implemented in firmware	Fully	Fully	Fully	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	38,550	61,250	84,975	8150	23,800/29,500
Monthly maint. of basic configura- tion above for on-site contract, \$	280	420	580	85	155/192
Discounts available	—	—	—	—	—
Price of memory increment, \$	3,500 (16K bytes)	3,900 (32K bytes)	6,900 (64K bytes)	1,000 (32K bytes)	7,500 (128K bytes)
Date of first delivery	November 1973	November 1973	October 1979	May 1979	September 1979
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Packaged system in- cludes 16KB core memory, magnetic tape, 20MB disk drive, 165 cps printer, and 1 CRT	Packaged system includes 32KB core memory, magnetic tape, 50MB disk drive, 165 cps printer, and 1 CRT	Packaged system includes 256KB MOS memory, magnetic tape, 128MB disk drive, 165 cps printer, and 2 CRT		

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MANUFACTURER AND MODEL	Modular Computer Systems Inc. Classic 7860	Modular Computer Systems Inc. Classic 7870	Modular Computer Systems Inc. Modcomp II	Modular Computer Systems Inc. Modcomp IV/35	Mylee Digital Sciences 3000
WORD LENGTH, BITS	16	16	16 + 1	16 + 1	16
NO. WORKSTATIONS SUPPORTED	128	128			16
MAIN STORAGE Storage type Cycle/access time Min./Max. capacity, words Parity checking Error correction Storage protection	Core, MOS .125/.250 128K/4096K bytes Standard Standard MOS Standard	MOS .125/.250 512K/4096K bytes — Standard Standard	Core 0.8/0.4 32K/128K Standard No Optional	Core 0.5/0.4 64K/1024K Standard No Standard	MOS 0.8 12K/143K 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	8192K bytes No .20 Standard Standard Standard Optional Standard	8192K bytes No .20 Standard Standard Standard Optional Standard	128K bytes No 0.8 Standard Optional Standard No Optional	128K bytes No 0.56 Standard Optional Standard No Standard	28K ROM 20 Standard No Standard Yes No
INPUT/OUTPUT CONTROL Direct memory access channel Maximum I/O rate, words/sec. No. of external interrupt levels	Standard To 96K bytes Up to 128	Standard To 96K bytes Up to 128	Standard 3.86M bytes Up to 128	Standard 7M bytes Up to 128	Standard 1M 1-18
COMMUNICATIONS Maximum number of lines Synchronous Asynchronous Protocols supported	256 FDX Opt.: 48-230.4K bps Opt.: 50-19.2K bps SDLC/HDLC, Bisync	256 FDX Opt.: 48-230.4K bps Opt.: 50-10.2K bps SDLC/HDLC, Bisync	— — — —	— — — —	15 Opt.: to 9600 bps Opt.: 1200 bps Bisync
Network architectures supported RJE terminals emulated IBM 3270 emulation	MAXNET HASP, 2780/3780 —	MAXNET HASP, 2780/3780 —	MAXNET — —	MAXNET — —	— 2780/3780 —
PERIPHERAL EQUIPMENT Floppy disk (diskette) drives Disk pack/cartridge drives	315-630K bytes Both: 2.5-256M bytes	315-630K bytes Both: 2.5-256M bytes	315-630K bytes Both: 2.5-256M bytes	315-630K bytes Both: 2.5-256M bytes	Yes Cart.: 16-64M bytes
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	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch Serial printer Line printer Data communications interface CRT Other supported peripheral units	(7) 36-409.6K bytes (4) 30-440 cps (5) 280-1000 lpm 50-200K bps 24 x 80 char. A/D & D/A converts, card inputs, others	(7) 36-409.6K bytes (4) 30-440 cps (5) 280-1000 lpm 50-200K bps 24 x 80 char. A/D & D/A converts, card inputs, others	(7) 36-409.6K bytes (4) 30-440 cps (5) 280-1000 lpm 50-200K bps 24 x 80 char. A/D & D/A converters, printer, plotter, color graphic CRT	(7) 36-409.6K bytes (4) 30-440 cps (5) 280-1000 lpm 50-200K bps 24 x 80 char. A/D & D/A converters, printer, plotter, color graphics CRT	No 165 cps 300 lpm 9600 bps 32 char. x 11 lines None
SOFTWARE Assembler Compilers Operating system Language implemented in firmware Operating system implemented in firmware	Assembler and macro assembler COBOL, FORTRAN, CORAL 66, TOTAL Batch, real-time, time-sharing No No	Assembler and macro assembler COBOL, FORTRAN, CORAL 66, TOTAL Batch, real-time, time-sharing No No	Assembler and macro assembler COBOL, FORTRAN, CORAL 66, TOTAL Batch, real-time time-sharing No No	Assembler and macro assembler COBOL, FORTRAN, CORAL 66, TOTAL Batch, real-time, time-sharing No No	No ACE Real-time 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	38,150 242 — 7,500 (128K bytes) April 1978 NA	61,500 382 — 25,900 (512K bytes) October 1978 NA	13,400 (64K bytes) — — 8,250 (512K bytes) March 1971 NA	48,200 (128K bytes) — — 17,950 (128K bytes) June 1974 NA	28,995 (56K bytes) 9% — 2,000 (32K bytes) May 1976 175
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

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MANUFACTURER AND MODEL	Nanodata QM/1	NCR 499	NCR 8130	NCR 8150	NCR 8200
WORD LENGTH, BITS	18 + 2	16 + 1	16 + 2	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	Appl. dependent	—	1	4	—
MAIN STORAGE					
Storage type	Core	Core	MOS	MOS	Core
Cycle/access time	0.75-125/0.35	1.2/0.65	0.6	0.6	1.2/0.65
Min./Max. capacity, words	16K/1024K	12K/32K	48K/64K bytes	48K/256K bytes	32K/128K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	Optional	No	No	No	No
Storage protection	Optional	No	Optional	Optional	No
CENTRAL PROCESSOR					
No. of directly addressable words	256K	—	32K	32K	—
Control storage	RAM; 40KX 18	ROM, 64K words	ROM, 4K bytes	ROM, 4K bytes	No
Add time, microseconds	0.75	1.7 milliseconds	—	—	24 (8 digits)
Hardware multiply/divide	Standard	Standard	No	No	Standard
Hardware floating point	Standard	No	No	No	No
Hardware byte manipulation	Standard	No	Standard	Standard	Standard
Battery backup	Optional	No	Optional	Optional	No
Real-time clock or timer	Optional	No	Optional	Optional	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Optional	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1M	833K	866K bytes	866K bytes	833K
No. of external interrupt levels	2,048	8	16	16	8
COMMUNICATIONS					
Maximum number of lines	Appl. dependent	—	1	—	—
Synchronous	Optional	Opt.; 2000-9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps
Asynchronous	Optional	Opt.; 300-1800 bps	No	No	Opt.; to 9600 bps
Protocols supported	Bisync, Async	Async, Bisync	Bisync	Bisync	Bisync
Network architectures supported	—	—	—	—	—
RJE terminals emulated	See Comments	IBM 2780/3780	—	—	IBM 2780
IBM 3270 emulation	—	—	—	—	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	512K-4096K bytes	250K bytes	No
Disk pack/cartridge drives	Both; 12-60M bytes	Cart.; 4.9-9.8MB	No	5 to 40M bytes	Cart.; to 39.2M bytes
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cartridge; 2.5M bytes	Cassette; 750 bpi	Cassette; 750 bpi	Both	Cassette; 750 cps
Magnetic tape, ½-inch	200KBS	No	No	No	No
Serial printer	200-1000 cps	75, 130 cps	110 cps	110 cps	50, 70, 125 cps
Line printer	600-1250 lpm	55-300 lpm	50-200 lpm	50-200 lpm	See Comments
Data communications interface	Up to 50K bps	300-9600 bps	To 9600 bps	To 9600 bps	1200, 9600 bps
CRT	Yes	No	512, 1920 char.	512, 1920 char.	80 char. x 24 lines
Other supported peripheral units	IBM 360 & Univac 1100 compatible channel	PT, mag ledger card	—	—	—
SOFTWARE					
Assembler	Assembler & macro assembler	Neat/AM	No	No	No
Compilers	PASCAL, APL/SV, See Comments	No	COBOL, BASIC	COBOL, BASIC	NEAT/3, COBOL
Operating system	See Comments	No	Interactive	Interactive	Batch, multipro- gramming
Language implemented in firmware	Yes	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, \$	176,000	17,900 (12K bytes)	10,700	18,300	Available only used
Monthly maint. of basic configura- tion above for on-site contract, \$	—	83	119	170	—
Discounts available	None	—	—	—	—
Price of memory increment, \$	4,960 (16K words)	1,100 (2K bytes)	600 (16K bytes)	1,000 (32K bytes)	—
Date of first delivery	1975	February 1976	March 1978	March 1978	September 1974
Number installed to date	20	NA	NA	NA	NA
COMMENTS	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 soft- ware provided; both vertical and hori- zontal control store	Replacement for NCR 399	Price includes proc- essor (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)	Line printers, 50, 70 and 125 lpm matrix, 200, 300 and 600 lpm band

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MANUFACTURER AND MODEL	NCR 8231	NCR 8251	NCR 8270	NCR 8271	NCR Century 50
WORD LENGTH, BITS	16 + 2	16 + 2	16 + 2	16 + 2	8 + 1
NO. WORKSTATIONS SUPPORTED	5	24	24	24	
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	Thin film
Cycle/access time	0.8	0.8	0.8	0.8	0.8
Min./Max. capacity, words	64K/96K bytes	64K/128K bytes	64K/512 bytes	96K/512M bytes	16K/32K bytes
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	Optional	Optional	Optional	Optional	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	64K	—	—	—
Control storage	No	No	No	No	No
Add time, microseconds	—	—	—	—	59 (5 digits)
Hardware multiply/divide	Standard	Standard	Standard	Standard	No
Hardware floating point	No	No	No	No	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	No	No	No
Real-time clock or timer	No	No	No	No	No
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	833K	833K	833K	833K	40K & 108K
No. of external interrupt levels	8	8	8	8	2
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	600-50,000 bps
Asynchronous	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	45-2400 bps
Protocols supported	Bisync	Bisync	Bisync	Bisync	
Network architectures supported	—	—	—	—	—
RJE terminals emulated	IBM 2780	IBM 2780	IBM 2780	IBM 2780	
IBM 3270 emulation	No	No	No	No	
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	250K-1024K bytes	250K-1024K bytes	243-486K bytes	243-486K bytes	No
Disk pack/cartridge drives	Cart.; to 39.2M bytes	Cart.; to 80M bytes	54M to 324M bytes	Fixed & removable; 20M-364M bytes	Pack; to 33.5M bytes
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette; 450K bytes	Cassette; 450K bytes	Cassette; 450K bytes	Cassette; 750 cps	Cassette; 750 cps
Magnetic tape, 1/2-inch	10-20 KBS	10-20 KBS	10-20 KBS	10-20 KBS	10-40 KBS
Serial printer	173 cps	173 cps	173 cps	173 cps	6 cps
Line printer	100-300 lpm	100-300 lpm	50-900 lpm	200-900 lpm	125-900 lpm
Data communications interface	1200, 9600 bps	1200, 9600 bps	1200, 9600 bps	Up to 9600 bps	45-50,000 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	—	—	—	—	PT; MICR/OCR
SOFTWARE					
Assembler	No	No	No	No	No
Compilers	NEAT/3, COBOL	NEAT/3, COBOL	NEAT/3, COBOL	NEAT/3, COBOL	BASIC, COBOL, FORTRAN, NEAT/3
Operating system	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming
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, \$	27,925	29,925	21,555	77,812	47,000 (16K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	119	119	85	Included for 5-years	347
Discounts available	—	—	—	—	—
Price of memory increment, \$	1,000 (16K bytes)	1,000 (16K bytes)	4,000 (64K bytes)	—	3,500 (16K bytes)
Date of first delivery	June 1977	March 1977	Fourth qtr. 1979	NA	December 1970
Number installed to date	NA	NA	NA	NA	NA
COMMENTS				Price includes 96K bytes memory, three CRT's, one 200 lpm printer, 5 years of hardware maintenance, one-time licensing fee for IMOS II, COBOL '74, and utilities	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 75	NCR Century 100	NCR Century 101	NCR Century 151	New England Digital Able/40
WORD LENGTH, BITS	8 + 1	8 + 1	8 + 1	8 + 1	16
NO. WORKSTATIONS SUPPORTED	—	—	—	—	NA
MAIN STORAGE	Core	Thin film	Core	MOS	Static MOS
Storage type	1.2/0.65	0.8	1.2/0.6	0.75 (1 or 2 bytes)	0.5 (avg.)/0.5 (avg.)
Cycle/access time	16K/64K bytes	16K/32K bytes	16K/128K bytes	64K/128K bytes	16K/64K
Min./Max. capacity, words	Standard	Standard	Standard	Standard	No
Parity checking	No	No	No	No	No
Error correction	No	No	Optional	Optional	No
Storage protection	—	—	—	—	64K
CENTRAL PROCESSOR	—	—	—	—	16 x 256
No. of directly addressable words	No	No	No	No	0.25
Control storage	25 (5 digits)	59 (5 digits)	28.8 (5 digits)	18.0 (5 digits)	Optional
Add time, microseconds	Optional	No	Optional	Standard	Optional
Hardware multiply/divide	Standard	Standard	Standard	No	Optional
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	No	No	No	No	Optional
Battery backup	Optional	No	Optional	Optional	Standard
Real-time clock or timer	—	—	—	—	Optional
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard	Optional
Direct memory access channel	120K & 416K	40K & 108K	120K & 416K	120K & 545K	2M
Maximum I/O rate, words/sec.	8	2	9	9	12
No. of external interrupt levels	—	—	—	—	64
COMMUNICATIONS	—	—	—	—	Optional
Maximum number of lines	600-50,000 bps	600-50,000 bps	600-50,000 bps	600-50,000 bps	300-38.4K bps
Synchronous	45-2400 bps	45-2400 bps	45-24000 bps	45-2400 bps	Bisync
Asynchronous	—	—	—	—	—
Protocols supported	—	—	—	—	NED WORK
Network architectures supported	—	—	—	—	IBM 2780
RJE terminals emulated	—	—	—	—	No
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT	—	—	—	—	180K bytes
Floppy disk (diskette) drives	No	No	No	No	No
Disk pack/cartridge drives	Cart.; to 9.8M bytes	Pack; 8.4-33.5M bytes	Pack; 8.4-381.6M bytes	Pack; 8.4-381.6M bytes	No
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	Cassette; 750 cps	Cassette; 750 cps	Cassette; 750 cps	No
Magnetic tape, 1/2-inch	10-320 KBS	10-80 KBS	10-320 KBS	10-320 KBS	No
Serial printer	6 cps	6 cps	6 cps	6 cps	30,120 cps
Line printer	200-450 lpm	450-3000 lpm	450-3500 lpm	450-3500 lpm	300 lpm
Data communications interface	45-50,000 bps	45-50,000 bps	45-50,000 bps	45-50,000 bps	300-38,400 bps
CRT	Interface only	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	1920 char.
Other supported peripheral units	PT; MICR/OCR	Paper tape units; MICR/OCR units	Paper tape units; MICR/OCR units	Paper tape units; MICR/OCR units	Plotter, graphic CRT, 16 channel AID & quad D/A, digital I/O
SOFTWARE	—	—	—	—	—
Assembler	No	No	No	No	Yes
Compilers	BASIC, COBOL, FORTRAN, RPG	COBOL, BASIC, FORTRAN, NEAT/3	COBOL, BASIC, FORTRAN, NEAT/3	COBOL, BASIC, FORTRAN, NEAT/3	XPL, PASCAL, BASIC
Operating system	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming	Batch, multi-programming	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, \$	56,850 (16K bytes)	71,500 (16K bytes)	69,520 (16K bytes)	119,925 (64K bytes)	7,950
Monthly maint. of basic configuration above for on-site contract, \$	367	458	—	521	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	5,000 (8K bytes)	3,500 (16K bytes)	5,000 (8K bytes)	20,000 (64K bytes)	Educ. qty. 1,000 (8K words)
Date of first delivery	May 1976	March 1963	August 1972	February 1975	June 1977
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	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	System price also includes line printer, 8.4-MB disk drive, and card reader	—	Includes minifloppy drives, RTC, APL, and serial port

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MANUFACTURER AND MODEL	New England Digital Able/60	Northern Telecom Systems Corp. 405	Northern Telecom Systems Corp. 410	Northern Telecom Systems Corp. 440	Northern Telecom Systems Corp. 445
WORD LENGTH, BITS	16	8	8	8	8
NO. WORKSTATIONS SUPPORTED	NA	2	1	8	8
MAIN STORAGE					
Storage type	Static MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.5 (avg.)/0.5 (avg.)	0.25/0.25	0.50/0.25	0.50/0.25	0.25/0.25
Min./Max. capacity, words	16K/64K	48K/64K bytes	40K/64K bytes	24K/64K bytes	64K/256K bytes
Parity checking	No	—	—	—	—
Error correction	No	—	—	—	—
Storage protection	No	—	—	—	—
CENTRAL PROCESSOR					
No. of directly addressable words	64K	—	—	—	—
Control storage	16 x 256	—	—	—	—
Add time, microseconds	0.25	5.5	5.5	5.5	5.5
Hardware multiply/divide	Optional	—	—	—	—
Hardware floating point	Optional	—	—	—	—
Hardware byte manipulation	Standard	—	—	—	—
Battery backup	Optional	—	—	—	—
Real-time clock or timer	Standard	—	—	—	—
INPUT/OUTPUT CONTROL					
Direct memory access channel	Optional	—	—	—	—
Maximum I/O rate, words/sec.	2M	—	—	—	—
No. of external interrupt levels	12	—	—	—	—
COMMUNICATIONS					
Maximum number of lines	64	2	2	2	3
Synchronous	Optional	Opt.; 600-9600 bps	Opt.; 600-4800 bps	Opt.; 600-9600 bps	Opt.; 600-9600 bps
Asynchronous	300-38.4K bps	Opt.; 37.5-1200 bps	Opt.; 37.5-1200 bps	Opt.; 37.5-1200 bps	Opt.; 37.5-1200 bps
Protocols supported	Bisync	Bisync, SDLC	Bisync, SDLC	Bisync, SDLC	Bisync, SDLC
Network architectures supported	NEDWORK	IBM/SNA	None	None	None
RJE terminals emulated	IBM 2780	Several	Several	Several	Several
IBM 3270 emulation	No	Yes	No	No	Yes
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	1.2M bytes	.5-1.0M bytes	256K bytes	256K bytes	256K bytes
Disk pack/cartridge drives	24M bytes	No	Cartridge; 5M bytes	No	Pack; 4-74.5M bytes
Drum/fixed head disk storage	No	No	No	To 20M bytes	5, 10, 20M bytes
Magnetic tape cassettes/cartridges	No	No	Cartridge; 1000 cps	Cartridge; 1000 cps	Cartridge; 12K cps
Magnetic tape, 1/2-inch	800 bpi	—	—	—	—
Serial printer	30,120 cps	To 180 cps	To 180 cps	To 180 cps	To 180 cps
Line printer	300 lpm	300 or 600 lpm	300 lpm	300 lpm	300 to 600 lpm
Data communications interface	300-38,400 bps	—	—	—	—
CRT	1920 char.	2000 characters	576 characters	Standard	2000 characters
Other supported peripheral units	Plotter, graphic CRT, 16 channel A/D & quad D/A, digital I/O	—	—	—	—
SOFTWARE					
Assembler	Yes	No	No	No	No
Compilers	XPL, PASCAL, BASIC	COBOL, BASIC, TAL 2000	COBOL, BASIC, TAL-2	COBOL, BASIC, TAL-2	COBOL, BASIC, TAL-2, -2000
Operating system	Real-time	Multiprogramming, multi-task	Multiprogramming, multi-task	Multiprogramming, multi-task	Multiprogramming, multi-task
Language implemented in firmware	No	No	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, \$	9,650	6,150	23,960	21,240	20,680
Monthly maint. of basic configuration above for on-site contract, \$	—	234	546	528	517
Discounts available	Educ., qty.	Quantity	Quantity	Quantity	Quantity
Price of memory increment, \$	1,000 (8K words)	800 (16K)	1,160 (8K)	1,160 (8K)	2,000 (32K)
Date of first delivery	April 1978	August 1978	May 1976	May 1976	May 1978
Number installed to date	NA	NA	NA	NA	NA
COMMENTS	Includes 8-inch floppy drives, RTC, APL, and serial port	Designed for transaction proc. in distributed or stand-alone environments; industry application software packages are available through distributors	Designed for transaction processing in distributed or stand-alone environments; industry application software packages are avail. through distributors		Six remote workstations on-line concurrently unlimited in time-sharing

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MANUFACTURER AND MODEL	Northrop Data Systems BDS Series 500	Northrop Data Systems BDS Series 1000	Northrop Data Systems BDS Series 2000	Northrop Data Systems BDS Series 4000	Olivetti 2030 FDV
WORD LENGTH, BITS	Variable 8-32	Variable 8-32	Variable 8-32	16	8-bit byte
NO. WORKSTATIONS SUPPORTED	2	4	8	32	1
MAIN STORAGE					
Storage type	Core	Core	Core	MOS	MOS
Cycle/access time	1.0/NA	1.0/NA	1.0/NA	1.0/NA	1/2.3
Min./Max. capacity, words	24K/32K	24K/32K	32K/32K	64K/512K	4K/16K bytes
Parity checking	No	No	No	No	Standard
Error correction	No	No	No	No	No
Storage protection	No	No	No	No	Optional
CENTRAL PROCESSOR					
No. of directly addressable words	24K	24K	32K	64K	—
Control storage	PROM, ROM; 4KB	PROM, ROM; 4KB	PROM, ROM; 4KB	PROM, ROM; 4KB	RAM
Add time, microseconds	9.68 (7 digits)	9.68 (7 digits)	9.68 (7 digits)	9.68 (7 digits)	6.0
Hardware multiply/divide	Standard	Standard	Standard	Standard	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	No	No	No	No	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	No
Maximum I/O rate, words/sec.	1M	1M	1M	1M	250K bps
No. of external interrupt levels	2; 128	2; 128	2; 128	2; 128	1
COMMUNICATIONS					
Maximum number of lines	1	4	8	32	1
Synchronous	No	No	No	Opt.; 9,600 bps	Standard
Asynchronous	Std.; 1,200 bps	Std.; 1,200 bps	Std.; 1,200 bps	Opt.; 9,600 bps	No
Protocols supported	—	—	—	IBM 2780	Bisync
Network architectures supported	—	—	—	IBM	None
RJE terminals emulated	—	—	—	IBM 2780	None
IBM 3270 emulation	—	—	—	No	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	No	Standard
Disk pack/cartridge drives	5MB, 10MB	10MB	20MB, 40MB	20MB, 500MB	No
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	Cassette; 1000 bps
Magnetic tape, 1/2-inch	Opt.; 20 kbs	Opt.; 20 kbs	Opt.; 20 kbs	Std.; 20 kbs	No
Serial printer	Opt.; 100 cps	Opt.; 100 cps	Opt.; 100 cps	Opt.; 100 cps	Std.; 1000 cps
Line printer	150 lpm	150 lpm	150 lpm	150 lpm	Opt.; 200 cps
Data communications interface	1200 bps	1200 bps	1200 bps	9600 bps	1200-9600 bps
CRT	Std.; 24 x 80 char.	Std.; 24 x 80 char.	Std.; 24 x 80 char.	Std.; 24 x 80 char.	Alphanumeric
Other supported peripheral units	—	—	—	—	Magnetic card, auto front feed
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes	Assembler
Compilers	—	—	—	BASIC	—
Operating system	Real-time	Real-time	Real-time	Reality Oper. Sys., virtual, English Rpt.	Batch
Language implemented in firmware	Partially	Partially	Partially	Partially	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, \$	\$29,500	\$34,920	\$40,355	\$52,295	\$14,950
Monthly maint. of basic configuration above for on-site contract, \$	\$250	\$283	\$372	\$355	\$91
Discounts available	—	—	—	—	—
Price of memory increment, \$	NA	NA	NA	\$3,900/\$6,900	650 (4K bytes)
Date of first delivery	1977	1972	1973	1975	January 1979
Number installed to date	Over 200 (all models)	Over 200 (all models)	Over 200 (all models)	Over 200 (all models)	NA
COMMENTS	Price includes CRT and printer	Price includes CRT and printer	Price includes CRT and printer	Price includes CRT and printer; memory increment price is for 32K and 64K, respectively	

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MANUFACTURER AND MODEL	Olivetti 2030 MDV	Olivetti BCS 3030	Olivetti P6060	Perkin-Elmer Sixteen 10	Perkin-Elmer Sixteen 20
WORD LENGTH, BITS	8-bit byte	16	—	16 + 1	16 + 1
NO. WORKSTATIONS SUPPORTED	1	1	1	4	16
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	1/2.3	—	—	1.0/NA	0.825/NA
Min./Max. capacity, words	4K/16K bytes	40K/56K bytes	16K/48K bytes	8K/32K	16K/131K
Parity checking	Standard	No	No	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	Optional	No	No	No	Optional
CENTRAL PROCESSOR					
No. of directly addressable words	—	3,500	—	32K	32K
Control storage	ROM	No	No	ROM	ROM
Add time, microseconds	6.0	—	—	1.0	0.825
Hardware multiply/divide	Standard	—	—	Optional	Optional
Hardware floating point	No	—	—	No	Optional
Hardware byte manipulation	Standard	—	—	Standard	Standard
Battery backup	No	No	No	Optional	Optional
Real-time clock or timer	Standard	No	No	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	No	Standard	Optional	Standard	Standard
Maximum I/O rate, words/sec.	—	—	—	1M	1.21M
No. of external interrupt levels	1	—	—	1-255	1-255
COMMUNICATIONS					
Maximum number of lines	1	—	4	—	—
Synchronous	Standard	No	No	—	—
Asynchronous	No	No	Opt.; 75-1920 bps	Std.; to 9600 bps	Std.; to 9600 bps
Protocols supported	Bisync	None	None	—	—
Network architectures supported	None	—	None	—	—
RJE terminals emulated	None	None	None	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	No	No	No	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	256K-1024K bytes	256K-1024K bytes	Yes, 1-4	Yes, 1-4
Disk pack/cartridge drives	No	Cart.; 10-20M bytes; Nonrem.; 2.5-20MB	Cart.; 10-20M bytes; Nonrem.; 2.5-20MB	Both, 10-4800 MB	Both, 10-4800 MB
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette; 1000 bps	Cassette; 1000 bps	Cassette; 1000 bps	No	No
Magnetic tape, 1/2-inch	No	800-1600 bpi	800-1600 bpi	Yes, 36-120 KB	Yes, 36-120 KB
Serial printer	Std.; 1000 cps	90-175 cps	30-175 cps	Yes, 30-180 cps	Yes, 30-180 cps
Line printer	Opt.; 200 cps	300-600 lpm	Optional	Yes, 300-600 lpm	Yes, 300-600 lpm
Data communications interface	1200-9600 bps	To 9600 bps	To 9600 bps	Yes, to 19.2K bps	Yes, to 19.2K bps
CRT	Alphanumeric	80 char. x 24 lines	80 char. x 24 lines	24 x 80 char.	24 x 80 char.
Other supported peripheral units	Magnetic card, auto front feed	None	Paper tape reader and punch	A/D and D/A, digital I/O	A/D and D/A, digital I/O
SOFTWARE					
Assembler	Assembler	Macro assembly	No	Assembler, macro assembler	Assembler, macro assembler
Compilers	—	Mini PL/1, RPG II	BASIC	BASIC, extended FORTRAN IV	BASIC, extended FORTRAN IV
Operating system	Batch	Interactive, batch	Interactive, batch	Batch, real-time, multi-tasking	Batch, real-time, multi-tasking
Language implemented in firmware	Fully	No	Partially	No	No
Operating system implemented in firmware	Partially	No	Partially	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	9,095	11,000	9,250	\$5,400 (8K words)	\$9,000 (16K words)
Monthly maint. of basic configura- tion above for on-site contract, \$	54	56	59	\$40	\$70
Discounts available	—	—	—	Quan., \$ vol., educat.	Quan., \$ vol., educat.
Price of memory increment, \$	650 (4K bytes)	900 (8K bytes)	900 (8K bytes)	See comments	See comments
Date of first delivery	January 1979	March 1978	January 1977	January 1979	March 1979
Number installed to date	NA	NA	NA	30	45
COMMENTS			Desktop computer features integrated 80-cps/80-col. thermal printer, single floppy disk drive display, 16K user memory, and full typewriter key- board with BASIC keywords and op- erating system commands	\$1,600 (8K words), \$2,000 (16K words)	\$2,000 (16K words), \$3,000 (32K words), \$4,500 (64K words)

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MANUFACTURER AND MODEL	Perkin-Elmer Sixteen 30	Perkin-Elmer Model 7/32 CII	Perkin-Elmer Model 8/32	Perkin-Elmer Model 3220	Perkin-Elmer Model 3240
WORD LENGTH, BITS	16 + 6	32 + 2	32 + 2	32 + 7	32 + 7
NO. WORKSTATIONS SUPPORTED	16	—	—	—	—
MAIN STORAGE	MOS	Core	Core	MOS	MOS
Storage type	0.750/NA	0.750/NA	0.3/NA	0.34/NA	0.25/NA
Cycle/access time	16K/131K	32K/500K	62K/500K	131K/500K	131K/8M
Min./Max. capacity, words	No	Optional	Standard	No	No
Parity checking	Standard	No	No	Standard	Standard
Error correction	Optional	Optional	Standard	Standard	Standard
Storage protection					
CENTRAL PROCESSOR					
No. of directly addressable words	32K	500K	500K	500K	8M
Control storage	ROM	ROM	ROM	ROM	ROM
Add time, microseconds	0.750	—	—	—	—
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Optional	Optional	Optional	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Standard	No	No	Standard	Standard
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.	1.33M	1M	1.5M	2M	10M
No. of external interrupt levels	1-255	1-1023	1-1023	1-1023	1-1023
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	—	—	—	—	—
Asynchronous	Std.; to 9600 bps	—	—	—	—
Protocols supported	—	—	—	—	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	IBM 2780/3780	—	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes, 1-4	No	No	No	No
Disk pack/cartridge drives	Both, 10-4800 MB	Both, 10-8400 MB	Both, 10-8, 400 MB	Both, 10-8, 400 MB	Both, 10-38, 400 MB
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, 36-120 KB	Yes, 36-120 KB	Yes, 36-120 KB	Yes, 36-120 KB	Yes, 36-120 KB
Serial printer	Yes, 30-180 cps	Yes, 30-180 cps	Yes, 30-180 cps	Yes, 30-180 cps	Yes, 30-180 cps
Line printer	Yes, 300-600 lpm	Yes, 300-600 lpm	Yes, 300-600 lpm	Yes, 300-600 lpm	Yes, 300-600 lpm
Data communications interface	Yes, to 19.2K bps	yes, to 19.2K bps	Yes, to 19.2K bps	Yes, to 19.2K bps	Yes, to 19.2 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 and D/A, digital I/O	A/D and D/A, digital I/O	A/D and D/A, digital I/O	A/D and D/A, digital I/O	A/D and D/A, digital I/O
SOFTWARE					
Assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler
Compilers	BASIC, extended FORTRAN IV	BASIC, extended FORTRAN IV	BASIC, COBOL, RPG II, FORTRAN IV	BASIC, COBOL, RPG II, FORTRAN IV	BASIC, COBOL, RPG II, FORTRAN IV
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	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, \$	\$11,500 (16K words)	\$12,045 (32K words)	\$51,900 (65K words)	\$33,500 (131K words)	\$85,000 (131K words)
Monthly maint. of basic configuration above for on-site contract, \$	\$80	\$160	\$500	\$300	\$540
Discounts available	Quan., \$ vol., educat.	Quan., \$ vol., educat.	—	—	—
Price of memory increment, \$	See comments	\$6,550 (32K words)	\$19,000 (65K words)	\$8,000 (131K words)	—
Date of first delivery	February 1979	NA	June 1975	May 1979	September 1979
Number installed to date	35	NA	Over 2,000	125	10
COMMENTS	\$2,000 (16K words), \$3,000 (32K words), \$4,500 (64K words)				

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MANUFACTURER AND MODEL	Point 4 Computer Corp. Point 4	Prime 450	Prime 550	Prime 650	Prime 750
WORD LENGTH, BITS	16	16, 32	16, 32	16, 32	16, 32
NO. WORKSTATIONS SUPPORTED	128 (32 recommended)	32	63	63	63
MAIN STORAGE	MOS	MOS; bipolar cache	MOS; bipolar cache	MOS; bipolar cache	MOS; bipolar cache
Storage type	0.4/0.2	0.75/0.54	0.75/0.54	0.75/0.54	0.75/0.54
Cycle/access time	32K/64K	256K/1024K bytes	512K/2048K bytes	512K/4096K bytes	512K/8192K bytes
Min./Max. capacity, words	Optional	Standard	Standard	Standard	Standard
Parity checking	No	Standard	Standard	Standard	Standard
Error correction	Optional	Standard	Standard	Standard	Standard
Storage protection		Std.; 3 levels	Std.; 3 levels	Std.; 3 levels	Std.; 3 levels
CENTRAL PROCESSOR	64K	64K	64K	64K	64K
No. of directly addressable words	*ROM	4K x 64	4K x 64	5K x 64	7K x 64
Control storage	0.40	1.1	1.1	1.1	0.5
Add time, microseconds	*Optional	Standard	Standard	Standard	Standard
Hardware multiply/divide	Optional	Standard	Standard	Standard	Standard
Hardware floating point	*Optional	Standard	Standard	Standard	Standard
Hardware byte manipulation	Optional	Standard	Standard	Standard	Standard
Battery backup	No	Optional	Optional	Optional	Optional
Real-time clock or timer	No	Standard	Standard	Standard	Standard
INPUT/OUTPUT CONTROL	Std. & high-speed	Standard	Standard	Standard	Standard
Direct memory access channel	1.1M	2.5M bytes	2.5M bytes	2.5M bytes	8M bytes
Maximum I/O rate, words/sec.	1-16	64	64	64	64
No. of external interrupt levels					
COMMUNICATIONS	128 (32 recom.)	Async. (32); Sync (4)	Async. (63); Sync (8)	Async. (63); Sync (8)	Async.(63); Sync. (8)
Maximum number of lines	Std.; 56,000 bps	Std.; to 56K bps	Std.; to 56K bps	Std.; to 56K bps	Std.; to 56K bps
Synchronous	Std.; 19,200 bps	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps
Asynchronous	SDLC	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780
Protocols supported	None	Primenet X.25	Primenet X.25	Primenet X.25	Primenet X.25
Network architectures supported	IBM 2780/3780	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780	HASP, 2780/3780
RJE terminals emulated	No	Emulate & support	Emulate & support	Emulate & support	Emulate & support
IBM 3270 emulation					
PERIPHERAL EQUIPMENT	No	512K-2M bytes	512K-2M bytes	512K-2M bytes	512K-2M bytes
Floppy disk (diskette) drives	No	Both; 12-2400M bytes	Both; 12-2400M bytes	Both; 12-2400M bytes	Both; 12-2400M bytes
Disk pack/cartridge drives	No	Fixed-head; 512K-1M bytes	Fixed-head; 512K-1M bytes	Fixed-head; 512K-1M bytes	Fixed-head; 512K-1M bytes
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	To 488K bps	To 488K bps	To 488K bps	To 488K bps
Magnetic tape, 1/2-inch	No	300 lpm	300 lpm	300 lpm	300 lpm
Serial printer	No	To 1000 lpm	To 1000 lpm	To 1000 lpm	To 1000 lpm
Line printer	No	To 56K bps	To 56K bps	To 56K bps	To 56K bps
Data communications interface	56,000 bps	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
CRT	No	PT, card reader/punch, printer/plotter	PT, card reader/punch, printer/plotter	PT, card reader/punch, printer/plotter	PT, card reader/punch, printer/plotter
Other supported peripheral units	No				
SOFTWARE	Assembler & macro assembler	Macro & micro assembler	Macro & micro assembler	Macro & micro assembler	Macro & micro assembler
Assembler	Business BASIC	BASIC, FORTRAN, COBOL, RPG II,	BASIC, FORTRAN, COBOL, RPG II,	BASIC, FORTRAN, COBOL, RPG II,	BASIC, FORTRAN, COBOL, RPG II,
Compilers	Real-time, inter-active, time-sharing	Multi-user, virtual memory	Multi-user, virtual memory	Multi-user, virtual memory	Multi-user, virtual memory
Operating system	No	Partially	Partially	Partially	Partially
Language implemented in firmware	No	Partially	Partially	Partially	Partially
Operating system implemented in firmware					
PRICING & AVAILABILITY	5,540	65,000 (450 QMB)	80,000 (550 HMB)	105,000 (650 HMB)	130,000 (750 HMB)
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	—	73,000 (450 HMB)	578/550 (HMB)	685/650 (HMB)	149,000 (750 1MB)
Monthly maint. of basic configuration above for on-site contract, \$	—	500 (450 QMB)			785 (750 HMB)
Discounts available	—	590/450 (450 HMB)	Volume	Volume	965 (750 1M byte)
Price of memory increment, \$	1,760 (32K bytes)	Volume	40,000 (1M byte)	40,000 (1M byte)	Volume
Date of first delivery	March 1979	1979	1979	1979	1979
Number installed to date	250-300	77	201	11	55
COMMENTS	*Starred features not available until third quarter 1980; Point 4 formerly known as Educational Data Systems	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 210	Qantel 950	Qantel 960/965	Qantel 970/975	Qantel 1400
WORD LENGTH, BITS	8	8	8	8	8
NO. WORKSTATIONS SUPPORTED	1	16	16	32	64
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.8	1.5	1.5	0.8	1.1
Min./Max. capacity, words	16K/32K bytes	48K/48K	48K/64K	64K/256K	40K/128K
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	64K bytes	48K bytes	64K bytes	256K bytes	128K bytes
Control storage	ROM; 26K bytes	ROM; 32K bytes	ROM; 32K bytes	ROM; 32K bytes	ROM; 32K bytes
Add time, microseconds	22	18	8	4	8
Hardware multiply/divide	No	No	No	Standard	No
Hardware floating point	No	No	No	No	No
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	No	NA	No
Real-time clock or timer	No	Optional	Optional	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	No	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	—	667K	909K	375K	909K
No. of external interrupt levels	None	1	1	1	1
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	No	110-50K bps	110-50K bps	110-50K bps	110-50K bps
Asynchronous	110-50K bps	110-50K bps	110-50K bps	110-50K bps	110-50K bps
Protocols supported	—	—	—	—	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	—	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	1.3-5.2 MB	No	1.3-5.2 MB	1.3-5.2 MB	1.3-5.2 MB
Disk pack/cartridge drives	No	Cart.; 6-36 MB	Cart.; 6-75 MB	Cart.; 12-300 MB	Cart.; 12-48 MB
Drum/fixed head disk storage	No	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	No	36-72 KBS	36-72 KBS	36-72 KBS	36-72 KBS
Serial printer	45-120 cps	45-120 cps	45-120 cps	45-120 cps	45-120 cps
Line printer	300 lpm	300-600 lpm	300-600 lpm	300-600 lpm	300-600 lpm
Data communications interface	1200 bps	To 50K bps	To 50K bps	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)	QIC (BASIC)	QIC (BASIC)	QIC (BASIC)	QIC (BASIC)
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, \$	11,950	27,900	39,500 (48K bytes)	59,900	43,900
Monthly maint. of basic configuration above for on-site contract, \$	105	245	330	482	335
Discounts available	Quantity	—	—	—	—
Price of memory increment, \$	1,450 (16K bytes)	1,450 (8K bytes)	2,450 (16K bytes)	2,950 (32K bytes)	2,450 (32K bytes)
Date of first delivery	4th qtr. 1977	1st qtr. 1975	3rd qtr. 1976	1st qtr. 1979	2nd qtr. 1977
Number installed to date	Over 2000 (all models)	Over 2000 (all models)	Over 2000 (all models)	Over 2000 (all models)	Over 2000 (all models)
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	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

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MANUFACTURER AND MODEL	Qantel 1400-2	Qantel 1450	Qantel 1450-2	Raytheon RDS-500	Raytheon RDS-7500
WORD LENGTH, BITS	8	8	8	16 + 2	16 + 2
NO. WORKSTATIONS SUPPORTED	64	64	64	—	—
MAIN STORAGE					
Storage type	MOS	MOS	MOS	Core or MOS	MOS
Cycle/access time	1.1	0.8	0.8	0.70/0.45	0.70/0.45
Min./Max. capacity, words	48K/128K	64K/1024K	128K/1024K	16K/64K	32K/128K
Parity checking	Standard	Standard	Standard	Standard	Standard
Error correction	No	No	No	Standard (MOS)	Standard
Storage protection	No	No	No		
CENTRAL PROCESSOR					
No. of directly addressable words	128K bytes	1024K bytes	1024K bytes	64K	64K
Control storage	ROM: 32K bytes	ROM: 32K bytes	ROM: 32K bytes	No	No
Add time, microseconds	8	4	4	1.4	1.4
Hardware multiply/divide	No	Standard	Standard	Standard	Standard
Hardware floating point	No	No	No	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	—	—	Optional	Optional
Real-time clock or timer	Optional	Optional	Optional	Optional	Optional
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	No	No	Standard	Standard
Maximum I/O rate, words/sec.	909K	—	—	2M	2M
No. of external interrupt levels	1	1	1	16	16
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	110-50K bps	110-50K bps	110-50K bps	—	—
Asynchronous	110-50K bps	110-50K bps	110-50K bps	—	—
Protocols supported	—	—	—	—	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	—	—	—	—	—
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	1.3-5.2 MB	1.3-5.2 MB	1.3-5.2 MB	No	No
Disk pack/cartridge drives	Fixed, moving heads; 25-600 MB	Fixed, moving heads; 25-600 MB	Fixed, moving heads; 25-600 MB	Both; 2.56-1200M bytes	Both; 2.56-1200M bytes
Drum/fixed head disk storage	No	No	No	Fixed-head; 770K-3.08M bytes	Fixed-head; 770K-3.08M bytes
Magnetic tape cassettes/cartridges	No	No	No	Cassette	Cassette
Magnetic tape, 1/2-inch	36-72 KBS	36-72 KBS	36-72 KBS	58.6K bps	58.6K bps
Serial printer	45-120 cps	45-120 cps	45-120 cps	10-165 cps	10-165 cps
Line printer	300-600 lpm	300-600 lpm	300-600 lpm	300-1250 lpm	300-1250 lpm
Data communications interface	Up to 50K bps	Up to 50K bps	Up to 50K bps	14.2K bps	19.2K bps
CRT	64 char. x 27 lines	64 char. x 27 lines	64 char. x 27 lines	1920 characters	1920 characters
Other supported peripheral units	None	None	None	Apollo array, plotters, A/D & D/A converters	Apollo array, plotters, A/D & D/A converters
SOFTWARE					
Assembler	Yes	Yes	Yes	Macro assembler	Macro assembler
Compilers	QIC (BASIC)	QIC (BASIC)	QIC (BASIC)	FORTRAN	FORTRAN
Operating system	Time-sharing	Time-sharing	Time-sharing	Batch, real-time, multi-programming	Batch, real-time, multi-programming
Language implemented in firmware	Partially	Partially	Partially	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, \$	64,900	44,900	69,900	19,800 (32K core)	17,100 (32K MOS)
Monthly maint. of basic configuration above for on-site contract, \$	485	335	485	5,400 (16K core)	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	2,450 (32K bytes)	2,950 (32K bytes)	2,950 (32K bytes)	—	—
Date of first delivery	2nd qtr. 1977	1st qtr. 1979	1st qtr. 1979	February 1973	1980
Number installed to date	Over 2000 (all models)	—	—	Over 800	NA
COMMENTS	System 1400-2 price includes 48K bytes, 25M bytes disk drive, magnetic tape drive, 300 lpm printer, and two CRT's	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	Apollo array processor can perform 22 specialized array operations	Multiprocessing system capability

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MANUFACTURER AND MODEL	Rolm 1602B (AN/UJK-19)	Rolm 1603A (AN/UJK-12)	Rolm 1606 (AN/UJK-19)	Rolm 1650 (AN/UJK-19)	Rolm 1664 (AN/UJK-19)
WORD LENGTH, BITS	16	16	16	16	16
NO. WORKSTATIONS SUPPORTED	2	2	10	12	2
MAIN STORAGE					
Storage type	Core	Core	Core	Core	Core
Cycle/access time	1.0	1.2	1.0	1.0/0.5	1.0/0.5
Min./Max. capacity, words	16K/64K	16K/32K	16K/1024K	16K/32K	16K/64K
Parity checking	No	No	No	No	No
Error correction	No	No	No	No	No
Storage protection	No	No	Standard	Optional	Optional
CENTRAL PROCESSOR					
No. of directly addressable words	64K	32K	64K	32K	64K
Control storage	ROM; 1K x 56 bits	—	ROM; 4K x 36 bits	PROM; 1K x 52 bits	ROM; 4K x 32 bits
Add time, microseconds	1.0	5.9	1.0	1.05	1.0
Hardware multiply/divide	Standard	Optional	Standard	Standard	Standard
Hardware floating point	Optional	No	No	Optional	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	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.	666K	768K	1M	666K	1M
No. of external interrupt levels	16	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	56	56	56	12	56
Synchronous	—	—	—	—	—
Asynchronous	19.2K baud	19.2K baud	19.2K baud	19.2K baud	19.2K baud
Protocols supported	—	—	—	—	—
Network architectures supported	—	—	—	—	None
RJE terminals emulated	—	—	—	—	None
IBM 3270 emulation	—	—	—	—	No
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes	Yes	0.6-1.2M bytes	Yes	Yes
Disk pack/cartridge drives	Cartridge; 5-10M bytes	Cartridge; 5-10M bytes	Cartridge & Pack.; 5-160M bytes	Cartridge; 5-10M bytes	Cartridge; 5-10M bytes
Drum/fixed head disk storage	Fixed-head; 2M bytes	Fixed-head; 2M bytes	Fixed-head; 0.5-4M bytes	Fixed-head; 2M bytes	Fixed-head; 2M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, ½-inch	60 KBS	60 KBS	60 KBS	60 KBS	60 KBS
Serial printer	60 cps	60 cps	60 cps	60 cps	60 cps
Line printer	1100 lpm	1100 lpm	1100 lpm	1100 lpm	1100 lpm
Data communications interface	20K bps	20K bps	20K bps	20K bps	20K 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 units, D/A & A/D conver., NTDS 1533	Paper tape units, D/A & A/D converters	Paper tape units, D/A & A/D converters, NTDS 1533	PT, D/A & A/D units, NTDS, 1533	Paper tape units, D/A & A/D converters
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, FORTRAN
Operating system	Batch, real-time	Batch, real-time	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, \$	25,250	13,400	43,900	26,250	39,450
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	—
Discounts available	GSA, OEM, qty. 7,000 (16K words)	GSA, OEM, qty. 6,000 (16K words)	GSA, OEM, qty. 7,000 (16KW)	GSA, OEM, qty. 7,000 (16K words)	OEM, GSA, qty. 7,000 (16K words)
Price of memory increment, \$	—	—	—	—	—
Date of first delivery	1977	1976	1978	1976	1976
Number installed to date	Approx. 500	90	100	NA	100
COMMENTS	Qualified to Mil-E-5400 & Mil-E-16400 specif.; ATR chassis; micro-programmed militarized CPU	Qualified to Mil-E-5400 & Mil-E-16400 specif.; ATR chassis; low-priced, faster version of previously offered Model 1603, Model compatible with DG Nova	Qualified to Mil-E-16400; system used on Navy DPEWS (AN/SLO-32); same as 1666 except for floating-point capability	Designed to meet Mil-E-5400 & Mil-E-16400 specif., half ATR version of Rolm 1602-A	Designed to meet Mil-E-5400 & Mil-E-16400 specif., ATR chassis, tri-processor militarized computer, upward-compatible with other Rolm computers

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MANUFACTURER AND MODEL	Roim 1666 (AN/UYK-19)	Roim MSE/30 MIL-SPEC Eclipse	Sperry Univac BC/7 600	Sperry Univac BC/7 700	Sperry Univac BC/7 800
WORD LENGTH, BITS	16	16	8	8	8
NO. WORKSTATIONS SUPPORTED	10	48	2	4	6
MAIN STORAGE					
Storage type	Core	Core	MOS	MOS	MOS
Cycle/access time	1.0/0.5	1.0/0.5	1.0/0.5	1.0/0.5	1.0/0.5
Min./Max. capacity, words	16K/1024K	32K/1024K	48K bytes/64K bytes	48K bytes/64K bytes	128K/128K bytes
Parity checking	No	No	Standard	Standard	Standard
Error correction	No	No	No	No	No
Storage protection	Optional	Standard	No	No	No
CENTRAL PROCESSOR					
No. of directly addressable words	64K	32K	64K bytes	64K bytes	64K bytes
Control storage	ROM; 4K x 36 bits	ROM	4K bytes	4K bytes	4K bytes
Add time, microseconds	1.0	0.5	106 (5 digits)	106 (5 digits)	106 (5 digits)
Hardware multiply/divide	Standard	Standard	—	—	—
Hardware floating point	Standard	Standard	—	—	—
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	No	No	No	No
Real-time clock or timer	Optional	Optional	Standard	Standard	Standard
INPUT/OUTPUT CONTROL					
Direct memory access channel	Standard	Standard	Standard	Standard	Standard
Maximum I/O rate, words/sec.	1M	800,000	1M bytes	1M bytes	1M bytes
No. of external interrupt levels	16	16	5	5	5
COMMUNICATIONS					
Maximum number of lines	56	—	—	—	—
Synchronous	—	10 lines	2000-9600 bps	2000-9600 bps	2000-9600 bps
Asynchronous	19.2K baud	48 x 19.2K baud	No	No	No
Protocols supported	—	—	—	—	—
Network architectures supported	None	—	—	—	—
RJE terminals emulated	None	IBM 3780	—	—	—
IBM 3270 emulation	No	Yes	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	Yes; 0.6-1.2MB	2.4M bytes	2M-6M bytes	2M-6M bytes	2M-6M bytes
Disk pack/cartridge drives	Pack & Cartridge; 5-160M bytes	Pack; 8 x 536M bytes	No	Cartridge; 5M-40M bytes	Cartridge; 10M-40M bytes
Drum/fixed head disk storage	Fixed-head; 0.5- 4.0M bytes	Fixed; 2 x 4M bytes	No	No	No
Magnetic tape cassettes/cartridges	No	Cartridge	No	No	No
Magnetic tape, 1/2-inch	60 KBS	Yes	No	20, 40 KBS	20, 40 KBS
Serial printer	60 cps	Yes	200 cps	200 cps	200 cps
Line printer	1100 lpm	Yes	125 lpm	125-600 lpm	125-600 lpm
Data communications interface	20K bps	Yes	9600 bps	9600 bps	9600 bps
CRT	80 char. x 24 lines	Yes	80 char. x 24 lines	80 char. x 24 lines	80 char. x 24 lines
Other supported peripheral units	Paper tape units, D/A & A/D conver- ters, NTDS, 1533	A/D, D/A, MIL-Std.- 1553A, NTDS	Punched card reader	Punched card reader	Punched card reader
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	No	No	No
Compilers	ALGOL, BASIC, FORTRAN	ALGOL, BASIC, PL/1, FORTRAN,	RPG II, ESCORT	RPG II, ESCORT	RPG II, ESCORT
Operating system	Batch, real-time	Time-sharing, real- time, 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, \$	48,900	135,000	22,400	21,800	29,400
Monthly maint. of basic configura- tion above for on-site contract, \$	—	—	187	161	193
Discounts available	OEM, GSA, qty.	OEM, GSA, qty.	—	—	—
Price of memory increment, \$	7,000 (16K words)	7,000 (16K words)	900 (16K bytes)	900 (16K bytes)	—
Date of first delivery	1977	NA	April 1977	April 1977	July 1978
Number installed to date	40	NA	NA	NA	NA
COMMENTS	Qualified to Mil-E-5400 & Mil-E-16400; Std. 64K-bit floating-point arithmetic; std. memory mgmt. for up to 1024K words; complete protection and security features	Includes 128K words memory, I/O chassis, pro- cessor, and front panel			

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MANUFACTURER AND MODEL	Sperry Univac BC/7 900	Sperry Univac V77-200	Sperry Univac V77-400	Sperry Univac V77-600	Sperry Univac V77-800
WORD LENGTH, BITS	8	16	16	16	16
NO. WORKSTATIONS SUPPORTED	8	—	—	—	—
MAIN STORAGE					
Storage type	MOS	MOS	MOS	MOS	MOS
Cycle/access time	0.67/0.33 (approx.)	0.66/0.56	0.66/0.56	0.66/0.56	0.60/0.375
Min./Max. capacity, words	262K/262K bytes	8K/32K	8K/1024K	16K/1024K	64K/1024K
Parity checking	Standard	Optional	Optional	Optional	No
Error correction	No	No	No	Yes	Yes
Storage protection	No	Optional	Std. w/megamap	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	64K bytes	32K	32K	2048	2048
Control storage	4K bytes	ROM; 512 x 24	ROM	WCS	WCS
Add time, microseconds	—	2.31	2.64	0.66-2.15	0.45
Hardware multiply/divide	—	Standard	Standard	Standard	Standard
Hardware floating point	—	No	Optional	Optional	Optional
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	Optional; 1.5 hrs.	Optional; 8 hrs.	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.	1M bytes	319K	1.5M	1.51M	2.65K
No. of external interrupt levels	5	8-64	8-64	8-64	8-64
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	—
Synchronous	2000-9600 bps	50KB	50KB	50KB	50KB
Asynchronous	No	9600 bps	9600 bps	9600 bps	9600 bps
Protocols supported	X.25	—	—	UDLC/SDLC	UDLC/SDLC
Network architectures supported	—	—	—	Univac DCA	Univac DCA
RJE terminals emulated	Many IBM	HASP + 1004	HASP + 1004	HASP + 1004	HASP + 1004
IBM 3270 emulation	—	—	—	SDLC/BISYNC	SDLC/BISYNC
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	2M-6M bytes	Yes	Yes	No	Yes
Disk pack/cartridge drives	Cartridge; 10M-40M bytes	Both; 10M-40M	Both; 10M-1.6B	Both; 10M-1.6B	Both; 10M-1.6B
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, 40 KBS	120 kbs	120 kbs	120 kbs	120 kbs
Serial printer	200 cps	200 cps	200 cps	200 cps	200 cps
Line printer	125-600 lpm	300-600 lpm	300-600 lpm	300-600 lpm	300-600 lpm
Data communications interface	9600 bps	50K bytes	50K bytes	50K bytes	50K bytes
CRT	80 char. x 24 lines	—	—	—	—
Other supported peripheral units	Punched card reader	IEEE-488 data acquisition	IEEE-488 data acquisition	IEEE-488 data acquisition	IEEE-488 data acquisition
SOFTWARE					
Assembler	No	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler, macro assembler
Compilers	RPG II, ESCORT	FORTRAN IV, RPG II, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL	FORTRAN IV, RPG II, COBOL, PASCAL
Operating system	Interactive, batch	Batch, real-time	Batch, real-time	Batch, real-time, multi-tasking	Batch, real-time, 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, \$	40,100	5,350 (8K words)	7,850 (8K words)	13,950 (16K words)	33,000 (128K words)
Monthly maint. of basic configuration above for on-site contract, \$	263	—	—	—	—
Discounts available	—	—	—	—	—
Price of memory increment, \$	3,500 (64K bytes)	1,350 (8K words)	1,350 (8K words)	2,900 (16K words)	5,000/9,000
Date of first delivery	Second qtr. 1980	NA	NA	December 1976	July 1979
Number installed to date	NA	NA	NA	NA	NA
COMMENTS				Price includes cabinet; power supply and memory at lower prices than chassis level components	See V77-600; memory increment prices for 64K words and 128K words, respectively

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MANUFACTURER AND MODEL	STC Systems Ultimacc 2000	STC Systems Ultimacc 3000	STC Systems Ultimacc 4000	STC Systems Personna-data	Systems Engineering Laboratories 32/30A
WORD LENGTH, BITS	16	16	16	16	32 + 7
NO. WORKSTATIONS SUPPORTED	3	20	20	20	16
MAIN STORAGE					
Storage type	Core	Core	Core	Core	MOS
Cycle/access time	0.7/0.35	0.7/0.35	0.7/0.35	0.7/0.35	0.6/0.3
Min./Max. capacity, words	32K/48K	32K/256K	32K/256K	32K/256K	32K, 64K/256K
Parity checking	Optional	Optional	Optional	Optional	No
Error correction	No	No	No	No	Standard
Storage protection	No	No	No	No	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	256	256	256	256	128KI
Control storage	No	No	No	No	PROM/ROM; 4096
Add time, microseconds	0.7	0.7	0.7	0.7	0.6/1.2
Hardware multiply/divide	Optional	Optional	Optional	Optional	Standard
Hardware floating point	No	No	No	No	Standard
Hardware byte manipulation	No	No	No	No	Standard
Battery backup	Optional	Optional	Optional	Optional	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.	1.1M	1.1M	1.1M	1.1M	6.67M
No. of external interrupt levels	16	16	16	16	16
COMMUNICATIONS					
Maximum number of lines	—	—	—	—	16
Synchronous	Opt.; 1200 bps	Opt.; 1200 bps	Opt.; 1200 bps	Opt.; 1200 bps	Opt.; to 9600 bps
Asynchronous	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 9600 bps	Opt.; 38.4 bps
Protocols supported	Bisync	Bisync	Bisync	Bisync	Bisync
Network architectures supported	—	—	—	—	—
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	IBM 2780/3780	HASP terminals
IBM 3270 emulation	Yes	Yes	Yes	Yes	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	No	No
Disk pack/cartridge drives	Pack; 12-24M bytes	Pack; 32-320M bytes	Pack; 32-320M bytes	Pack; 12-320M bytes	Both; 10-1200MB
Drum/fixed head disk storage	No	No	No	No	Fixed-head; 5-40MB
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	60 KBS	60 KBS	60 KBS	60 KBS	36K-1.2M bytes
Serial printer	165 cps	165 cps	165 cps	165 cps	340 cps
Line printer	150-900 lpm	150-900 lpm	150-900 lpm	150-900 lpm	300-900 lpm
Data communications interface	300-2400 bps	300-2400 bps	300-2400 bps	300-2400 bps	40K bps
CRT	24 x 80 char.	24 x 80 char.	24 x 80 char.	24 x 80 char.	1920 characters
Other supported peripheral units	—	—	—	—	A/D, D/A, Digital I/O, high-speed data interface
SOFTWARE					
Assembler	Yes	Yes	Yes	Yes	Assembler & macro assembler
Compilers	BASIC	BASIC	BASIC	BASIC	FORTRAN, COBOL, BASIC
Operating system	Real-time	Real-time	Real-time	Real-time	Real-time, inter-active, multi-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, \$	7,800	17,700	Contact vendor	17,700	25,100 (128K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—	200
Discounts available	—	—	—	—	See 32/57 Comments
Price of memory increment, \$	3,500 (32K bytes)	3,500 (32K bytes)	—	3,500 (32K bytes)	9,300 (128K bytes)
Date of first delivery	1976	1976	1980	1976	September 1979
Number installed to date	100	50	NA	3	10
COMMENTS	Sold only as integral part of turnkey system	Sold only as integral part of turnkey system	Sold only as integral part of turnkey system	Sold only as integral part of turnkey system	Single Chassis System, memory map, 16MB addressing capability, multi-processor configurations. Total DBMS, instrumenter I/II, scientific accelerator, plotters and graphics

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MANUFACTURER AND MODEL	Systems Engineering Laboratories 32/55	Systems Engineering Laboratories 32/57	Systems Engineering Laboratories 32/77	Systems Engineering Laboratories 32/75	Systems Engineering Laboratories VPS 3200
WORD LENGTH, BITS	32 + 7	32 + 7	32 + 7	32 + 4	32 + 7
NO. WORKSTATIONS SUPPORTED	16	64	64	64	64
MAIN STORAGE					
Storage type	Core	MOS	MOS	MOS	MOS
Cycle/access time	0.6/0.3	0.6/0.3	0.6/0.3	0.6/0.3	0.6/0.3
Min./Max. capacity, words	8K/256K	64K/256K	64K/4096K	32K/2048K	64K/4096K
Parity checking	Standard	No	No	Standard	No
Error correction	No	Standard	Standard	No	Standard
Storage protection	Standard	Standard	Standard	Standard	Standard
CENTRAL PROCESSOR					
No. of directly addressable words	128K	128K	128K	128	128K
Control storage	PROM	PROM/ROM	PROM/ROM	PROM/ROM	PROM/ROM
Add time, microseconds	0.6/1.2	0.6/1.2	0.6/1.2	0.6/1.2	See Comments
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Standard	Standard	Standard	Standard	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	No	Optional	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.	6.67M	6.67M	6.67M	6.67M	6.67M
No. of external interrupt levels	16-112	16-112	16-112	16-112	16-112/192
COMMUNICATIONS					
Maximum number of lines	16	64	64	64	64
Synchronous	Opt.; to 40.8K bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 9600 bps	Opt.; to 40.8K bps
Asynchronous	Opt.; 38.4K bps	Opt.; 38.4 bps	Opt.; 38.4 bps	Opt.; 38.4 bps	Opt.; 38.4 bps
Protocols supported	—	Bisync	Bisync	Bisync	—
Network architectures supported	—	—	—	—	—
RJE terminals emulated	HASP terminals	HASP terminals	HASP terminals	HASP terminals	HASP terminals
IBM 3270 emulation	—	—	—	—	—
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	No	No
Disk pack/cartridge drives	Both; 10-1200M bytes	Both; 10M-19.2G bytes	Both; 10M-19.2G bytes	Both 10M-19G bytes	Both; .1-19.26B bytes
Drum/fixed head disk storage	Fixed-head; 4-16M bytes	Fixed-head; 5-40M bytes	Fixed-head; 5-40M bytes	Fixed-head; 5-40M bytes	Fixed-head; 5-40M bytes
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	36K-1.2M bps	36K-1.2M bytes	36-1.2M bytes	36-1.2M bytes	36K-1.2M bps
Serial printer	340 cps	340 cps	340 cps	340 cps	340 cps
Line printer	300-900 lpm	300-900 lpm	300-900 lpm	300-900 lpm	300-900 lpm
Data communications interface	40K bps	40K bps	40K bps	40K bps	40K bps
CRT	1920 characters	1920 characters	1920 characters	1920 characters	1920 characters
Other supported peripheral units	A/D, D/A, digital I/O, high-speed data interface	A/D, D/A, Digital I/O, high-speed data interface	A/D, D/A, Digital I/O, high-speed data interface	A/D & D/A, Digital I/O, high-speed data interface	A/D, D/A, digital I/O, high speed data interface
SOFTWARE					
Assembler	Asembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler & macro assembler
Compilers	FORTRAN, COBOL, BASIC	FORTRAN, COBOL, BASIC	FORTRAN, COBOL, BASIC	FORTRAN, COBOL, BASIC	FORTRAN, COBOL, BASIC
Operating system	Batch, real-time	Real-time, interactive, multi-batch	Real-time, interactive, multi-batch	Real-time, interactive, multi-batch	Real-time, interactive, multi-/vector batch
Language implemented in firmware	No	FORTRAN RTL (part.)	FORTRAN RTL (part.)	FORTRAN RTL (part.)	FORTRAN RTL (part.)
Operating system implemented in firmware	No	No	No	No	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	53,900 (128K bytes)	39,500 (256K bytes)	46,300 (256K bytes)	72,300 (128K bytes)	79,000
Monthly maint. of basic configuration above for on-site contract, \$	375	295	330	470	710
Discounts available	See 32/57 Cmnts.	See Comments	See 32/57 Cmnts.	See 32/57 Cmnts.	See 32/57 Cmnts.
Price of memory increment, \$	6,300 (8K words)	12,500 (256K bytes)	13,500 (256K bytes)	6,300 (32K bytes)	13,500 (256K bytes)
Date of first delivery	October 1975	April 1979	June 1978	January 1978	—
Number installed to date	425	10	275	325	—
COMMENTS	Single or double cabinet systems; multiprocessor configurations; total DBMS; instrumenter I/II, plotters/graphics	Discounts are based on projected point values for equipment purchased during the term of the agreement; OEM, volume end-user, and educational discounts are available	4MB memory in double cabinet, memory map, 16MB addressing capability, multi-processor configurations, TOTAL DBMS, instrumenter I/II, scientific accelerator, internal processing unit, plotters and graphics	Double cabinet system, memory map, 16MB addressing capability, multi-processor configurations, TOTAL DBMS, instrumenter I/II, scientific accelerator, internal processing unit, plotters and graphics.	Includes a 32/77 CPU for scalar arithmetic and a VPU for vector arithmetic; the VPU can perform two 32-bit floating-point adds and one floating-point multiply in 420 nanoseconds; software includes SNAP II vector processing executive and array processing routines.

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MANUFACTURER AND MODEL	Systems Engineering Laboratories VPS 3300	Systems Engineering Laboratories VPS 6400	Tandem Computers T16/1102	Tandem Computers T16/1403	Terak Corporation 8510/a
WORD LENGTH, BITS	32 + 7	32 + 4	16 + 1	16 + 1	16
NO. WORKSTATIONS SUPPORTED	64	64	256	256	8
MAIN STORAGE					
Storage type	MOS	MOS	Core	MOS	MOS RAM
Cycle/access time	0.6/0.3	0.6/0.3	0.8/0.5	0.5/0.5	1.2/1.2
Min./Max. capacity, words	64K/4096K	64K/4096K	32K/256K	32K/256K	64K/64K
Parity checking	No	No	Standard	No	Standard
Error correction	Standard	Standard	No	Standard	—
Storage protection	Standard	Standard	Standard	Standard	No
CENTRAL PROCESSOR					
No. of directly addressable words	128K	128K	128K	128K	64K
Control storage	PROM/ROM; 4096	PROM/ROM; 4096	PROM; 4K x 32 bits	PROM; 4K x 32 bits	—
Add time, microseconds	See Comments	See Comments	0.5	0.5	3.5
Hardware multiply/divide	Standard	Standard	Standard	Standard	Standard
Hardware floating point	Standard	Standard	Optional	Standard	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard	Standard
Battery backup	Optional	Optional	No	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.	6.67M	6.67M	NA	NA	—
No. of external interrupt levels	16-112/192	16-112/192	16	16	2
COMMUNICATIONS					
Maximum number of lines	64	64	256	256	8
Synchronous	Opt.; to 40.8K bps	Opt.; to 40.8K bps	Opt.; to 80K bps	Opt.; to 80K bps	Optional
Asynchronous	Opt.; 38.4K bps	Opt.; 38.4K bps	Opt.; 50-19.2K bps	Opt.; 50-19.2K bps	Std.; 19.2K bps
Protocols supported	—	—	—	—	Several
Network architectures supported	—	—	NCP	NCP	DECnet
RJE terminals emulated	HASP terminals	HASP terminals	2780/3780, 360/370	2780/3780, 360/370	None
IBM 3270 emulation	—	—	—	—	Optional
PERIPHERAL EQUIPMENT					
Floppy disk (diskette) drives	No	No	No	No	Yes
Disk pack/cartridge drives	Both; 1-19.26B bytes	Both; 1-19.26B bytes	Pack & cartridge; 10M-24M bytes	Pack & cartridge; 10M-24M bytes	No
Drum/fixed head disk storage	Fixed-head; 5-40M bytes	Fixed-head; 5-40M bytes	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No	No
Magnetic tape, 1/2-inch	36K-1.2M bps	36K-1.2M bps	36-120KBS	36-120 KBS	No
Serial printer	340 cps	340 cps	Yes	Yes	60, 180 cps
Line printer	300-900 lpm	300-900 lpm	300-1500 lpm	300-1500 lpm	No
Data communications interface	40K bps	40K bps	50-80K bps	50-80K bps	19.2K bps
CRT	1920 characters	1920 characters	80 char. x 24 lines	80 char. x 24 lines	1920 characters
Other supported peripheral units	A/D, D/A, digital I/O, high-speed data interface	A/D, D/A, digital I/O, high speed data interface	None	None	Plotters, digitizers
SOFTWARE					
Assembler	Assembler & macro assembler	Assembler & macro assembler	Assembler, macro assembler	Assembler, macro assembler	Assembler & macro assembler
Compilers	FORTRAN, COBOL, BASIC	FORTRAN, COBOL, BASIC	COBOL, TAL, FORTRAN	COBOL, TAL, FORTRAN	BASIC, FORTRAN, PASCAL
Operating system	Real-time, interactive, multi-1 vector	Real-time, interactive, multi-/vector	Multiprocessing, multiprog., virt.	Multiprocessing, multiprog., virt.	Real-time
Language implemented in firmware	FORTRAN RTL (part.)	FORTRAN RTL (part.)	Partially	Partially	No
Operating system implemented in firmware	No	No	Partially	Partially	No
PRICING & AVAILABILITY					
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	85,000	137,500	20,400	22,000	7,850
Monthly maint. of basic configuration above for on-site contract, \$	765	1,240	106	136	NA
Discounts available	See 32/57 Cmnts.	See 32/57 Cmnts.	—	—	Qty., educational
Price of memory increment, \$	13,500 (256K bytes)	17,000 (16K x 64-bit)	8,000 (64K bytes)	7,200	NA
Date of first delivery	—	—	May 1976	May 1976	April 1977
Number installed to date	—	—	250 + (processors)	250 + (processors)	Over 700
COMMENTS	Includes a 32/77 CPU for scalar arithmetic and a VPU for vector arithmetic; the VPU can perform four 32-bit floating-point adds and two floating-point multiplications in 420 nanoseconds; software includes SNAP II vector processing executive and array	Includes a 32/77 CPU for scalar arithmetic and a VPU for vector arithmetic; the VPU can perform two 64-bit floating point adds and one floating-point multiply in one microsecond; software includes SNAP II vector processing executive and array processing routines.	Multiprocessor system containing from 2 to 16 CPU's for fault-tolerance; all system components are dual-ported; CPU's have dual buses	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 960B	Texas Instruments 980B	Texas Instruments 990/4	Texas Instruments 990/5
WORD LENGTH, BITS	16 + 6	16 + 6	16 + 1	16 + 1
NO. WORKSTATIONS SUPPORTED	—	—	See Comments	See Comments
MAIN STORAGE	MOS	MOS	MOS	MOS
Storage type	0.75	0.75	0.67/0.67	0.50/0.50
Cycle/access time	8K/64K	8K/64K	4K/28K	16K/32K
Min./Max. capacity, words	No	No	Standard	Standard
Parity checking	Standard	Standard	No	No
Error correction	Standard	Standard	No	No
Storage protection				
CENTRAL PROCESSOR				
No. of directly addressable words	64K	64K	32K	32K
Control storage	ROM; 256 x 16 bits	ROM; 256 x 16 bits	No	No
Add time, microseconds	3.6	1.75	4.7	3.5
Hardware multiply/divide	Optional	Standard	Standard	Standard
Hardware floating point	No	No	No	No
Hardware byte manipulation	No	Standard	Standard	Standard
Battery backup	Optional	Optional	Optional	Optional
Real-time clock or timer	Optional	Optional	Standard	Standard
INPUT/OUTPUT CONTROL				
Direct memory access channel	Standard	Standard	No	Standard
Maximum I/O rate, words/sec.	1.3M	1M	1.5M	M
No. of external interrupt levels	3-2048	4-32	M	16
COMMUNICATIONS				
Maximum number of lines	—	1 to 256	See Comments	See Comments
Synchronous	Up to 9600 bps	Up to 9600 bps	Std.; to 9600 bps	Std.; to 9600 bps
Asynchronous	Up to 9600 bps	No	Standard	Standard
Protocols supported	Bisync	—	Bisync	Bisync
Network architectures supported	None	None	—	—
RJE terminals emulated	IBM 360/370	Any RS-232C/20mA	IBM 2780/3780	IBM 2780/3780
IBM 3270 emulation	No	No	No	No
PERIPHERAL EQUIPMENT				
Floppy disk (diskette) drives	No	No	242-968K bytes	242K-4M bytes
Disk pack/cartridge drives	Cartridge & pack; 2.28-392M bytes	Cartridge & pack; 2.28-392M bytes	No	10M-200M bytes
Drum/fixed head disk storage	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette; 120 cps	Cassette; 120 cps	Cassette; 120 cps	Cassette; 120 cps
Magnetic tape, 1/2-inch	30 KBS	30 KBS	No	30-60 KBS
Serial printer	30-330 cps	30-330 cps	180 cps	180 cps
Line printer	No	No	300-600 lpm	300-600 lpm
Data communications interface	110-9600 bps	110-9600 bps	75-9600 bps	75-9600 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	1920 char.	1920 char.
Other supported peripheral units	Process control interfaces, A/D & D/A converters	Paper tape units	PROM programmer, A/D & D/A converters	PROM programmer, A/D & D/A converter
SOFTWARE				
Assembler	Assembler & macro preprocessor	Assembler & macro preprocessor	Yes	Yes
Compilers	FORTRAN	FORTRAN, BASIC	FORTRAN	FORTRAN, BASIC
Operating system	Single-user, real-time, multiprogramming.	Single-user, real-time, multiprogramming.	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, \$	4,850 (8K words)	5,650 (8K words)	1,925 (4K words)	3,400 (16K words)
Monthly maint. of basic configuration above for on-site contract, \$	75	95	41	55
Discounts available	—	—	—	—
Price of memory increment, \$	1,400 (8K MOS)	1,400 (8K MOS)	2,050 (16K words)	750 (16K words)
Date of first delivery	May 1974	May 1974	March 1976	April 1979
Number installed to date	Over 4,100	Over 4,400	NA	NA
COMMENTS	Heavily supported for process control applications		Based on TI's TMS 990 microprocessor; num. of workstations & lines are a function of application	Based on TI's TMS 990 microprocessor; num. of workstations & lines are a function of application & memory sizes

MANUFACTURER AND MODEL	Texas Instruments 990/10	Texas Instruments 990/12	Wang PCS II	Wang 2200 VP/MVP
WORD LENGTH, BITS	16 + 6	16 + 6	8-bit byte	8-bit byte
NO. WORKSTATIONS SUPPORTED	See Comments	See Comments	1	4-8
MAIN STORAGE				
Storage type	MOS	MOS/cache	MOS	MOS
Cycle/access time	0.67/0.67	.74, .15/.50, .15	1.6	0.6
Min./Max. capacity, words	64K/1,048K	128K/1,048K	8K/32K bytes	16K/256K bytes
Parity checking	No	No	No	No
Error correction	Standard	Standard	No	No
Storage protection	Standard	Standard	No	No
CENTRAL PROCESSOR				
No. of directly addressable words	32K	32K	No	No
Control storage	No	No	ROM; 425K bytes	ROM; 48K words
Add time, microseconds	3.6	.552	800	13
Hardware multiply/divide	Standard	Standard	Standard	Standard
Hardware floating point	No	Standard	Standard	Standard
Hardware byte manipulation	Standard	Standard	Standard	Standard
Battery backup	Optional	No	No	No
Real-time clock or timer	Standard	Standard	Optional	Optional
INPUT/OUTPUT CONTROL				
Direct memory access channel	Standard	Standard	No	No
Maximum I/O rate, words/sec.	3M	3M	10K	100K
No. of external interrupt levels	16	16	None	None
COMMUNICATIONS				
Maximum number of lines	See Comments	See Comments	—	9
Synchronous	Std.; to 9600 bps	Std.; to 9600 bps	Optional	Up to 9600 bps
Asynchronous	Standard	Standard	Up to 9600 bps	Up to 9600 bps
Protocols supported	Bisync	Bisync	Bisync	Bisync
Network architectures supported	—	—	—	—
RJE terminals emulated	IBM 2780/3780	IBM 2780/3780	—	—
IBM 3270 emulation	Yes	Yes	—	—
PERIPHERAL EQUIPMENT				
Floppy disk (diskette) drives	242K-4M bytes	242K-4M bytes	89-178K bytes	262-786K bytes
Disk pack/cartridge drives	10M-800M bytes	10M-800M bytes	No	Cartridge 12-20M bytes
Drum/fixed head disk storage	No	No	No	No
Magnetic tape cassettes/cartridges	Cassette; 120 cps	Cassette; 120 cps	Cassette; 326 bps	Cassette; 326 bps
Magnetic tape, 1/2-inch	30-60 KBS	30-60 KBS	No	10 KBS
Serial printer	180 cps	180 cps	200 cps	200 cps
Line printer	300-600 lpm	300-600 lpm	600 lpm	600 lpm
Data communications interface	75-9600 bps	75-9600 bps	To 9600 bps	To 9600 bps
CRT	1920 char.	1920 char.	64 char. x 16 lines	64 char. x 16 lines
Other supported peripheral units	Prom programmer A/D & D/A converters	Prom programmer A/D & D/A converters	Plotter	Paper tape reader, paper tape punch, card punch, plotter
SOFTWARE				
Assembler	Assembler & macro assembler	Assembler & macro assembler	No	No
Compilers	FORTRAN, BASIC, COBOL, PASCAL, RPG II	FORTRAN, BASIC, COBOL, PASCAL, RPG II	BASIC, BASIC-2	BASIC, BASIC-2
Operating system	Real-time, multi-task	Real-time, multi-task	None	None
Language implemented in firmware	No	No	Fully	Fully
Operating system implemented in firmware	No	No	NA	NA
PRICING & AVAILABILITY				
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	14,675 (64K words)	29,050 (128K words)	4,800	9,000 (16K bytes)
Monthly maint. of basic configuration above for on-site contract, \$	103	261	50	55
Discounts available	—	—	—	—
Price of memory increment, \$	6,250 (128K words)	6,250 (128K words)	1,300 (8K bytes)	4,000 (32K bytes)
Date of first delivery	March 1976	September 1979	March 1977	November 1977
Number installed to date	NA	NA	25,000 + (all mod.)	25,000 + (all mod.)
COMMENTS	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	Portable computer weighing 62 lbs. Information taken from report dated April 1979	Information taken from report dated April 1979

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MANUFACTURER AND MODEL	Wang 2200T	Wang 2200 VS	Warrex Centurion 100	Warrex Centurion 200
WORD LENGTH, BITS	8-bit byte	32	8	8
NO. WORKSTATIONS SUPPORTED	4	32	2	4
MAIN STORAGE	MOS	MOS/cache	MOS	MOS
Storage type	1.6	0.66	0.8/0.2	0.8/0.2
Cycle/access time	16K/32K bytes	128K/2048K bytes	16K/64K	16K/64K
Min./Max. capacity, words	No	Standard	No	No
Parity checking	No	Standard	No	No
Error correction	No	Standard	No	No
Storage protection	No	Standard	No	No
CENTRAL PROCESSOR	No	512K bytes	64K	64K
No. of directly addressable words	ROM; 425K words	—	PROM; 7,512 x 8	PROM; 7,512 x 8
Control storage	800	—	3.0	3.0
Add time, microseconds	Standard	—	No	No
Hardware multiply/divide	Standard	Standard	No	No
Hardware floating point	Standard	Standard	No	No
Hardware byte manipulation	Standard	Standard	No	No
Battery backup	No	No	No	No
Real-time clock or timer	No	Optional	Standard	Standard
INPUT/OUTPUT CONTROL	No	Standard	Standard	Standard
Direct memory access channel	10K	—	1.25M	1.25M
Maximum I/O rate, words/sec.	None	5	0-16	0-16
No. of external interrupt levels	3	16	2	4
COMMUNICATIONS	Up to 9600 bps	No	No	No
Maximum number of lines	Up to 9600 bps	Up to 9600 bps	Std.; 300 bps	Std.; 300 bps
Synchronous	Bisync	Bisync	None	None
Asynchronous	—	—	None	None
Protocols supported	—	2780/3780, HASP	None	None
Network architectures supported	—	No	None	None
RJE terminals emulated	—	—	None	None
IBM 3270 emulation	—	No	No	No
PERIPHERAL EQUIPMENT	262-786K bytes	3154K bytes	600K-3.6M bytes	No
Floppy disk (diskette) drives	Cartridge; 12-20M bytes	Removable; to 90M bytes	No	Both; 10.4-20.8M bytes
Disk pack/cartridge drives	No	Fixed; 288M bytes	No	No
Drum/fixed head disk storage	Cassette; 326 bps	No	No	No
Magnetic tape cassettes/cartridges	10 KBS	120 KBS	No	No
Magnetic tape, 1/2-inch	200 cps	30, 120, 200 cps	65-600 cps	65-600 cps
Serial printer	250 lpm	250-600 lpm	125-500 lpm	125-600 lpm
Line printer	To 9600 bps	To 9600 bps	No	No
Data communications interface	64 char. x 16 lines	80 char. x 16 lines	80 char. x 24 lines	80 char. x 24 lines
CRT	Paper tape reader, paper tape punch, card punch, plotter	None	Any RS-232C	Any RS-232C
Other supported peripheral units	—	—	—	—
SOFTWARE	No	Assembler & macro assembler	Yes	Yes
Assembler	BASIC, BASIC-2	BASIC, COBOL, RPG II, PL/1, FORTRAN	CPL SMART	CPL SMART
Compilers	None	Interactive, virtual-storage, multi-user	Time-sharing	Time-sharing
Operating system	Fully	Fully	No	No
Language implemented in firmware	NA	Partially	No	No
Operating system implemented in firmware	5,000 (16K bytes)	19,000 (128K bytes)	6,339	12,766
PRICING & AVAILABILITY	43	240	—	—
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	—	—	—	—
Monthly maint. of basic configuration above for on-site contract, \$	2,200 (16K bytes)	7,000 (128K bytes)	2,060 (32K)	2,060 (32K)
Discounts available	February 1975	December 1977	First qtr. 1979	Second qtr. 1979
Price of memory increment, \$	25,000+ (all mod.)	NA	150	100
Date of first delivery	Also available in packaged systems WCS-20 & WCSI-30. Information taken from report dated April 1979	Packaged systems includes 128KB memory, one 308KB floppy disk, 7-slot chassis, cabinets, operating system, resource management software, and choice of one language	English oriented JCL; large selection of applications	English oriented JCL; large selection of applications; spooled sprint
Number installed to date	—	—	—	—
COMMENTS	—	—	—	—

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MANUFACTURER AND MODEL	Warrex Centurion III	Warrex Centurion Series 6000	Xerox Diablo 3000	Xerox Diablo 3200
WORD LENGTH, BITS	8	8	8 + parity	8 + parity
NO. WORKSTATIONS SUPPORTED	8	32	1	9
MAIN STORAGE	MOS	MOS	MOS	MOS
Storage type	0.8/0.2	0.8/0.2	.41/.25	.488/.30
Cycle/access time	32K/64K	64K/256K	32K/64K	24K/64K
Min./Max. capacity, words	No	Standard	Standard	Standard
Parity checking	No	No	No	No
Error correction	No	Standard	No	No
Storage protection				
CENTRAL PROCESSOR	64K	64K	64K	64K
No. of directly addressable words	PROM; 7,512 x 8	PROM; 14, 1024 x 18	ROM; 2K	ROM; 1K
Control storage	3.0	1.6	16.7 (6 digits)	23.9 (6 digits)
Add time, microseconds	No	Standard	No	No
Hardware multiply/divide	No	No	No	No
Hardware floating point	No	Standard	Standard	Standard
Hardware byte manipulation	No	No	No	No
Battery backup	Standard	Standard	Standard	Standard
Real-time clock or timer				
INPUT/OUTPUT CONTROL	Standard	Standard	Standard	Standard
Direct memory access channel	1.25M	1.25	1.5M	1M
Maximum I/O rate, words/sec.	0-16	0-16	8	8
No. of external interrupt levels				
COMMUNICATIONS	4	8	0	9
Maximum number of lines	No	Opt.; 1.2-9.6K bps	No	Opt.; up to 9600 bps
Synchronous	Std.; 300 bps	Std.; 300 bps	No	Opt.; up to 9600 bps
Asynchronous	None	Bisync	None	None
Protocols supported				
Network architectures supported	None	None	None	None
RJE terminals emulated	None	IBM 2780/3780	None	IBM 2780
IBM 3270 emulation	No	No	No	No
PERIPHERAL EQUIPMENT	600K-3.6M bytes	600K-3.6M bytes	1M-2.5M bytes	1M-5M byte
Floppy disk (diskette) drives	Both; 10.4-81.6M bytes	Both; 10.4-72,000M bytes	No	Cartridge; 10-20M bytes
Disk pack/cartridge drives				
Drum/fixed head disk storage	No	No	No	No
Magnetic tape cassettes/cartridges	No	No	No	No
Magnetic tape, 1/2-inch	No	72 KBS	No	No
Serial printer	65-600 cps	65-600 cps	40, 45, or 200 cps	40, 45, or 200 cps
Line printer	125-600 lpm	125-600 lpm	No	No
Data communications interface	No	1.2-9.6K bps	No	Up to 9600 bps
CRT	80 char. x 24 lines	80 char. x 24 lines	1920 characters	1920 characters
Other supported peripheral units	Any RS-232C	Any RS-232C	—	—
SOFTWARE				
Assembler	Yes	Yes	Global assembler	Global assembler
Compilers	CPL SMART	CPS SMART, BASIC, COBOL	DACL* (English-like compiler)	DACL (English-like compiler)
Operating system	Time-sharing	Time-sharing	Batch, interactive	Batch, interactive, time-sharing
Language implemented in firmware	No	No	No	No
Operating system implemented in firmware	No	No	No	No
PRICING & AVAILABILITY	15,652	19,712	15,950 (w/prINTER)	18,950 (w/prINTER)
Price of CPU, power supply, frt. panel, and minimum memory in chassis, \$	—	—	On-call only	On-call only
Monthly maint. of basic configuration above for on-site contract, \$	—	—	—	—
Discounts available	2,060 (32K)	2,060 (32K)	Various	Various
Price of memory increment, \$				
Date of first delivery	1975	Third qtr. 1979	October 1979	December 1976
Number installed to date	900 +	NA	NA	NA
COMMENTS	English oriented JCL; large selection of applications; spooled print	English oriented JCL; large selection of applications; print sub-systems; CRT security, disk security, dynamic memory allocation; up to 64 partitions	*DACL compiler language is a high-level English like language source statement compiler	Diablo systems are manufactured by Xerox and distributed worldwide; in the U.S. it is exclusively distributed by Shasta General Systems