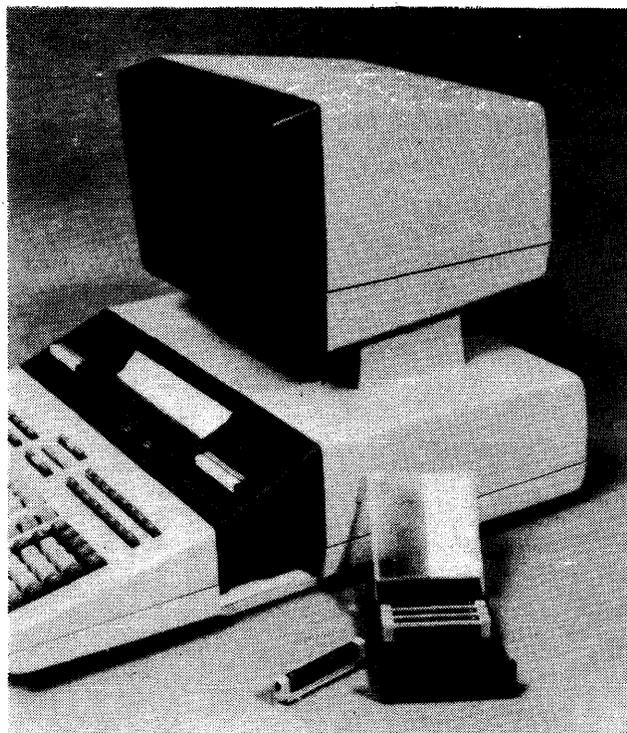# Hewlett-Packard System 45

Hewlett-Packard's System 45 allows the addition of up to 16 read-only memories (ROM's) that fit into two drawers found on the sides of the desk-top computer. One such ROM is shown in the lower center of the picture, and three more are in the storage case to the right. The modules are 0.4 x 3.8 x 1.1 inches and weigh 1.4 oz.

MANAGEMENT SUMMARY

The most powerful member of the HP 9800 family, the System 45 Desktop Computer has been designed specifically for use by scientists, designers, statisticians, engineers, and the business world. Like HP's other desktop computers, the System 45 features the company's enhanced version of the BASIC programming language. This version extends beyond the proposed ANSI standard minimal BASIC and includes array operations, debugging tools, sub-programs, multi-character variables and line identifiers, formatted outputs, and annotated documentation programs.

The System 45's BASIC language interpreter is implemented in firmware (ROM), making it unnecessary to load the interpreter each time it is needed. Hewlett-Packard also offers optional plug-in modules of ROM which extend the language and permit peripheral and instrument control.

The System 45 includes a 1920-character CRT, four input/output slots for interface cards, an integral 217K-byte tape cartridge drive, 56K to 449K bytes of memory, and drawers for 16 ROM modules as standard equipment. Optional equipment includes an 80-column thermal line printer, a second 217K-byte tape cartridge drive, graphics hardware, and memory to a maximum of 449K bytes. ▷

Hewlett-Packard's System 45 desk-top computers are offered in two models—the basic mainframe 9845B with 56K bytes of read/write memory, a 24-line CRT display, and a built-in 217K-byte tape cartridge drive; and the 9845T with 187K bytes of memory, CRT, and an optional second tape cartridge drive, graphics package, and integral thermal line printer. System 45 prices start at $12,500.

CHARACTERISTICS

MANUFACTURER: Hewlett-Packard, Technical Computer Group, Desktop Computer Division, 19447 Pruneridge Ave., Cupertino, CA 95014. Telephone (408) 725-8111.

Hewlett-Packard is one of the foremost manufacturers of sophisticated laboratory test equipment and specialized process control instrumentation. In addition to conventional laboratory equipment such as signal generators, oscilloscopes, and voltmeters, HP also manufactures more exotic instruments such as gas chromatographs, digital thermometers, network analyzers, and spectrum analyzers. Related products include both digital and analog graphic recorders, analytic instrumentation systems, and medical electronic instrumentation systems. Other Hewlett-Packard divisions manufacture hand-held and desk-top calculators, both programmable and nonprogrammable.

The Computer Groups organization includes the General Systems Division that is responsible for the HP 3000, HP 300, and HP 250 computer systems; the Computer Marketing Group that is responsible for the coordination and monitoring of sales efforts across HP's entire computer line; the technical computer group that includes the Desktop Computer Division that is responsible for the HP 9800 family, and the Data Systems Division responsible for the HP 1000 line; the Computer Peripheral Group that includes the Disc Memory Division, the Boise Division (tape drives), and the Vancouver Division (printing terminals); and the Data Terminals division that is responsible for the company's computer operations in Grenoble, France as well as terminal operations in the U.S.

Hewlett-Packard products are sold by 135 sales offices and serviced by 160 offices in 37 countries and are manufactured in facilities in the U.S., United Kingdom, Germany, France, Japan, and Malaysia. The company employs about 40,000 persons worldwide, with about 14,100 worldwide involved in computational products.

MODELS: HP 9845B and HP 9845T.

DATE ANNOUNCED: Original 9845 line-1977; Current models—April 1979.

DATE OF FIRST DELIVERY: July 1979.

NUMBER DELIVERED TO DATE: Not available.

DATA FORMATS

BASIC UNIT: 16-bit (2-byte) word. ▶

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▷ The alphanumeric keyboard features sixteen user-definable special-function keys. German, French, Spanish, Swedish/Finnish, or Katakana character sets (any one of the five) are also offered at no increase in price as a factory-installed option in lieu of the standard ASCII keyboard, which will be supplied if no special option is requested. The optional printer is also available with the same character sets.

The sixteen special-function keys can be used to represent thirty-two (using a shift key) single- or multiple-line functions, programs, or text (where text can be used as a typing aid). By defining keys with functions such as sine, cosine, square root, etc., users can save time and possible errors by not having to rekey these routines each time they are needed. Keyboard overlays are available to define the specific use for keys in individual applications.

The 9845 user has a wide selection of peripheral devices from which to choose, making it possible to customize a system to unique specifications. Users can select a card reader, printers, a plotter, a plotter/printer, a digitizer, a paper tape reader and a paper tape punch, a disk drive, and others. Special-purpose input/output interface cards make an even wider variety of peripherals usable on the 9845. Four interface cards can be inserted into slots in the rear of the mainframe, and as many as twelve interface cards can be attached by adding the I/O expander option. Utilizing the HP-IB interface, each interface card can accommodate up to fourteen HP-IB-compatible peripherals.

Another important option allows the user to augment BASIC's capabilities by adding ROM modules. Four such ROM's are presently available: an Input/Output ROM which provides an extension to BASIC for exchanging data and control information with external devices, a Mass Storage ROM to communicate with disk drives, an Advanced Programming ROM for matrix sort/search operations, and a Graphics ROM which provides the statements necessary to create graphic images on the CRT or peripheral plotters. Hewlett-Packard can be expected to make other ROM's available in the future.

Hewlett-Packard offers a wide variety of application packages for scientific, medical, engineering, mathematical, statistical, and business needs. All software is available on an unbundled basis from HP and includes the necessary reference manuals. There is also a BASIC Users' Club which serves as a clearing-house source for additional programs.

USER REACTION

Detailed below are the results of Datapro's interviews with ten users of the Hewlett-Packard 9845S, forerunner of the 9845T. The ten users had a total of 15 systems installed. Applications were varied and included machinery diagnosis and analysis, mechanical contracting estimating and inventory, preparation of overhead transparencies, explosives testing, flat-bed plotting, on-line processing of biomedical data, and as a tool for supplying an engineering shop with engineering and production data. More usual applications included scientific/engi- ▷

▶ INSTRUCTIONS: The System 45 is programmed by the entry of BASIC language instructions in a version enhanced by Hewlett-Packard. Actual machine-language instructions are firmware components of read-only memory (ROM) and are not alterable by the user.

INTERNAL CODE: ASCII.

MAIN STORAGE

TYPE: MOS/LSI integrated circuits.

CYCLE TIME: Not available.

CAPACITY: 56K bytes of read/write memory is expandable to 449K bytes. Up to 16 read-only memories (ROM's) can be inserted into two drawers on the sides of the base.

CENTRAL PROCESSOR

Read-only memory is utilized to store the operating system. Plug-in modules of ROM chips can be added to supply increased language and system flexibility. Provision is made for the addition of up to 16 ROM modules, and four are currently available: Graphics, Mass Storage, General I/O, and Advanced Programming.

CONTROL STORAGE: The operating system resides in 122K bytes of the system's read-only memory. Additional read-only memory is available in plug-in modules in 130K-byte increments.

REGISTERS: Coventional minicomputer rules on registers do not apply.

INDIRECT ADDRESSING: None.

INSTRUCTION REPERTOIRE: The System 45 uses an HP-enhanced version of BASIC which includes features and capabilities found in APL and FORTRAN and provides for matrix and string manipulations, error trapping, flexible tracing, mass storage operations, multicharacter variables, and subprogram capability.

INSTRUCTION TIMINGS: The following are representative timings only and are given in approximate milliseconds. The routines all use full 12-digit floating point data.

Add	0.27
Subtract	0.33
Multiply	0.89
Divide	2.90

INTERRUPTS: Available in software and optional interface cards.

PHYSICAL SPECIFICATIONS: The System 45 is 18.8 inches high, 18.8 inches wide, 26.4 inches deep and weighs 77.5 pounds with the optional graphics hardware and printer installed. Power is switch-selectable by rear panel switches at 110 or 220 VAC with a tolerance of +15% and -20%, and line frequency is from 48 to 66 Hertz. Operating temperatures can range from 41 to 104 degrees F.

CONFIGURATION RULES

Four I/O slots in the rear of the 9845 accept input/output interface cards. Up to twelve interface cards can be attached by using the 9878A I/O Expander, and, in conjunction with the HP-IB interface, each interface card can support up to fourteen HP-IB-compatible peripherals.

The 9845 is configured with 122K bytes of control storage, expandable through the use of optional plug-in ROM ▶

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PERIPHERALS/TERMINALS

DEVICE	DESCRIPTION & SPEED	MANUFACTURER
INTEGRAL WITH PROCESSOR		
Cartridge drive	217K-byte capacity, 1,440 bytes per second	HP
CRT	Display/keyboard (console), 1920 characters (24 lines by 80 characters), 128 ASCII character set (French, Spanish, German, Swedish/Finnish, or Katakana character sets optional), adjustable brightness, inverse video, blinking, underline	HP
- Printer (optional)	Thermal, 80 characters, 5 x 7 dot matrix, 480 lpm	HP
MAGNETIC TAPE EQUIPMENT		
9875A	Cartridge; single or double drive, 225K-byte capacity, 1,500 bytes per second	HP
PRINTERS		
9876A	Thermal line printer; graphics capability, ASCII character set, 80 positions, 480 lpm	HP
9871A	Serial printer; 96-character interchangeable disk, 132 positions, bidirectional, 30 cps	HP
CARD EQUIPMENT		
9869A	Reader; 40- or 80-column cards, punched or marked cards, 450-card hopper, 300 cpm	HP
PAPER TAPE EQUIPMENT		
9883A	Reader; 8-level, 1-inch paper/Mylar/plastic tape, 500 cps	HP
9884A	Punch; 5-, 6-, 7-, or 8-level; paper/Mylar/plastic tape, 75 cps	HP & Facit
PLOTTERS		
9872A	Digital plotter; 11 x 15.75 inches, four program-selectable pens, multicolor, 14 inches per second	HP
7245A	Plotter/printer; 7.4 x 11 inches, 10.1 inches per second, long-axis plotting to 16.4 feet	HP
DIGITIZER		
9874A	Tiltable glass platen, 15-character LED display, 16K bytes of read-only memory, rear projection of graphic images	HP

neering computing, real-time control, data communications, data base management, and business data processing.

The systems had been in use from a maximum of 17 months to a minimum of five months, with the average being 12 months. All systems had 62K bytes of memory, and six had on-line disk storage ranging from one million to 20 million bytes.

The ratings assigned by these ten users are shown in the table below.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	10	0	0	0	4.0
Reliability of mainframe	7	3	0	0	3.7
Reliability of peripherals	4	5	0	0	3.4
Maintenance service:					
Responsiveness	7	1	0	0	3.9
Effectiveness	6	2	0	0	3.8
Technical support	3	5	1	0	3.2
Manufacturer's software:					
Operating system	7	2	0	1	3.5
Compilers and assemblers	3	2	0	0	3.6
Applications programs	1	4	0	1	2.8
Ease of programming	9	1	0	0	3.9
Ease of conversion	1	2	1	1	2.6
Overall satisfaction	7	2	1	0	3.6

*Weighted Average on a scale of 4.0 for Excellent.

modules which individually fit into any one of 16 drawers on the sides of the chassis.

The integral CRT displays 24 lines of 80 characters each on its 12-inch screen. As a factory-installed option, the standard ASCII character set can be replaced by any one of the following at no increase in price: a French, Spanish, German, Swedish/Finnish, or Katakana character set. A tape cartridge drive which handles 217K-byte cartridges is built into the mainframe, and a second tape cartridge drive is optional equipment. The average transfer rate of the tape drives is 1,440 bytes per second.

MASS STORAGE

9885M/S FLEXIBLE DISK DRIVE: Provides 0.5 megabytes of disk storage on a single-platter flexible disk drive. The 9885M ("master") includes a built-in controller which handles data storage for the master and up to three additional "slave" drives (9885S), offering a total on-line capacity of two megabytes. The 9885S has no controller and must be connected to a 9885M. The required interface card and cable is included with the 9885M. There is a maximum of 65 user-available tracks per disk, 30 records per track, and 256 bytes per record. The total storage available to the user is 499,200 bytes per disk. The rotational speed is 360 rpm; average access time is 267 milliseconds; and data transfer rate is 23,000 bytes per second. The disks are removable. The Mass Storage ROM, which is required, uses about 1000 bytes of read/write memory for data buffer, bootstrap area, pointers, and status words. A write verify feature ensures that the information recorded on disk storage exactly matches the source information from the 9845's memory.

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▷ As can be seen from the above table, there was unanimous agreement on the ease of operating the 9845, and the ratings in most of the other eleven categories were also generally high.

When asked to comment on the principal strengths of their systems, six users mentioned the ease of programming, especially by non-computer personnel. The 9845 was also praised for its reliability, for its programmability, for being people-oriented, for its compactness, for its speed of access time, and for the speed of the graphics capability. One user called the system a "high-class, professional piece of equipment worth the price."

On the negative side, two users were unhappy with the software, saying that there were bugs and that the "canned" programs have too much superfluous information. Two other users said that the documentation of the technical (hardware) aspects and of programming the peripherals was inadequate. Individual comments included "Delivery times for new and replacement parts have not been good" and "cost of maintenance." A suggestion was made that the scanners be "broken up into smaller groups" for faster access. However, four users had no negative comments at all, and a fifth said that his problems had been "minor, but less than we would have had elsewhere."

In general, judging from the tenor of their comments, these users were highly pleased with their 9845's and had found the system very useful in an unusually wide range of diverse applications.□

▶ **7906 DISK UNIT:** Available in two models, the 7906M and 7906S. The 7906M includes a controller that supports the 7906S add-on drive. The 7906 has a capacity of 19,660,800 bytes stored on one fixed and one removable cartridge disk. The fixed disk has a single recording surface of 800 tracks and the cartridge disk has two surfaces with 400 tracks per surface. Data is stored on 48 256-byte sectors per track. Average seek time is 25 milliseconds, and average rotational delay is 8.3 milliseconds. The data transfer rate is 937.5K bytes per second.

7920 DISK UNIT: Available in two models: 7920M and 7920S. The 7920M includes a controller that supports the 7920S add-on drive. The 7920 has a capacity of 50,073,600 bytes stored on a removable disk pack. There are five recording surfaces with 815 tracks per surface and 48 256-byte sectors per track. Average seek time is 25 milliseconds, and average rotational delay is 8.3 milliseconds. The data transfer rate is 937.5K bytes per second.

7925 DISK UNIT: Available in a 7925M model that includes a controller and a 7925S add-on unit. The 7925 has a capacity of 120,176,640 bytes stored on a removable disk pack. There are nine recording surfaces with 815 tracks per surface and 64 256-byte sectors per track. Average seek time is 25 milliseconds, and average rotational delay is 11.1 milliseconds. The data transfer rate is 937.5K bytes per second.

INPUT/OUTPUT UNITS

See the Peripherals/Terminals table.

COMMUNICATIONS CONTROL

The 98036A Interface provides bit serial communications between the System 45 and asynchronous EIA RS-232C devices such as data terminals and modems. Data rates available are 75, 110, 150, 300, 600, 1200, 1800, 2400, 4800, and 9600 bits per second and are set by an externally accessible rotary switch. Under program control, the switch-selected data rate can be reduced to one half of its set value. Allowable data formats include 5, 6, 7, or 8 bits per character with 1, 1.5, or 2 stop bits and odd, even, or no parity. The physical interface can be either EIA RS-232C or 20 mA current loop. Receive-only capability for a 60 mA current loop is also possible.

The I/O ROM is required for buffered input operations and extended RS-232C control/status capability. Transmitter and receiver sections of the 98036A have separate one-character buffers whose status can be interrogated by the System 45. This interface can be programmed to interrupt when the input buffer is full or when the output buffer is empty. The interface will detect framing errors (invalid stop bit), parity errors, and overrun errors, all of which are indicated by a status word.

SOFTWARE

OPERATING SYSTEM: All executive and input/output operations are controlled by firmware-implemented software. The operating system reserves 122K bytes of the system's read-only memory.

PROGRAMMING LANGUAGE: Hewlett-Packard's enhanced version of BASIC is utilized on the System 45. Any ANSI standard BASIC program can be run on the System 45. Automatic syntax checking and error diagnostics are included.

Optional ROM chips or modules can be inserted into two special drawers on the side of the mainframe, enhancing the system by providing additional capability. Four such ROM's are currently available.

● **GRAPHICS ROM**—Provides the necessary statements to create graphic images on the CRT or peripheral plotters. The Graphics ROM is required for use with the optional graphics hardware. With the Graphics ROM, the System 45 can interface to the external, four-color 9872A Plotter or to incremental plotters by accessing the same BASIC language program used with the internal CRT.

● **MASS STORAGE ROM**—Provides drivers to communicate with the 9885M/S Flexible Disk Drive. The BASIC language commands for this storage medium are resident in the System 45, and the same commands are used which are used for the tape cartridge.

● **INPUT/OUTPUT ROM**—Provides an extension to the BASIC language of the System 45 for exchanging data and control information with external devices. Exchange of data can be performed automatically in one of four modes: asynchronous handshake, vectored interrupt, fast handshake, or DMA (Direct Memory Access). Additional language statements provide for extensive bit manipulation and full control of the HP-IB Interface Bus.

● **ADVANCED PROGRAMMING (AP) ROM**—Provides additional BASIC statements to improve the data handling capabilities of the System 45. Matrix data manipulations and upper and lower case transformations include storing array data in ascending, descending, or alphabetical sequence; rearranging an array in physical order corresponding to a sorted order; transforming ▶

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uppercase characters to their lowercase equivalents and vice versa.

APPLICATIONS SOFTWARE: Specialized applications programs are available in a number of statistical, mathematical, engineering, and business areas. These include a Utility Library, Basic Statistics and Data Manipulation, Regression Analysis Methods, Statistical Graphics, Non-linear Regression, Numerical Analysis, Waveform Analysis, Clinical Laboratory Library (includes three major programs), Structural Engineering, Linear Programming, Graphics Presentations, Forecasting and Graphics, Text Processing, Project Management, Payroll, Inventory, and List Management. Additional programs are available through HP's BASIC Users' Club. All Hewlett-Packard software for the System 45 is available on an unbundled basis.

PRICING

POLICY: Hewlett-Packard offers the System 45 for purchase or on a rental or lease arrangement with terms ranging from three months to seven years. Specific rental and leasing information is available on request from local HP sales offices.

SUPPORT: All HP System 45's are covered under a 90-day parts and labor warranty. Maintenance, training, and other services are available on an individual-contract basis.■

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*
SYSTEMS			
9845B	Desk-top computer; includes mainframe with 56,266 bytes of read/write memory, 24-line CRT display, and 217K-byte tape cartridge drive	$12,500	$ 65
9845T	System 45; includes 187,146 bytes of read/write memory (Opt. 204), graphics package (Opts. 311 and 700), second tape cartridge drive (Opt. 600), and integral thermal line printer (Opt. 560 or equivalent). Keyboard and line printer options (no extra charge) must be specified.	22,500	115
FACTORY-INSTALLED OPTIONS			
Opt. 204	Read/write memory, 187,146 total bytes (9845B)	5,800	17
Opt. 205	Read/write memory, 318,026 total bytes (9845B)	11,600	34
Opt. 206	Read/write memory, 448,906 total bytes (9845B)	17,400	51
Opt. 215	Read/write memory, 318,026 total bytes (9845T)	5,800	17
Opt. 216	Read/write memory, 448,906 total bytes (9845T)	11,600	34
Opt. 311	Graphics ROM (9845B only)	500	1
Opt. 312	I/O ROM	750	2
Opt. 313	Mass Storage ROM	500	1
Opt. 314	Advanced Programming ROM	500	1
Opt. 560	Integral thermal line printer with standard ASCII character set and 8.5-inch-wide paper	3,000	16
Opt. 561	Same as 560 with 210-mm-wide paper	3,000	16
Opt. 540	Same as 560 with Katakana character set	3,000	16
Opt. 541	Same as 540 with 210-mm-wide paper	3,000	16
Opt. 600	Second tape cartridge drive, 217K bytes (9845B only)	900	8
Opt. 700	Graphics display subsystem (Opt. 311 required) (9845B only)	1,900	8
Opt. 810	French character set	NC	NC
Opt. 820	Spanish character set	NC	NC
Opt. 830	German character set	NC	NC
Opt. 840	Katakana character set	NC	NC
Opt. 850	Swedish/Finnish character set	NC	NC
FIELD-INSTALLABLE OPTIONS			
98425A	Read/write incremental memory, 130,880 total bytes	5,900	17
98426A	Read/write incremental memory, 261,760 total bytes	11,800	34
98427A	Read/write incremental memory, 392,640 total bytes	17,700	51
98456A	Integral thermal line printer with standard ASCII or European character set and 8.5-inch-wide paper	3,100	16
98456A-561	Same as 98456A with 210-mm-wide paper	3,100	16
98454A	Integral thermal line printer with Katakana character set and 8.5-inch-wide paper	3,100	16
98454A-541	Same as 98454A with 210-mm-wide paper	3,100	16
98460A	Second tape cartridge drive, 217K bytes (9845B only)	1,000	8
98470A	Graphics display subsystem (98411A required)	2,000	8
98411A	Graphics ROM (9845B only)	500	1
98412A	I/O ROM	750	2
98413A	Mass storage ROM	500	1
98414A	Advanced Programming ROM	500	2
MASS STORAGE			
7906M-100	Cartridge disk drive (master, 20 million bytes)	14,800	82
7920M-100	Cartridge disk drive (master, 50 million bytes)	17,800	81
7925M-100	Cartridge disk drive (master, 120 million bytes)	21,800	89
9885M-045	Flexible disk drive, with interface card and cable (master)	3,750	28
9885S	Flexible disk drive (slave)	2,500	18

*Basic monthly maintenance charges are for zone 1 (0-100 mile radius).

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EQUIPMENT PRICES

PERIPHERALS

		Purchase Price	Monthly Maint.*
9876A-045	Thermal line printer; 480 lpm, 80 positions, with interface card and cable	3,750	18
9876A-035	Thermal graphics printer (HP-IB; requires 98034A)	3,500	21
9871A-045	Serial impact printer; 30 cps, with interface card and cable	3,800	28
9871A-001	Serial impact printer (HP-IB; requires 98034A), 30 cps	3,600	26
2631A-845	Serial impact printer; 180 cps (HP-IB)	3,200	31
2631G-845	Serial impact printer; graphics (HP-IB)	4,250	34
2608A-845	Dot matrix line printer (HP-IB)	9,750	62
9872A-045	Four-color plotter (HP-IB; 98034A required)	4,750	30
7245A-045	Printer/plotter (HP-IB; requires 98034A)	4,600	30
9874A-045	Digitizer (HP-IB)	6,200	26
9875A-045	Cartridge tape drive, double or single, 225K bytes	2,600	7
9878A-045	I/O expander, with interface card and cable	1,200	5
9869A-045	Optical card reader, 40- or 80-column cards	4,275	40
9883A-045	Paper tape reader, with interface card and cable	2,710	20
9884A-045	Paper tape punch, with interface card and cable	3,280	51

SPECIAL PURPOSE INTERFACE CARDS

98032A-445	16-bit parallel interface	400	2
98033A-445	BCD input interface	400	2
98034A-445	HP-IB interface	400	2
98035A-045	Real-time clock interface	600	3
98036A-445	RS-232C bit serial interface	600	3
98040A-445	Incremental plotter interface	600	2
98041A	Disk interface I/O	2,100	7

*Basic monthly maintenance charges are for zone 1 (0-100 mile radius).

SOFTWARE PRICES

		Purchase Price
09845-15100	Basic Statistics and Data Manipulation; Provides comprehensive summary statistics as well as routines for entering, editing, naming, recoding, sorting, storing, transforming, and listing data for statistical analysis by other programs.	$ 200
09845-15110	Regression Analysis Methods; Performs multiple linear regression; variable selection methods using stepwise, forward, backward or manual procedures; polynomial regression analysis; and residual analysis. Includes Basic Statistics and Data Manipulation.	500
09845-15120	Statistical Graphics; Contains nine routines for plotting statistical data; time plot, histogram, probability plots, x-y scatter plot, semi-log plot, log-log plot, xyz plot, and Andrews plot; contains Basic Statistics and Data Manipulation.	500
09845-15130	General Statistics; Contains parametric and nonparametric tests for single sample, paired sample, two independent sample, and multiple sample data; has statistical distributions which eliminate need for tables; contains Basic Statistics and Data Manipulation.	500
09845-15140	Nonlinear Regression; Uses Marquardt's Method to fit nonlinear models using up to ten parameters and allows residual analysis; includes Basic Statistics and Data Manipulation.	500
09845-15160	Monte Carlo Simulations Utilities; Includes advanced random number generators, random deviate generators for various statistical distributions, and a series of tests which aid in the evaluation of simulation studies.	500
09845-15170	Analysis of Variance; A collection of routines for the analysis of statistically designed experiments. Includes procedures for factorial (up to 4 factors), nested, split-plot, one-way, two-way unbalanced, and one-way covariate designs as well as routines for generating contrasts, orthogonal polynomials, multiple comparisons and interaction plots; contains Basic Statistics and Data Manipulation.	500
09845-10350	Numerical Analysis Library; Contains seven main sections: rootfinders, numerical integration, O.D.E. solvers, Eigen analysis, interpolation, general functions and Fourier analysis.	500
09845-12600	Waveform Analysis; Provides discrete mathematical representation of data via Fourier-transform and associated algorithms such as convolution and correlation; outputs may be displayed, printed, or plotted.	500
09845-12610	Digital Simulation; Provides gate-level simulation of digital logic networks. Allows for timing and logic analysis with output in either tabular or graphical form.	750
09845-12620	A-C Circuit Analysis; Calculates the frequency response of linear circuits, magnitude, phase, time, and impedance including the effects of component tolerances.	500
		-
09845-12750	Continuous Frame Analysis; Analyzes a continuous beam or single-level frame with variable or constant sections for concentrated, partial uniform, or combination loadings.	450
09845-12760	Beam Span Analysis; Calculates shears, moments, and deflections at specified points for any constant or variable-section beam span.	250
09845-12770	Multi-Story Frame Analysis; Analyzes a planar, multi-story rigid frame for concentrated dead and live loads or uniformly distributed loads.	700
09845-12780	General Frame Analysis; Analyzes a planar frame of any configuration with variable or prismatic sections for member loads, joint loads, and axial displacements.	700
09845-12790	Truss Anaysis; Analyzes statistically determinate or indeterminate trusses of any configuration.	600
09845-12810	Reinforced Concrete Beam Design; Designs reinforced concrete beams of variable depth and width using the working stress or ultimate strength method, according to ACI code.	350
09845-12820	Reinforced Concrete Column Design; Designs any rectangular, square, or circular (tied or spiral) reinforced column according to ACI code.	350
09845-12830	Flat Slab Analysis and Design; Analyzes and designs flat slab systems including flat plates, slabs, and waffle slabs according to ACI code.	500

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SOFTWARE PRICES

		Purchase Price
09845-12840	Steel Beam Design; Designs braced or unbraced steel beams according to AISC specifications. Sections are checked or selected from W6 through W36 sections, S-shapes, and channel sections.	250
09845-12850	Steel Column Design; Designs steel columns under biaxial bending according to AISC specifications, including base plate design.	300
09845-12860	Composite Steel Beam Design; Designs composite, simple span steel, and concrete beams according to AISC and ACI specifications.	250
09845-12870	Pre-Stressed Concrete Beam Analysis and Design; For simple span beams, considers uniform and concentrated loads for any shape cross-section for a given pre-stress force (ACI code).	600
09845-12880	Dynamic Load Analysis; Determines natural frequencies, characteristic mode shapes, and modal participation factors for a multi-degree elastic system with lumped masses.	400
09845-12890	Footing Design; Designs a footing support for a single column subjected to an axial load with biaxial bending.	500
09845-12900	Section Properties; Determines properties of irregularly shaped sections composed of area or line elements. Cracked section and "effective" moment of inertias are determined for reinforced concrete members.	150
09845-12910	Job Cost Accounting; Provides work-in-progress reporting of labor, direct expenses, and burden charges, including both job and periodic cost reporting.	2,000
09845-10540	Graphic Presentations; Produces bar charts, line charts, pie charts. Featuring 4 character fonts, the pack can also create 7-color overhead slides.	750
09845-10600	Linear Programming; Stores problems, allows modification; gives solutions and prints sensitivity analysis.	500
09845-10610	Forecasting; Allows time series data to be analyzed, smoothed, forecast, and plotted using a variety of statistical techniques.	500
09845-10620	Text Management; Combines features of text editing with character-editing capabilities of a word processor, including assembly/merge, hyphenation, search/replace, and many others.	500
09845-10630	List Management; Produces mailing labels and manages a file of names. Performs sorting, sublisting, editing and other listing needs.	500
09845-10850	Payroll; Performs all payroll processing and produces checks and management reports.	500
09845-10860	Inventory; Handles finished goods inventory, provides interactive parts inquiry on the CRT display, and produces printed management reports such as turnover and reorder reports.	500
09845-11100	Project Management; Analyzes project networks using CPM, PERT, and MPM techniques, and includes GANTT chart output.	500
09845-14350	Clinical Laboratory Library; Contains 3 major programs; Radioimmunoassay (RIA), Quality Control Statistics, and Blood Gas Analysis. RIA program provides weighted and un-weighted Logit-Log, Spline Approximation and Four Parameter Logistic curve fits. Quality Control Statistics program provides basic and correlation statistics, Levey-Jennings Plots, Youden Plots and Scattergram. Blood Gas program provides acid-base data, acidosis correction, and P50 calculation.	500
09845-10050	Graphics Utilities (2D); Contains 50 subprograms for figure construction and manipulation including data base set-up and initialization routines.	500
09845-10110	Computer Games Library; Various computer games are provided to allow the user to become familiar with the System 45B; provides input and output examples.	100
09845-10130	HPL to 9845B BASIC Translator; Provides aid in transferring programs written in HPL language (9825 Desktop Computer) to BASIC language programs for System 45B Desktop Computer. Translates 85-90% of HPL statements into BASIC. Provides a means of reading 9825 cartridges in System 45B.	500
09845-10140	Asynchronous Terminal Emulator; Provides asynchronous terminal capability for the 9845B. Line mode and character mode terminal emulation are included. Includes utility programs useful for writing custom emulators. Allows access to mass storage devices via escape code sequences. Provides compatibility mode which permits plotting data intended for graphics terminals with 1,024 x 780 displayable points.	500
09845-10150	Utilities II Library; Contains programs for documentation, internal thermal line printer enhancements, mass storage management programs, base conversion routines, I/O card status subprograms, real time clock subprograms, and a menu selection subroutine.	500
09845-10160	Terminal Manager; Allows data entry from terminals. Contains a driver which may be expanded with new commands, and a multiple terminal text editor. Will manage up to 7 terminals.	500
09845-10170	Forms Utility; Provides the ability to create a form image on the CRT. Allows the user to display data on the form.	500
09845-10200	Utility Library; Contains six main sections: graphics, finance, statistics, numerical analysis, sorts, and information management; each section consists of several related programs and/or subroutines. This pack is shipped free of charge with each 9845B mainframe.	500