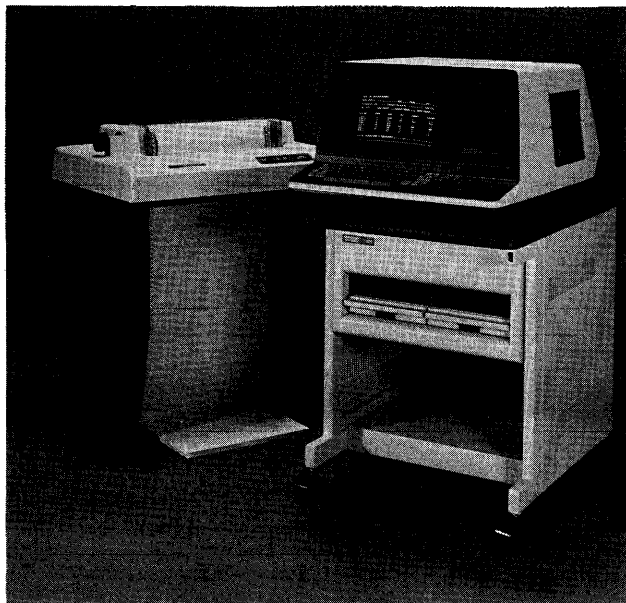


DEC Datasystem 308 and 310 Series



A basic Datasystem 308, consisting of a VT78 video terminal/central processor with 32K bytes of MOS memory and a dual floppy disk system, is shown in the standard mini-desk enclosure, with the optional LA78 printer at left. The basic system purchase price of \$12,600 also includes the COS-310 operating system, DEC's DIBOL business-oriented language, and system installation. The monthly maintenance charge is \$68. The LA78 printer is available for \$3,300.

MANAGEMENT SUMMARY

The Datasystem 310 has been as successful over the same period of time as its generic type, the small business computer. During the nearly four years following the introduction of the Datasystem 310 and the IBM System/32, the industry has been flooded with small business computer systems, from major minicomputer makers and from OEM system builders who assemble both general and specialized packages of hardware and software.

At the time of its introduction, the Datasystem 310 shattered price barriers by offering a complete packaged business computer system at a purchase price of just \$12,000. But the DS310 originally lacked the performance of the IBM System/32 primarily because the only mass storage available to it was floppy disk drives (up to four), whereas the IBM system also featured a fixed disk subsystem.

A basic DS310 configuration with DEC's first double-density floppy disk and a newly announced replacement for the VT52 display terminal now costs \$13,900, but it still offers an excellent opportunity for even the smallest potential user to have a disk-based business computing system, complete with operating software and an easy-to-learn programming language.

DEC has removed the last substantial difference between the DS310 and the IBM System/32 by adding a hard disk ➤

The Datasystem 308 and 310 are the entry-level members of DEC's Datasystem family of packaged business systems. The 310 was introduced in January 1975 and is based on DEC's PDP-8/A, while the 308, introduced in January 1978, is based on an LSI version of the same computer. Both models are single-user systems designed for business applications such as order processing, invoicing, inventory control, accounts receivable/payable, and payroll.

CHARACTERISTICS

MANUFACTURER: Digital Equipment Corporation, Commercial Products Group, Continental Boulevard, Merrimack, New Hampshire 03054. Telephone (603) 884-5111.

Digital Equipment Corporation (DEC) is the world's largest manufacturer of minicomputer systems. DEC's product lines include general-purpose computing systems, laboratory monitoring and control systems, process control systems, industrial control systems, editing and typesetting systems, and business computing systems. DEC maintains 200 sales and service offices in over 35 countries and has manufacturing facilities in Puerto Rico, Canada, Ireland, Scotland, Hong Kong, and Taiwan in addition to 17 facilities in the U.S. The company employs 38,000 persons worldwide and has installed more than 100,000 computer systems.

VENDORS: Manufacturer and OEM suppliers. Contact DEC's Commercial Products Group to find the OEM supplier in your locale.

MODELS: Datasystem 308 and 310.

DATE ANNOUNCED: DS310, January 1975; DS308, January 1978.

DATE OF FIRST DELIVERY: DS310, May 1975; DS308, March 1978.

NUMBER INSTALLED TO DATE: Not available.

DATA FORMATS

BASIC UNIT: The PDP-8/A and VT78 processors use 12-bit words; programmers, however, see only 6-bit modified ASCII for numeric or alphanumeric data.

FIXED-POINT OPERANDS: The PDP-8/A and VT78 use 12-bit binary words; programmers, however, see the systems as having fixed-point decimal capability only, with precision of 15 digits, due to the standard software.

FLOATING-POINT OPERANDS: None provided.

INSTRUCTIONS: One-word single-address machine instructions, as is common to the PDP-8 line. But since the only programming language available to users is DIBOL, users see the instruction format in terms of the DIBOL syntax, and the repertoire in terms of the DIBOL command list.

INTERNAL CODE: Binary, as in the PDP-8 line. But users make no reference to machine code; they see alphanumeric data in DIBOL data structure, coded in 6-bit modified ASCII. ➤

DEC Datasystem 308 and 310 Series

CHARACTERISTICS OF THE DEC DATASYSTEM 308 AND 310

MODEL	308	310
Processor	VT78*	PDP-8/A
Number of terminals	1	1
Standard disk model	RX28 floppy	RX28 floppy
Standard disk capacity	512K words	512K words
Memory capacity, words:		
Minimum	16K (MOS)	16K
Maximum	16K (MOS)	32K

NOTE All models include one DECscope console, COS-310 Operating System, DIBOL, and DECform software. Printers are optional and range from 45 cps to 300 lpm.

*The VT78 is a fully integrated LSI version of the PDP-8/A.

▷ subsystem. DEC now offers the RK05 series of cartridge disks with the DS310, making the system more directly competitive with the System/32 and many other small business computers. One significant difference is that DEC's disk drives employ interchangeable cartridges whereas the System/32 uses a nonremovable disk. Another major difference between the two product lines is IBM's numerous Industry Application Programs (IAP's). The IAP's mark the most significant strategy difference between DEC and IBM. While Digital provides the DIBOL language for application program development, IBM supplies separately priced packages that include all coding, documentation, and training material required to get a user installation up and running. System/32 users can also develop their own application programs, but the programming language provided is RPG II, which, although simpler to use, is generally not as effective as DIBOL. In addition, System/32 users must cope with IBM's not-so-simple Operation Control Language when developing their own programming. It should also be noted that the System/32 RPG II compiler is separately priced.

The Datasystem 308, announced in January 1978, comes close to re-establishing the original \$12,000 entry price into the Datasystems line. The non-expandable LSI processor has 16K 12-bit word words of main memory, is presently limited to 2 million 8-bit bytes or 1 million 12-bit words of diskette storage, and lacks data communications capabilities.

The Datasystem 308 employs Digital's LSI-based PDP-8 video data processor, the VT78, which features a software self-diagnostic capability and single-button program loading capability. The minimum Datasystem 308 package also includes a double-density dual-diskette subsystem, desk hardware, the COS-310 operating system with file management capabilities, and the DIBOL language. The price of this minimum system is \$12,600, or \$10,600 without training credit or support services.

The DS308 system can be augmented with a second dual-diskette subsystem, priced at \$3,900, and either a 180-cps LA78 Serial Printer, priced at \$3,300, or a 45-cps, letter-quality LQP78 Daisy-Wheel Printer, priced at \$3,995. ▷

▶ MAIN STORAGE

TYPE: Magnetic core (DS310); MOS (DS308).

CYCLE TIME: 1.4 microseconds (DS310); 3.6 microseconds (DS308)

CAPACITY: 16K to 32K 12-bit words, in 8K increments (DS310); 16K 12-bit words (DS308) (K=1,024). DEC also refers to capacities in "bytes" or characters. A DECbyte is six bits; hence, the DS310 capacities could be quoted as 32K to 64K six-bit bytes in 16K increments.

CHECKING: None.

STORAGE PROTECTION: None in hardware, but via operating system software. The basic COS-310 residency requirement is 4K words, and the operating system manages the memory resource for a single user.

RESERVED STORAGE: 4K words of memory for COS-310. The "system" diskette also has a reserved section for COS-310 and system utility programs.

CENTRAL PROCESSOR

The Datasystem 310 CPU is a PDP-8/A minicomputer, a slower, one-board version of the DEC PDP-8/E. See Report M11-384-101 for more details on the DS310 CPU. The Datasystem 308 CPU, the VT78, is an LSI version of the PDP-8/A.

CONTROL STORAGE: None is accessible to users.

REGISTERS: The PDP-8-style "autoindex" registers are used by COS 310 and are not accessible to programmers. The CPU has the normal complement of PDP-8 registers for the operating system to use: 12-bit accumulator, general-purpose register, program counter, memory address register, memory buffer register, 3-bit operation code register, and 1-bit link carry register for arithmetic overflow. None of these registers is accessible to DIBOL programmers. (The switch register has been eliminated, since there is no operator's console.)

ADDRESSING: All PDP-8's have four addressing modes: direct (128 locations); indirect (one-level); indirect-indexed, using the auto-index registers in memory; and program-relative.

INSTRUCTION REPERTOIRE: The CPU has the basic PDP-8 instruction set: 6 memory reference instructions, 4 interrupt control system instructions, 3 flag processing instructions, and 41 "operate" instructions for logical control. But only DIBOL is available to programmers. DIBOL has field manipulation instructions and add, subtract, multiply, ▶

DEC Datasystem 308 and 310 Series

PERIPHERALS/TERMINALS

DEVICE	DESCRIPTION	MANUFACTURER
PRINTERS		
LA180	DECprinter; 132 positions, 96 ASCII characters, variable forms width, top-of-form control; 180 cps	DEC
LE8	Line printer; drum, 132 positions, 64 ASCII characters, top-of-form control; 300 lpm	Dataproducts
LQP8	Letter-quality daisy-wheel printer; 132 positions, 96 ASCII characters; 45 cps characters; 45 cps	DEC
TERMINALS		
VT100	DECscope CRT; 132 characters by 14 lines (24 optional), or 80 character by 24 lines; 3 character sizes selectable on a line basis; standard underline or reverse video and optional bold and blink display; 18-key auxiliary keypad; up to 19,200 bps	DEC

➤ Both of these printers have a 96-ASCII character set and 132 positions per line of print.

The basic Datasystem 310 configuration includes a PDP-8/A CPU with 16K words of 1.5-microsecond core memory and bootstrap loader; a double-density dual floppy disk drive subsystem, with each drive capable of storing up to 512,572 six-bit characters; a 1920-character CRT display/keyboard; and a desk. Also included in the \$13,800 purchase price is a license for the COS-310 operating system and the DIBOL compiler. Memory can be expanded to 32K words, and floppy disk storage can be increased to a maximum of four drives (two dual-drive units), for a total of 2 million characters on-line.

Up to four RK05 cartridge disk drives can also be added to the Datasystem 310, providing an extra 12.8 million characters of storage. The first disk drive and controller cost \$9,180 and include a cabinet capable of mounting one additional drive.

Three types of printers are also offered as options with the DS310: the DEC-manufactured LA180 printer, the 300-lpm LE8 line printer, and a letter-quality printer that prints at up to 45 cps with a 96-character set.

The Datasystem 310 can be employed as a remote entry terminal to a host system through the IBM 2780 Emulation package. This package includes a synchronous line controller and the necessary software to communicate with other DEC Datasystems (310's, 320's, 350's, or 500's), DECsystem 10's or DECsystem 20's, or any IBM 360/370 computer system. The communications software package provides automatic answering, automatic retransmission of data in error, and double buffering of disk and line printer files. The data transmission rate is 4800 bps.

The entire Datasystem 308 and 310 systems, including the cartridge disk drives and line printers, plug into standard three-prong wall sockets. No special flooring is required, and any normal office environment is suitable for the systems.

DEC sells both systems to end users and OEM's alike. The company makes the units available to volume purchasers ➤

➤ divide, numeric content check, numeric field formatting, truncation, and rounding available in any combination in a single DIBOL statement. DIBOL also provides the system's I/O instructions, logical functions, and branching.

INSTRUCTION TIMINGS: Timings are given in *microseconds* for both CPU (machine-level) instructions and DIBOL operations on 15-digit operands.

	<u>CPU</u>	<u>DIBOL</u>
Load/store	1.4	100 average
Add/subtract	2.8	1,000
Multiply/divide	NA	2,000
Compare & branch	1.4	25-100*

*For 15 characters. The time can vary widely, since DIBOL permits the operation on fields 1 to 4096 characters in length.

INTERRUPTS: A single-line interrupt structure is provided. Software polls the interrupting device for its identification. Interrupts are handled by COS 310, and the programmer is not concerned with them.

PHYSICAL SPECIFICATIONS: Except for optional printers, the Datasystem 310 fits within a desk measuring 30 inches high, 48 inches wide, and 30 inches deep, and weighing 400 pounds. The Datasystem 308 is supplied in a small desk 27 inches high, 22 inches wide, and 30 inches deep. No special environment is required; the systems work in the normal office environment. The desks are mounted on casters, and the systems plug into a standard wall socket (single-phase, 3-wire grounded duplex, 110-120 volts AC, 60 Hertz). Power consumption is 1,000 watts for the DS310 and 685 watts for the DS308. The optional printers vary in size and weight, are not caster-mounted, and obtain power from the desk unit. The printers connect to the systems via short cables.

Power consumption, heat dissipation, and weights for various elements of the Datasystems are as follows:

<u>Unit</u>	<u>Power Consumption, Watts</u>	<u>Heat Dissipation, BTU/hr.</u>	<u>Weight, Pounds</u>
DS308	685	2360	—
DS310	1000	3400	400
RK05	160	2400	110
Dual RK05 (in cabinet)	220	4800	550
VT100	95	—	35
VT52	110	1000	44
RX02 (dual)	575	—	65 ➤

DEC Datasystem 308 and 310 Series

➤ at quantity-discount prices. Even more substantial discounts are available to OEM buyers, and about 100 of these are committed to making tailored and/or turnkey DS310-based business applications systems available to customers at negotiated prices.

USER REACTION

Datapro contacted eight Datasystem 310 users through both telephone interviews and mailed questionnaires. The eight users included both end users and OEM system builders, and had a total of 14 systems installed.

The systems surveyed had an average installed life of 10 months. The typical configuration included four floppy disk drives and an LA180 printer. The average memory size was about 16K words, but the systems ranged from the minimum 8K words to the maximum 32K words. Four of the eight users reported having the RK05 cartridge disk drives. One system included a 300-lpm line printer, and all but one were configured with DEC's 960-character VT50 CRT display.

The results of the user survey are tabulated below. The categories of application programs and ease of conversion have been omitted since DEC offers no applications software with the Datasystem 308 or 310 and none of the surveyed systems had replaced other equipment.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	7	1	0	0	3.9
Reliability of mainframe	6	2	0	0	3.8
Reliability of peripherals	2	5	0	1	3.0
Maintenance service:					
Responsiveness	6	1	1	0	3.6
Effectiveness	3	5	0	0	3.4
Technical support	1	2	2	0	2.8
Manufacturer's software:					
Operating system	6	1	1	0	3.6
Compilers and assemblers	5	1	1	0	3.6
Ease of programming	3	1	0	0	3.8
Overall satisfaction	5	3	0	0	3.6

*Weighted Average on a scale of 4.0 for Excellent.

It is evident from the results that these users are well satisfied with the Datasystem 310. Technical support received the lowest rating, but this is not uncommon with systems of this size and type in today's market, as evidenced by the average rating of 2.6 assigned by all of the 816 users who responded to Datapro's latest annual survey of users of minicomputers and small business computers (Report M07-100-401). Several users also mentioned problems with DEC's floppy disk subsystems for short periods following the installation of their systems, but all agreed that this is no longer the problem it once was.

On the positive side, these users gave high ratings to the system's ease of operation and the reliability of the CPU, and most of the users praised the COS-310 operating system and the DIBOL compiler. All of these users had written some of their own application programs and were confident of their ability to develop any others they might require. □

➤ INPUT/OUTPUT CONTROL

I/O CHANNELS: Six cycle-stealing channels on the Omnibus are used by the basic systems. Six more are available for expansion. The channels operate at rates in accordance with the I/O device speeds.

SIMULTANEOUS OPERATIONS: Full peripheral overlap is provided by the hardware and COS-310. The keyboard and serial printers are buffered; diskette access is overlapped with serial or line printer output; and COS-310 includes a standard line printer spooler.

CONFIGURATION RULES

DS308 systems are packaged. Minimum configuration is a CPU with 16K words of MOS memory, CRT, and two diskette drives. A second dual diskette unit can be added to the system.

The packaged DS310's minimum configuration is a CPU with 16K words of core memory, CRT, two diskettes, and keyboard; maximum system is a CPU with 32K words, CRT, four diskettes, keyboard, one printer, IBM 2780 emulation, and up to four RK05 cartridge disks for a total capacity of 6.4 million words or 12.8 million characters (DECbytes.)

The basic Datasystems have six Omnibus slots available for system expansion. Slot requirements for various expansion options are provided with the component descriptions in the Equipment Prices section of this report.

MASS STORAGE

DEC offers standard floppy disk subsystems for both the DS308 and DS310, and standard cartridge disk subsystems for the DS310.

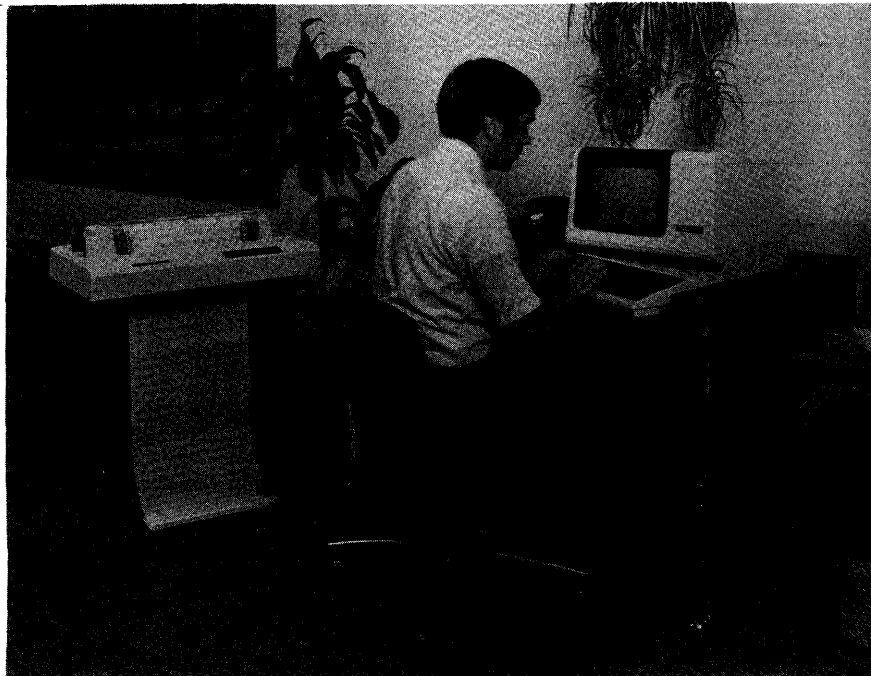
RX28 FLOPPY DISK: The recently announced RX28 (RX02) is a flexible disk drive with a per drive capacity of 128K 12-bit words in single density or 256K 12-bit words in double density. Up to two drives per controller and 8 controllers per processor can be configured. Average access time is 263 milliseconds. A track-to-track move takes at least 6 milliseconds. Rotational speed is 360 rpm, yielding an average rotational delay of 83 milliseconds. Data transfer rate is 62K 12-bit words per second. The surface of the diskette is divided into 77 tracks, each with 26 sectors. The RX28 floppy disk drive is manufactured by DEC. The floppy disks are standard (IBM-compatible) and are available from many sources.

RK8-J CARTRIDGE DISK SUBSYSTEM: Includes an RK05J cartridge disk drive with one removable IBM 5440-type cartridge and a controller for up to eight drives. The RK05J drive records data at 256 words per sector, 16 sectors per track, and 203 tracks per surface. Formatted capacity is 1.6 million 12-bit words. Average rotational delay is 20 milliseconds, and average head-positioning time is 50 milliseconds. Data transfer rate is 120K words per second. The RK05J cartridge disk drive can be intermixed with the RK05F double-density drive on the same controller. The RK05J disk drive is manufactured by DEC.

RK05F CARTRIDGE DISK DRIVE: A double-density version of the RK05J cartridge disk drive having 406 tracks per surface. It uses a nonremovable cartridge and has a capacity of 3.3 million words. The RK05F drive can be intermixed with the RK05J drives on the same controller. To the operating software, one RK05F appears as two logical RK05Js. The RK05F disk drive is manufactured by DEC.

In addition to the disk products offered by DEC, more than 15 manufacturers currently supply DEC-compatible disk drives. These units are either DEC-equivalent units or IBM 2315, 5440, or 3470 equivalents. A detailed summary of these ➤

DEC Datasystem 308 and 310 Series



This typical single-user Datasystem 310 configuration includes 16K words of core memory, four floppy disk drives, a VT100 terminal, and a 180-cps DEC-printer in addition to the basic DS310 system. The basic configuration is priced at \$13,800, and the monthly maintenance charge is \$99. System storage capacity can be expanded by adding up to four RK05 cartridge disk drives for a total on-line capacity of 12.8 million 6-bit characters. An IBM 2780 Emulation package, consisting of a synchronous controller and 2780 Emulator software, permits the system to function as a remote job entry terminal to an IBM host system.

► products is presented in Report M13-100-201, *Minicomputer Disk Storage*, and Report M13-100-251, *Minicomputer Floppy Disk Storage*.

INPUT/OUTPUT UNITS

See Peripherals/Terminals table on the third page of this report. Also, a number of vendors manufacture direct-replacement line printers for the PDP-8 series, as outlined in Report M13-100-401, *Minicomputer Printers*.

COMMUNICATIONS CONTROL

The Datasystem 310 can handle one communications line, with the speed of synchronous data transmission set by the modem used: 2000, 2400, or 4800 bits per second. The transmission code used is EBCDIC, and the line protocol is IBM 2780-compatible binary synchronous (BSC), full duplex. Leased or switched lines can be used, both with auto-answer. No switched control is available. The languages supported are DIBOL for program development and IBM 2780 remote job entry conventions. Another Datasystem 310, a Datasystem 320, 350, or 500, or an IBM System/360 or 370 computer can be interfaced. An IBM 2780 emulator software package is supported. Communications error control consists of a block check character with automatic retransmission upon detection of an error.

SOFTWARE

The Datasystem 308 and 310 are intended to function as stand-alone systems that permit entry-level users to generate applications programs through the DEC-developed DIBOL language (Digital Business-Oriented Language).

OPERATING SYSTEM: The operating system is *COS-310*, a modified version (not a proper subset) of CTS 300 for DEC's larger Datasystems. *COS-310* functions to make the CPU appear as "black box," control I/O operations, and handle the operator interface. It supports DIBOL. The operating system requires about 4K words of memory and resides, with numerous utility programs, on about one-third of a diskette.

COS-310 supports named I/O devices in the packaged systems. It supports batch and interactive processing as well as interactive program development. It manages direct access to diskette data through user file directories. It provides direct printing or spooling for an optional line printer, cursor control for the CRT, and a buffer for the keyboard. It allows programs to be chained. *COS-310* supports multiple-volume data files on diskette. The operating system also contains fixed-point decimal arithmetic routines.

The *COS-310 MONITOR* is split into a core-resident and a diskette-resident segment; it includes interactive job control and editor functions, and maintains a directory of all programs stored within the system. The *EDITOR* is an interactive, line-oriented program that also accepts input from the keyboard and accepts and stores batch-mode commands or control files for *SORT*, *BUILD*, or other programs. The *COS-310 MONITOR* and one or two key utilities occupy about one-fifth of a diskette. The remaining diskette space is available for compilation, etc.

LANGUAGE: *COS-310 DIBOL* is composed of data definition and procedure sections. It resides on a diskette and runs on a minimum Datasystem 308 or 310. It will support up to 28K words of user storage, which is the maximum storage capacity. Source code can be input from the console or from diskette, via job control statements. DEC quotes compile times for complex programs in the range of 10 to 20 seconds.

DIBOL object code, in executable form, resides on the system diskette and can be stored by name in the user's program library. DIBOL provides decimal arithmetic precision to 15 places, using one 6-bit "DECbyte" of memory to express each decimal digit. Further, the language offers program debugging from the console CRT, logical data files, program chaining, and an internal subroutine facility. Simple DIBOL commands are expressed in English statements, and can be classified according to type and function as follows:

Compiler commands—statement type defined.

Control commands—program execution sequence.

Data manipulation—calculations and data movement in main memory. ►

DEC Datasystem 308 and 310 Series

► Data specification—size, type, and position of data.

Debug facility—program step trace.

File control—data file open and close.

I/O control—data movement into and from memory.

DIBOL supports a six-bit ASCII character subset, and features data manipulation capabilities such as subscripting, array handling, rounding, truncating, and record overlaying. CALLs can be nested. There are useful utilities for DIBOL supported by COS-310.

DEC has extended the availability of DIBOL to the entire Datasystem line, including the PDP-11-based Datasystem 320's, 350's, and 500's. The version that is used with these other Datasystems is DIBOL-11, which is not truly compatible with COS-310 DIBOL. Hence, some reprogramming will be required in the event a user upgrades to a larger Datasystem.

UTILITIES: With the COS-310 SORT/Merge routine, the user can specify one to eight subfields in the sort key. The SORT utility also has a file merge capability. The system's editor is interactive, allowing various types of input. The BUILD utility creates data files from a data entry terminal. An UPDATE routine maintains master files.

The WPS-8 word processing software is a stand-alone program that allows users to write original reports, prepare contracts and other documents from stored paragraphs, and print personalized form letters. All system commands, some requiring only one keystroke, are executed immediately, according to DEC. The system includes command prompting and output queuing to a letter-quality or optional draft copy printer.

DDT (DIBOL Debugging Technique) is an optional run-time DIBOL debugging feature. It lets the programmer stop execution at a given statement to examine variables, using their DIBOL labels. It is interactive.

DAFT (Dump and Fix Technique) is a selective file maintenance/dumping utility written in DIBOL. It searches a data file on a specified key, makes minor changes to a data file, prints or displays records or parts of records, searches for a specified record, skips or backspaces a requested number of records, and places a specified number of copies of a record on an output file.

CREF (Cross Reference) provides an alphabetic listing of symbols used in a DIBOL program, and also gives the program line numbers.

PATCH is used to update programs. It contains a check sum feature to verify the validity of the changes.

PRINT is an output utility for the optional printer. Written in DIBOL, it provides page counts, page headings, and field headings, and its data positioning commands are defaulted. It accumulates field totals, generates breaks at specified levels, and optionally ejects pages with summaries at breaks.

Some computational routines are supported. PRINT is actually an output-oriented language that translates report parameters into a DIBOL program. If the DIBOL program is not exactly what the user wanted, he can modify it.

COMMUNICATIONS SOFTWARE: COS 310 supports an optional IBM 2780 Remote Data Communications emulator package for the DS310.

PRICING

POLICY: Datasystem 308's and 310's are available for purchase only; maintenance is separately priced. End-user

discounts are provided for volume purchases, as summarized below.

Number of Systems	Discount, percent
2-4	2
5-9	5
10-19	8

OEM volume discounts range from a minimum of 15 percent for a single system to 35 percent for quantities greater than 100. Hardware installation and software are included in the price. Leasing arrangements are available through DEC's joint venture with U.S. Leasing Corp. or through TEC Leasing Corp. of New York. Lease rates vary with the prime interest rate, the customer's volume of business with DEC, and the value of the equipment being leased.

Software maintenance is offered through several levels of optional service, ranging from a periodic software newsletter to automatic updates of software and manuals (software subscription service). In addition, software components, including documents and updates, can be purchased separately from Digital's Software Distribution Center.

The Digital Equipment Computer Users Society (DECUS) is a voluntary, non-profit users' group supported by DEC. DECUS provides an extensive program library, users' groups, special interest groups, and workshops/symposia. Technical symposia are sponsored twice a year in the United States and once a year in Europe, Canada, and Australia. In terms of documentation, the society has the responsibility of maintaining the DECUS program library and publishing a library catalog, the proceedings of symposia, and a periodic newsletter, *DECUSCOPE*.

Training credits are issued with the systems, allowing the customer to obtain free training in programming techniques and systems operation and applications. Each individual student week of instruction or fraction thereof requires one training credit. Training is offered in 17 DEC facilities found in Japan, Australia, Great Britain, Germany, France, The Netherlands, Sweden, Italy, Canada, and throughout the United States. At present, over 100 courses are offered. Digital also offers on-site instruction in both standard and customized courses and self-paced audio/visual (A/V) courses. A/V courses are presented through mixed media of audio/film-strip cartridges, video cassettes, and workbooks. DEC's Special Systems group offers training in both hardware and software areas on-site and in DEC training centers.

Field service is offered on several levels to meet varying customer needs. For customers with in-house troubleshooting and self-maintenance capabilities, DEC offers the off-site facilities of its Product Repair Center (PRC), with 17 locations throughout the world. Services provided by PRC include return-to-PRC agreements which cover all repairs (user performs troubleshooting) on a specific CPU, peripheral, or system for one year; exchange service providing teletypewriters, punches, and selected disk drive exchange at a flat rate; a fixed quote service, which provides a quote on equipment repair before any work is performed; and a loose piece module repair plan for modules and subassemblies. Under the repair plan, DEC estimates a typical turn-around repair time of 20 working days after receipt at the customer returns area (CRA). PRC also offers a module exchange service on a yearly contract basis, allowing a customer to replace a defective module within seven working days from the time it is received at the CRA. DEC supplies special mailers for both the loose piece module repair plan and the module exchange service. Also available for this class of customer is a customer spares program, which includes component and subassembly spares, engineer-designed spares kits, memory stack spares, maintenance test equipment, maintenance documentation service, and emergency parts service. ►

DEC Datasystem 308 and 310 Series

► On-site field service is offered worldwide through a network of 300 offices, 190 of which are located in North America. These offices provide both field service and spare parts inventory. Over 4000 service representatives are assigned to these offices.

Per Call On Site Service is offered to customers for whom downtime may not be critical and who have sufficient expertise to perform first-line maintenance, or as a supplementary program for standard service agreement customers if remedial maintenance is required outside their normal hours of coverage. Labor rate charges are portal-to-portal; parts and travel expenses are rated separately. Labor rates from 8 a.m. to 5 p.m. Monday through Friday are \$42 per hour; all other times, including Digital holidays, are priced at \$48 per hour. A two-hour minimum is in effect for per call service. Travel charges are based on a portal-to-portal rate of 16 cents per mile plus any commercial travel expenses incurred. Normal response for per call service is one to two days. If unanswered in three working days, per call requests are placed in the same category as standard service agreement or warranty customers.

The basic field service agreement includes remedial maintenance; preventive maintenance; an assigned service representative; all parts, material, and labor; engineering modifications; and documentation. Hours of coverage are 8

a.m. to 5 p.m. Monday through Friday. (Preventive maintenance time is extended by 3 hours to 8 p.m. on week-days.) Extensions are available to allow coverage up to 24 hours a day, 7 days a week.

The DECservice agreement is the same as the basic field service agreement except for these additions: response time of four hours or less if a call is made during coverage hours; continuous service until system level repairs are complete; and no extra charge for service continued after coverage hours.

EQUIPMENT: The packaged Datasystem 308's basic configuration consists of an LSI VT78 CPU with 16K words of MOS memory, dual floppy disk drive subsystem, CRT display/keyboard, mini-desk, COS-310 operating system, DIBOL compiler, and system utilities. Purchase price for this package is \$12,600, with monthly maintenance priced at \$68.

The Datasystem 310 is packaged in a full-sized desk. The basic configuration includes a PDP-8/A CPU with 16K words of core memory, dual RX02 floppy disks, and a VT100 terminal. It is purchase-priced at \$13,900, with a monthly maintenance charge of \$99. A Datasystem 310 with a 300-lpm line printer and 6.4-million-word cartridge disk subsystem in a separate cabinet is priced at \$38,700; monthly maintenance charges are \$297. ■

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.
SYSTEMS			
All Datasystem 308's include a VT78 video data processor with 1.5-microsecond MOS memory and automatic loader, RX02 (RX28) floppy disk subsystem, H978 mini-desk, COS-310 operating system, DIBOL compiler, and utilities.			
D308A-A	With 16K words of MOS memory; includes full software support; contains additional slots for addition of another dual disk unit and a printer	\$12,600	\$68
D308A-Y	Same as D308A-A except supplied with software license only.	10,600	68
All Datasystem 310's include a PDP-8/A CPU with 1.5-microsecond core memory and bootstrap loader, RX02 dual floppy disk subsystem, VT100 CRT display/keyboard, desk, COS-310 operating system, DIBOL compiler, and utilities.			
DS310-E	With 16K words of memory; includes full software support and additional slots for up to 32K words of memory, additional dual floppy disk subsystem, up to four RK05 cartridge disk drives (or one RK05 and two RK05J's), a printer, and 2780 communications	13,800	99
DS310-R	Same as DS310-E except includes RK05J and RK05F cartridge devices as additional storage, and software license only	21,800	218
MEMORY (DS310 only)			
MM8-A	8K words of core memory; requires 2 slots	1,750	10
MM8-B	16K core words of memory; requires 2 slots	2,500	15
MASS STORAGE			
DS3RX-B	RX02 Dual Floppy Disk Drive and Controller; 1 dual drive per controller, maximum 2 per system, requires 1 slot	4,510	33
Mass storage available for Datasystem 310 only:			
DS3RK-E	Cartridge Disk Drive and Controller; 1.6 million words, four RK05J or two RK05F drives maximum, requires 3 slots	9,180	49
RK05J-A	Cartridge Disk Drive for DS3RK-E above; 1.6 million words, maximum 4 per system	5,100	39
RK05F-A	Cartridge Disk Drive for DS3RK-E above; 3.2 million words, maximum 2 per system, includes cartridge	5,100	54
RK05K-08	Disk Cartridge for RK05J-A or RK05F-A	99	—
PRINTERS			
DS3D5	LA35 DECwriter II Printer and Controller; 64-character set, 30 cps, requires 1 slot; for DS310 only	2,960	30
LA78-PA	LA180 Printer and Controller; 96-character set, 180 cps, requires 1 slot; for DS308 only	3,300	50
LA8A	Same as LA78-PA, except for DS310 only	3,470	50
LE8-VA	Printer and Controller; 64-character set, 300 lpm, requires 1 slot; DS310 only	11,800	113
LQP78	Letter-Quality Printer; 96-character set, 45 cps, for DS308 only	3,995	47
LQP8	Same as LQP78, except for DS310 only	4,500	49
VTXX	LA36 or LA180 printer interface for local or remote printing	240	5
COMMUNICATIONS			
DS3CB	2780 Communications Package; includes DP8 synchronous interface, 2780 Emulator license and software installation; requires 3 slots	4,730	16
—	Same as DS3CB except without software installation	3,080	16
CABINETS AND HARDWARE			
H967	Cabinet; 50-inch, for third and fourth RK05 disk drives, includes power control	935	—