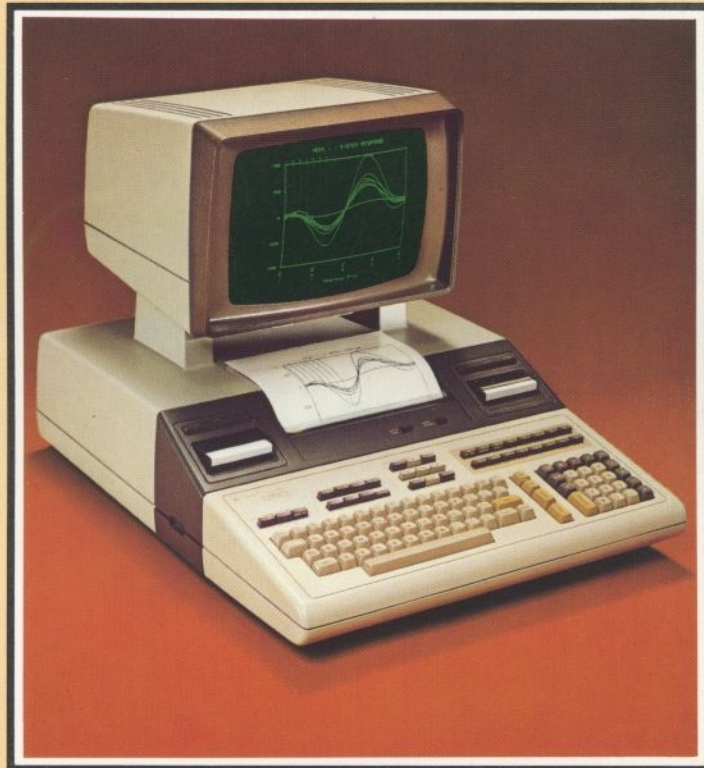


Series 9800 Desktop Computers

System 45B

A complete, computing solution



HEWLETT  PACKARD

System 45B

A friendly and powerful problem-solving system... ...sitting on your desk.

The System is the solution. The new Hewlett-Packard System 45B represents the most advanced class of Desktop Computers available today. Its unique, integrated system architecture combines all the necessary ingredients of computing power and versatility:

- operating system
- graphical display device
- input device
- large user memory
- complete I/O capability
- mass storage capability

into a neat, single-unit package.

The System 45B puts interactive computing where it belongs: at your desk or work station. With it, you can solve a problem, check the result, perform side computations, re-iterate the problem until you get the best result and then print a hard copy of the solution.

But the System 45B doesn't stop there.

With the appropriate HP-created software, it goes on to format your data tables, prepare text and generate charts or graphs. You can do all this and more, without complicated programming or combinations of expensive, specialized equipment.

Bring power to your problem-solving. Power in computing devices can mean many things. It can be a programming language that handles complex operations with fewer statements. It can mean a large memory capable of manipulating lengthy or involved routines. Or, it can simply mean raw speed.

The System 45B puts its power where the problems are.

The System 45B's enhanced BASIC language provides a conversational style of problem-solving. Easy-to-learn, literal commands and syntax coupled with familiar algebraic operators and expressions make HP enhanced BASIC programming very straight forward.

Yet with all its simplicity, the experienced programmer will find HP enhanced BASIC a very capable language. With it, you can invoke many of the powerful features found in languages such as FORTRAN and APL to streamline high-order math calculations and other complex data manipulations. With HP enhanced BASIC's extensive matrix and array functions, you can perform, with a single instruction, operations that would otherwise require many program lines. These features not only save memory, but significantly reduce coding, debugging and processing time.

The System 45B's memory is an expandable problem-solver:

- Operating System . . . 120 000 bytes (in ROM)
- Read/Write Memory . 56 000 bytes (standard) expandable to 449 000 bytes
- Optional Read Only Memory up to 720 000 bytes

Since the System 45B's operating system resides in its own ROM, the entire Read/Write memory (56 000 to 449 000 bytes) is available for programs and data.

Overlapped Processing: data in, results out — fast.

It isn't always computation that hangs a computer up; it's the reading and writing that slows it down. To open up this bottleneck, we designed a unique dual processor system into the System 45B. These two processor units, a peripheral processor and language processor, speed up through-put by overlapping functions. That means the system rarely has to wait for the completion of a slower I/O operation before executing a computation function.

Add to all this the powerful graphics capability of the System 45B — plotting, digitizing, charts, graphs, histograms, window plotting and more — and you get a complete computing solution.

What is a "friendly" computer?

It's one that is easy to use. One that is designed with you in mind — it's human engineered.

It's a complete computer system in one unit, small enough to sit on your desk, where the problems are. It puts you in charge of solving those problems, your way. No waiting, no time charges, no standing in line at a terminal.

It's ready to start solving your problems as soon as you turn it on. It has no complicated start-up procedures. No operating system to load. No compiling to do. And it lets you interact with every step of the problem solving process.

Friendly also means a programming language that's easy to learn. And an operating system that can point out typographical errors as soon as you make them so you can correct them easily and immediately. It can talk to you in meaningful phrases. It can indicate why a program didn't work. Then it helps you locate the problem.

In short, it is a computer system you can work with.

Integration
The computer
power
management



1000-0041
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Integration: The combination of computing power and peripherals.

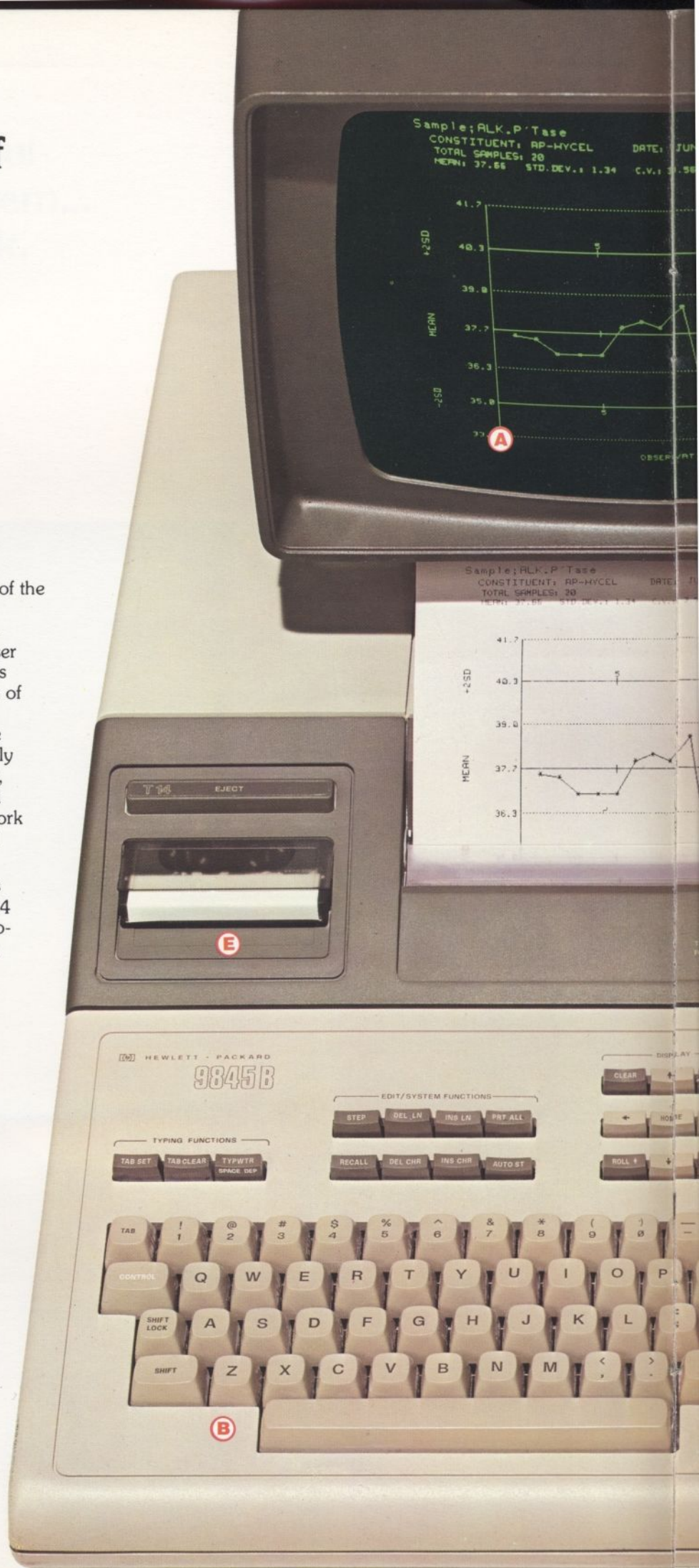
Putting the pieces together. The strength of the System 45B lies in its integration of a powerful computing device, a CRT, a line printer, a keyboard, dual tape cartridge drives and a large user memory into a single, manageable unit. But this integration is much more than the compression of power, features and graphics capability into a small package. It is the coordination of all these system elements plus special function Read Only Memories (ROMs), enhanced BASIC language, application software, high performance I/O and modular design. It must all come together to work toward a single purpose — the convenient and quick solutions to your problems.

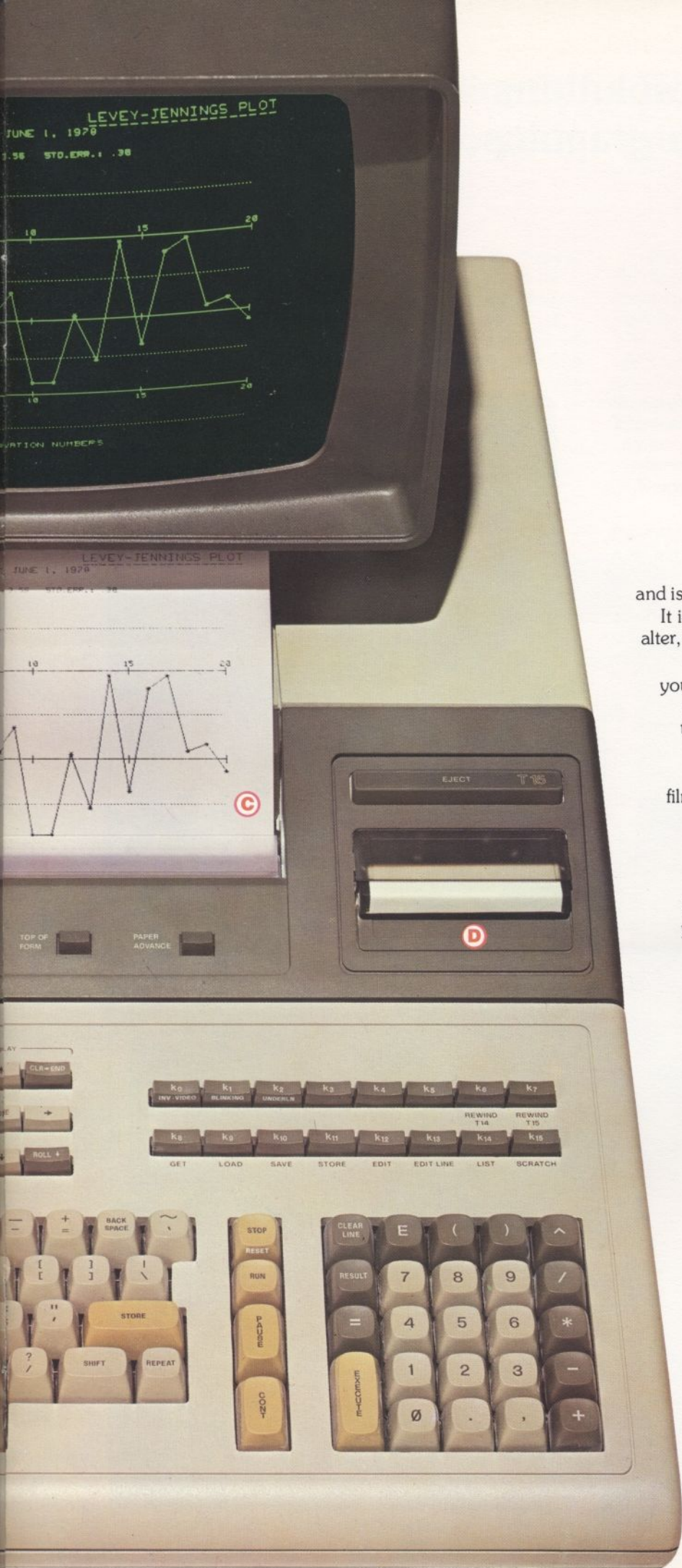
See what you're doing. The System 45B's 12-inch CRT produces an 80-character wide, 24 line display (A) that shows you data listings, program segments or graphics images as the work is being performed.

It is a "dual raster scan" device. "Raster scan" means the green phosphor CRT image is refreshed 60 times every second rather than being stored on the tube. This allows you to move a cursor (up, down, right and left), scroll through text and program listings or edit/correct data as you put it in. "Dual" means that the CRT can operate in two modes: the standard alphanumeric mode or an optional graphics mode. High speed listing, upper and lower case characters, inverse video, blinking and underlining are also additional System 45B CRT features.

Input your data on a "typewriter." The keyboard (B) of the System 45B features the full 128-character ASCII set, color-coded and configured like a standard office typewriter. In fact, the keys are staircased like an electric typewriter and require the same keystroke force and movement. Alternate character sets for German, French, Spanish, Japanese and Swedish/Finnish are available.

The keyboard provides alphanumeric, control, editing, and Special Function keys





and is used to enter data or programs into the system.

It interacts directly with the CRT and allows you to alter, add-to or manipulate the displayed information.

Capture displays in hard copy form. When you need hard copy printout of your work, there is no need to hand copy a plot or list of data from the CRT. The System 45B's built-in thermal line printer (C) can output it on command.

The printer, a product of HP's advanced thin-film technology, is quiet, prints up to 480 lines per minute and can generate special or customized symbols and logos.

An important feature of this printer is the ability to copy formatted information or graphics directly from the CRT. In the graphics mode, you simply type DUMP GRAPHICS on the keyboard and the CRT image is transferred to the printer. The printer precisely reproduces the display on the CRT with a resolution that is unprecedented in a CRT/printer combination.

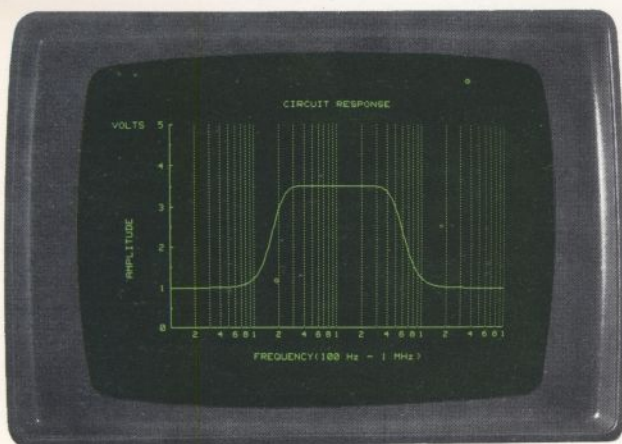
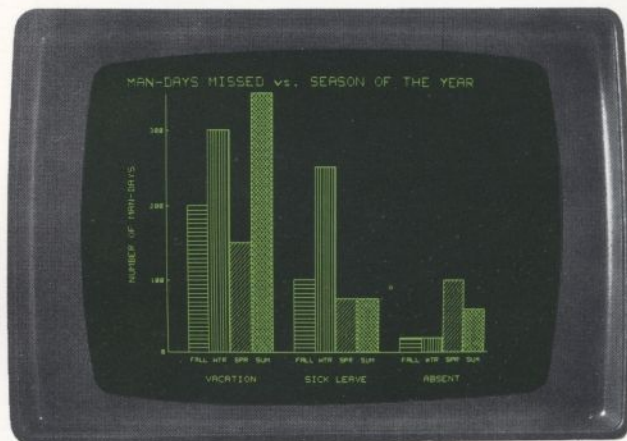
You can keep it on tape. The two tape drives built into the System 45B mainframe (one is standard (D), the second is optional) provide an easy-to-use storage capability of 217K bytes (or about 847 physical records) per tape cartridge. You can use both tapes for data and programs. The optional second tape drive (E) also permits tape copying and data back-up or overlap operations.

Should your requirements exceed the capability of this built-in storage provision, the System 45B is designed to accommodate a wide selection of mass storage devices such as flexible disk (floppy) and hard disc (cartridge) units. By changing a single BASIC program statement, the data and programs that worked with a tape cartridge can also be used with large capacity disc memory units. That means if your data base gets too big for a tape, you can graduate to a larger medium without re-writing all your software.

Communicate your solutions more effectively with graphics.

A picture is worth... When it comes to quickly visualizing computer results or arranging data into a meaningful form, one picture is worth a thousand pages of printout. Interactive computer graphics is an accepted, scientific method of representing data so that trends or general shapes can be quickly recognized.

By adding the optional Graphics ROM and hardware to your System 45B, you'll no longer have to settle for a pile of tabular data that is difficult to assemble or assimilate. This powerful graphics system can give you high-resolution "soft" plots and drawings for "quick look" results, dump CRT images to the built-in printer and generate engineering quality plots (using our HP 9872A Four-Color Plotter) without additional formatting.



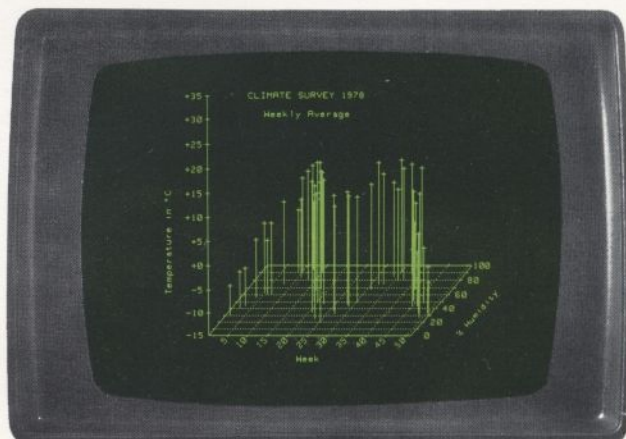
them at your fingertips and at a fraction of the cost of large computer systems.

Speaking the language. The System 45B graphics option provides a versatile, interactive HP graphics language that not only controls the CRT but works with the internal line printer and other external graphics devices as well. Within the language there are single statements for instructions like PLOT, SCALE, LABEL AXIS plus 29 other precise functions. These powerful BASIC statements make it easy to define your problem; scale, draw and label axes and grids; then execute X-Y incremental or relative plots.

Graphic versatility. System 45B graphics can create visual representations of your data such as contour plots, histograms, pie-charts, and diagrams. Its programmable digitizing lets you transfer cursor locations on your image to X-Y data within your program — to set limits on a plot for integral calculations, for example.

With the System 45B's window plotting feature, you can frame a specific area within a plot or diagram, then expand it for a closer analysis. To selectively change or erase data from your graph, drawing or plot just move the graphics cursor to that specific point and make the correction. You don't have to erase the whole screen and re-plot.

Until now, you had to pay a premium in cost or programming time for these capabilities. The System 45B puts



System 45B Applications Software offers shortcuts to your results.

To help you fully utilize the capabilities of the System 45B and put it to work in your department, HP has developed a comprehensive, applications-oriented software library. Designed to get your system up-and-running as quickly and trouble-free as possible, these software packs provide program tapes and Special Function key overlays. Depending on your application, this software can provide either total solutions or convenient building blocks for developing your own specialized programs.

The System 45B software library offers software support in many general areas including: Statistical and Numerical Analysis, Engineering Design, Medical, Business Management and Structural Engineering. Each System 45B comes with a free Utility Library package containing often used operations such as root finders, graphics, numerical integration, basic statistics, linear equations, and sorting routines.



Transform statistics and numerical analysis problems into answers ...right at your desk.

Whatever your discipline, Numerical Analysis and Statistical Methods probably play an important role in your work and the System 45B can make that work easier. Whether you have a simple statistical problem or more complex jobs such as analysis of variance or multiple linear regression, the System 45B and its Statistical and Numerical Analysis Software can offer quick and convenient solutions.

While working toward a regression solution, for example, the System 45B allows you to try various alternatives to find a "best fit" situation. This means you can take the time to investigate other approaches to the problem, choose the optimum curve fit, then plot residuals to evaluate your results.

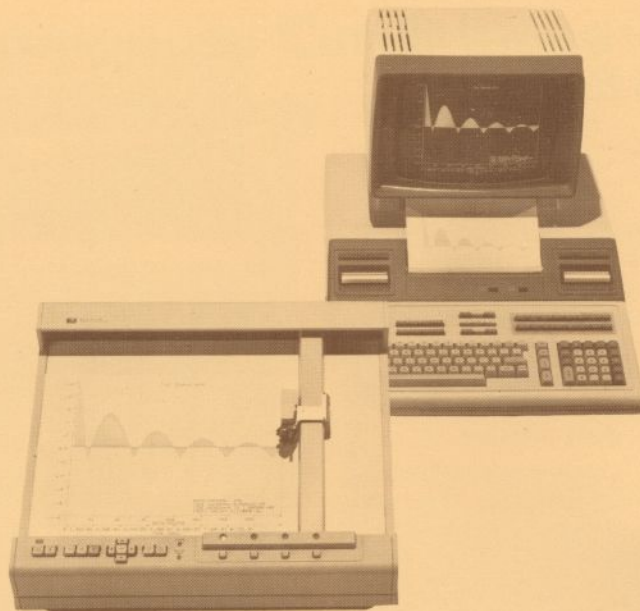
The System 45B Statistical and Numerical Analysis software library consists of several major program packs that are designed to cover specific, yet broad, application areas. As an added feature, the Basic Statistics and Data Manipulation pack is included in all other System 45B statistics packs (Regression Analysis, Analysis of Variance, etc.) and provides a common data base. With this program

pack you can enter your data once and it can be analyzed using any of the other programs in the System 45B statistics library. You don't have to learn new data entry techniques when switching from one program to another.

Another requirement for quick and convenient solutions to statistics problems is sufficient storage capacity for data, observations and variables. Each System 45B tape cartridge is capable of storing as many as 30 data sets, each of which consist of 100 observations on each of 10 variables. That's roughly equivalent to 3 000 (80 column) punched cards. When your problems demand mass storage capability, you can easily connect an HP Flexible Disk Drive for medium sized data bases. Or you can add a fixed disc for large data bases and even faster access times.

The System 45B's unified mass storage command structure provides another very useful feature: the file-by-name directory. It is this capability that allows you to give files a meaningful title for quick, easy identification. And the system determines where files fit on the storage medium — automatically.





Put computer power into your engineering design process.

A powerful System 45B strategically located in your work area places a computer aided design system directly under your control. From program development to final documentation, this integrated system provides all the elements you need — right at your fingertips. And it eliminates waiting for Data Processing to run your jobs and the delays and costs inherent in most time-sharing systems.

With the System 45B and its Engineering Design Software you can determine a design's results on-the-spot. For example, an Electrical Engineer might use an analysis program to determine what effect component tolerances would have on a given filter network. The System 45B can compute and plot response curves for all component values that are input. This gives you the advantage of predicting a design's yield and margins before you build the hardware prototype.

As you develop your program around an algorithm or math model, you will find the System 45B's CRT and editing keys very helpful. With them you can make changes or corrections even as the program is running. Should the results of an analysis prove unsatisfactory, you can easily input new values for the variables and re-run the analysis immediately. This can be done over and over until you achieve the best result or just to check the model's response to a given set of variables.

Whether your engineering application is in the life sciences, acoustics, bio-engineering, communications, computer networks, mechanics, electronics, vibration analysis or image processing, the System 45B can provide you with a powerful computing tool designed by people who have researched your needs.

Business management software for better decisions and tighter control.

If you are like most scientists and engineers, you've probably found yourself increasingly concerned with planning, management and business administration duties. The System 45B can improve your performance in these areas, too.

HP's Business Management Software Library for the System 45B extends and streamlines your forecasting, decision-making and business reporting by bringing disciplined procedures to the management process. The Library includes programs for linear programming, project management, forecasting and graphic presentations. Also included are payroll, inventory control, list management and text processing.

To accomplish many management tasks you usually have to deal with large quantities of data or analyze past performances to pick the best alternatives or evaluate potential results. You can use the System 45B Software to assemble your data, convert it to different forms, store it for future use and perform all types of arithmetic operations on it. You can organize and condense features and relationships into a variety of graphic displays such as bar graphs, pie charts, time series and PERT charts. Or you can produce tabulated lists, mailing labels (with an optional impact printer) and text summaries — all of which can be updated, reviewed or edited. With this capability you can build a data base that will provide a strong foundation upon which to build your forecasts and decisions.

The System 45B gives you added control over other business functions as well. Maintaining and updating payroll and inventory files can be accomplished quickly and easily. The System 45B Business Management Software covers many of the tasks a manager needs to monitor his business functions.

Accurate and quick calculation for the Structural Engineer.

Handling the myriad of complex calculations and design analyses encountered in the field of Structural Engineering requires a computing system that offers three major benefits: answers that exhibit a high degree of accuracy, modest equipment cost and ease-of-operation, and solutions that are obtained quickly. The System 45B and its Structures Software can offer all three of these benefits and throw in a few more just for good measure.

The System 45B Structures Library was prepared by professional Structural Engineers who recognize the needs, problems and technical requirements of the engineer and architect. For example, the engineer is usually very busy and he needs answers to his calculations quickly. The System 45B, since it is a desktop computer, is ideally suited to the Structural Engineer's work environment. What could be faster and more convenient than having a powerful computer sitting right next to the drafting table? The HP Structures Software has all the various code specifications to provide fast answers that conform to accepted U.S. industry standards.

And since the engineer is usually not an experienced programmer and doesn't have the time to get involved with a hard-to-operate computational tool, the System 45B's enhanced BASIC allows him to interact with the computer in easy-to-learn, literal commands and syntax.

Steel and concrete beam analysis and design, flat slab analysis and design, footing design, dynamic load analysis and section properties are just a few of the areas included in the System 45B Structures Software Library. In addition, a complete software pack is devoted to Job Cost Accounting as it applies to Structural Engineering.

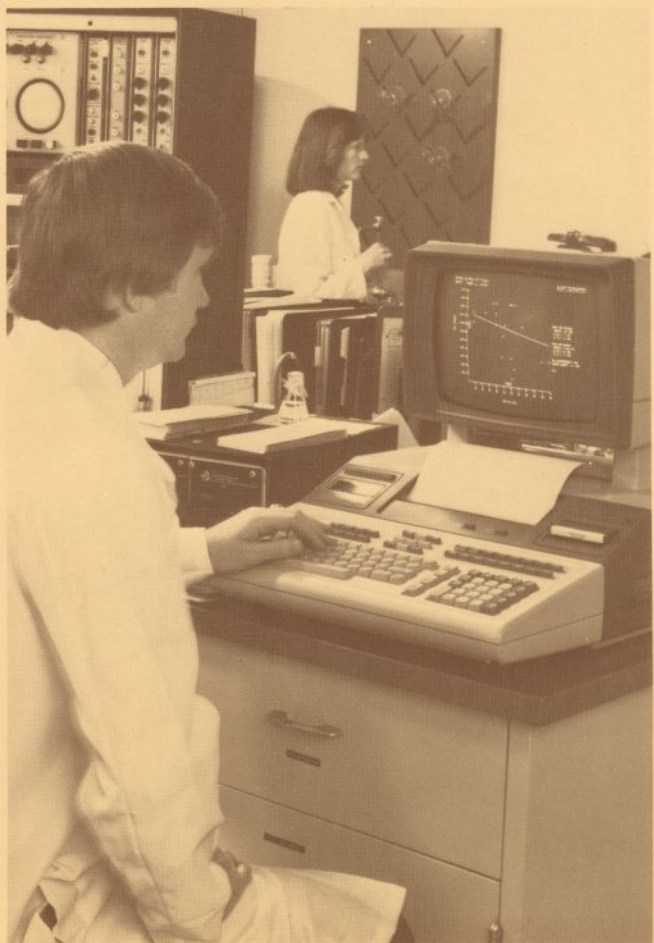
Hewlett-Packard's friendly System 45B and its professionally prepared software are designed to *solve* your Structural Engineering problems...not add to them.

Plus additional software to handle many tasks.

In addition to software support in the areas of Statistics, Engineering Design, Business Management and Structural Engineering, HP offers several other System 45B software packs. These packs provide programs in Graphics Utilities, Clinical Lab applications, Terminal Emulation, Multi-terminal Management and Language Translation.

HP also supports a world-wide BASIC Users' Club which maintains a library of user-contributed BASIC language programs covering a wide range of applications. Participants exchange programs and share programming ideas and innovations.

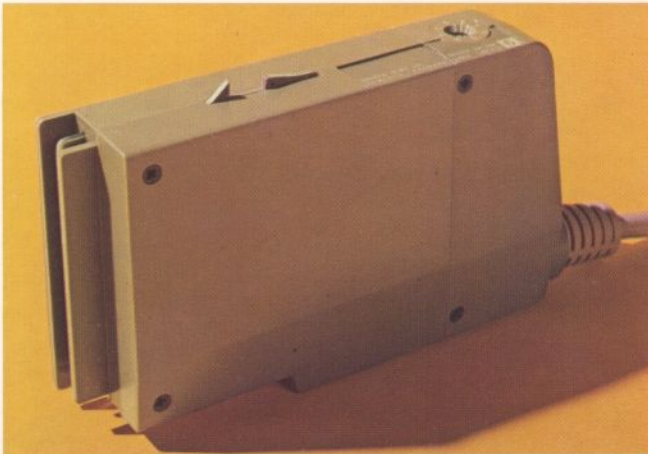
Beyond the software libraries we've described here, HP continues to define and develop specific applications programs in basic research, engineering and science — all designed to get you from problem to total solution faster and easier.



System 45B Interface Cards make the I/O connection easy.

Whether you need to talk to another computer, control an instrument or automate data acquisition, the System 45B can handle most any interfacing requirement you're likely to encounter. Connecting your instruments to the System 45B is largely a matter of plugging in the proper interface card and cable assembly.

When it comes to high performance I/O, the System 45B provides virtually all the capabilities you'd expect in a mini-computer plus one thing the mini can't deliver: simplicity. We built the I/O drivers, utilities and a powerful I/O command set right into the operating system. There is no need to use assembly or machine code. You can communicate with your instruments in easy-to-use HP enhanced BASIC.



System 45B Interface Card/Cable Assemblies

- 16 Bit Parallel** — for many computer peripherals
- BCD Input** — for medical and electronic instrument protocol
- HP-IB Interface** — the universal instrument and peripherals interface
- RS-232-C Serial** — for terminals and modems
- Real Time Clock** — for real time reference and time related control
- Incremental Plotter** — for large drum or flat bed plotters needing unencoded inputs
- Disc Interface** — contains drivers, receivers and logic for large capacity mass storage devices

In spite of this simplicity, you don't sacrifice I/O performance. The System 45B's overlapped processing feature gives you direct memory access and automatic data buffering for real time communication with high speed devices. Fifteen assignable levels for BASIC priority interrupts plus error trapping add further dimensions to the System 45B I/O versatility.

Nearly 40 years of instrument system research and experience are distilled into the System 45B's I/O design. To you, the practical benefit of this experience is the ability to solve the problems of designing I/O software and eliminate the struggle of logic and electrical connections. With the System 45B you literally plug in a solution to your instrumentation problems.

Hewlett-Packard helps you plan for tomorrow.

The System 45B "system." The problem-solving system you choose must be adaptable, not only to your needs today, but to your needs in the future. To provide that potential, Hewlett-Packard offers an extensive line of plug-in peripherals that are as easy-to-use as the System 45B.

For converting graphic information such as maps, X-rays, photos, diagrams or strip charts to numeric form, HP offers a micro-processor controlled Digitizer. HP magnetic tape cartridge units and paper tape and card readers provide accurate and fast data entry. You can also configure a mass storage system, with flexible or hard discs, to meet your needs. In addition, a wide variety of System 45B-compatible printers and plotters are available to help you organize your data into visual presentations.

These fully compatible peripheral devices save you the design and set-up time common to many other systems. You're not faced with evaluating operating systems, writing and debugging I/O drivers in machine language or documenting entire systems. With the System 45B and its full line of input, storage and output peripherals you can assemble a system that will meet your needs today as well as provide a growth path to the future.

And best of all, the System 45B's device-independent, Mass Storage Command structure allows you to upgrade to a larger or faster storage medium by changing only one BASIC statement — no costly program conversions should your future needs dictate a change in system configuration.



Reliability and service: Protection for the future.



HP Desktop Computers are supported by a dedicated field force and a 40-year reputation for quality and reliability. Not only are our designs tested for thousands of hours during research and prototype stages, but each unit is monitored throughout production to meet rigid quality-control standards.

Hewlett-Packard's service organization is thoroughly trained in desktop computer repair and maintenance procedures. If your machine should ever malfunction, your HP service representative can get it back up and running again in a hurry, thus avoiding expensive downtime. HP manufacturing quality and service excellence combine to ensure your System 45B a long and productive life.

Grow with HP. Because Hewlett-Packard is dedicated to serving your problem-solving needs, we have accepted the challenge of designing our Desktop Computers so that, in many cases, as new advancements/capabilities are available, you can upgrade your computer to the newest specifications — your system can indeed “grow” with expanding technology. As an example of this policy, the System 45A can be upgraded to the System 45B.

Take a closer look. To fully appreciate and evaluate the System 45B, you must see it in action. We would be happy to arrange a demonstration or perhaps provide you with more details. Just call your local Hewlett-Packard sales office today.

Specifications

Size/Weight (typical system)

Height	483 mm (19 in.)
Width	457 mm (18 in.)
Depth	667 mm (26.3 in.)
Shipping Wt.	61.4 kg (135 lb.)

General

Power Required	110V or 220V, 48-66Hz
Power Consumption	275 watts (max.)
Read/Write memory:	
standard	56 266 bytes*
optional	187 146 bytes*
optional	318 026 bytes*
optional	448 906 bytes*
	*total user available, with standard Special Function keys loaded.

Operating Temp.

Range	5° C. to 40° C.
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Thermal Printer

Print Speed	up to 480 lines/min.
Line Width	80 characters

Tape Cartridge

Storage Capacity	217 000 bytes per tape cartridge
Search Speed	2 286 mm/sec. (90 in./sec.)
Rewind Time	19 sec. (end-to-end)

CRT

Screen Size	310 mm (12.2 in.) diagonal
Brightness	12 - 30 ft. Lamberts (adjustable)
Refresh rate	60Hz

Alphanumeric Mode

Screen Capacity	24 lines, 80 characters/line
Raster size	236 x 122.9 mm (9.3 x 4.8 in.)
Character Generation	7 x 9 character font in a 9 x 15 character cell

Graphics Mode

Raster Size	200 x 162.5 mm (7.9 x 6.4 in.)
Display Speed	2 032 mm/sec. (80 in./sec.)
Cursor	full screen or blinking crosshair
Array Size	560 x 455 dots



For further information, contact your local Hewlett-Packard Sales and Service Office:

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