HEWLETT hp PACKARD

HP 9830

Desktop Computing Power

POWER
VERSATILITY

The HP 9830A/B Offers Power and Versatility

YOUR PERSONAL PROBLEM SOLVER. The 9830 desktop computing system approaches the power of a minicomputer, has the simplicity of a calculator and the versatility of being used as a terminal. Yet, you configure it for your application. When Hewlett-Packard first introduced the 9830, we had in mind a device that would bridge the gap between programmable calculators and computers. In other words, personal computing power.

Years of experience in building both programmable calculators and computers have provided HP with the experience and knowledge necessary to build a stand-alone computational system; one that is compact, inexpensive, and easy to use.

The 9830 also provides you with an extensive line of peripherals, instrument interfacing capability, data communications capability, a large expandable memory, and a versatile language. . .in other words, computer-like capabilities.

In terms of size, the 9830 is not much larger than the typical office typewriter, yet it can handle many business problems...or sophisticated scientific work.

With the 9830, you get a proven computing system design that lets you confidently apply computing power to your job, even on a modest budget or with limited programming experience.

THERMAL PRINTER — prints 240 lines per minute, quietly.

32-CHARACTER LED DISPLAY — allows you to see what you enter, when you enter it.

SPECIAL FUNCTION KEYS — let you store and execute special program commands, program lines, or whole programs on any or all of these 20 keys.

TYPEWRITER-LIKE KEYBOARD — lets you make entries fast with its familiar design.

BUILT-IN TAPE CASSETTE — provides you with up to 64,000 bytes of storage for programs or data, high-speed bidirectional search, and file addressing capability.

EDIT KEYS — enable you with just a couple of keystrokes to insert, delete, or change a character, a word, a line, or group of lines.

10-KEY NUMERIC PAD — permits fast figuring and scratch pad-type calculations.

Solve a Variety of Computational Problems

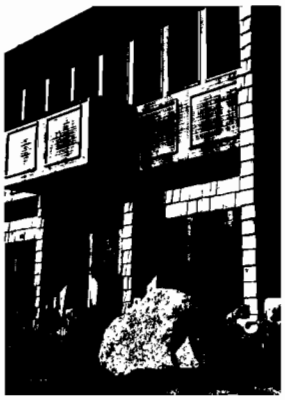
RESEARCH AND DESIGN. Slide rule calculations, repetitive design-equation solutions, multivariable analysis, mathematical modeling...these typify the scientist's and engineer's day-to-day problem-solving environment. The 9830 speeds solutions to these problems. You have instant access to computer-like power. It saves wasted hours in trips to the computer center, in waiting for a programmer, or in trying to solve problems with a pencil and paper. The 9830-aided research and design applies to many disciplines, encompassing electronics, mechanics, hydraulics, and pneumatics, in addition to the structural, environmental, and biomedical fields. The 9830 extends your capabilities.

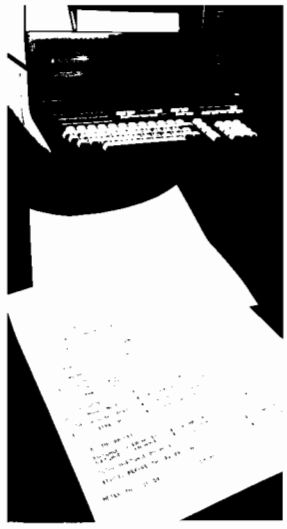
MANUFACTURING. One minute it's statistics, the next it's design equations. In manufacturing, it's versatility that counts. That's why the 9830 has become an essential manufacturing tool. Incoming inspection and quality assurance people run a statistics program, then production personnel can use the same machine (easily relocated if necessary), to solve analytical or engineering problems. The 9830 can edit and verify numerical control tapes, provide up-to-date inventory and cost figures, and monitor process quality...the list goes on and on. As a manager, you need current facts and figures to keep production moving smoothly, and you get them with the 9830.

INVESTMENT ANALYSIS. Making the best use of available capital resources...that's your goal. And the 9830 helps by giving you the facts and figures you need to make the best decisions...the most profitable decisions. In property investments, for example, an educated guess can't compare with a computer's assessment based on comparable values. Pencil-and-paper calculations come out second best when making price and yield calculations in bond and security decisions. And there's no substitute for hard figures or printed schedules when you need information on loans or depreciation methods. You'll find quick, accurate answers to most of your investment questions with the 9830.

MANAGEMENT INFORMATION. Up-to-date, accurate information — that's the key in making intelligent management decisions. Buying capital equipment? You need current budget figures on development costs, manufacturing profit, sales expenses, and return on investments. If you're making "either-or" decisions or "what-if" decisions, you need facts and figures for evaluation. And you need computational tools to explore alternatives. That's what the 9830 is all about...so that you can get the information you need, in understandable terms, when you need it.

FINANCIAL SERVICES. With the 9830, the accountant can get out of the computing profession and get back to his own. The 9830 can easily handle the full range of accounting jobs — general ledger, accounts receivable, accounts payable, payroll, and inventory. It will print out balance sheets and P&L statements, and write checks and billing statements. A single keystroke gives essential reports, such as cash requirements, accounts payable, inventory turnover, aged accounts receivable, and more. This computational power in your hands means greater efficiency.





APPLICATIONS

Plug It in and Go to Work

NO SPECIAL ENVIRONMENT. From the moment that you take the 9830 out of its shipping box, set it upon your desk, and plug it in, it is ready to work. Unlike a computer that might require loading a compiler and programming a system for your application, we built into the 9830 a hardwired compiler and an operating system that are ready to go.

The hardwired compiler and operating system function as reserved memory for the HP BASIC PLUS language and special commands. All the information that the 9830 needs to help you operate it, program it, and solve certain problems is permanently stored internally without sacrificing a significant amount of the read/write memory available to the user. If you should need additional peripheral control and special syntax, plug-in function blocks provide specific problem-solving, increased programming efficiency, and increased program execution speed. This hardwired ROM can be increased in increments of 2000 bytes up to 16,000 bytes.

SIMPLICITY

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

EASY TO PROGRAM AND EDIT. To use computing power fully, a computing device must be easy to program and edit. The 9830 offers you some important bonuses in this area:

- Hardware features such as the typewriter-like keyboard and Special Function keys help make programming easy.
- The Edit key serves as an electronic eraser that lets you edit with a minimum of effort.
- A self-teaching cassette included with every 9830 tutors you on operating and programming.
- Each program line is checked as it is entered to catch mistakes as they happen.
- Prewritten programs are available from HP's extensive software library. Because BASIC is a standard computer language, programs are also available from publishers, universities, and commercial software houses.
- KEYBOARD magazine is available to you free with your purchase of any HP 9800-Series computing system. This publication contains many programming tips and articles of special interest to computing system owners.

You enter mathematic operations almost exactly as you'd write them on paper. For example, to add 3 + 4, enter 3 + 4 and press EXECUTE. To calculate the solution to a linear algebraic equation, enter M *Y + B.

THE DIALOG LOOP. In practice, you set up a dialog with the 9830. You talk to it through the keyboard, and it talks to you through the display. Here's how the concept works for a loan amortization program. As you proceed, the 9830 gives you operating instructions. For instance, it tells you when to enter your data:

```
INTEREST RATE PER YEAR?
NUMBER OF YEARS?
PRESENT VALUE OF LOAN?
```

It shows your data for verification:

```
INTEREST RATE = 9.75
NUMBER OF YEARS = 30
PRESENT VALUE OF LOAN=35000
```

If you have a question, you can recall your program, line by line, to check the operations:

```
100X=P*(1/2)
```

And, of course, it will display your labeled solution:

```
MONTHLY PAYMENT = $300.56
```

ERROR RECOVERY. When a mistake is made, the 9830 not only lets you know there's an error, but also indicates precisely what and where the error is.

Suppose, for example, you keyed in the expression, 20 IF Y = (Y2 + 3.41 /Y THEN 45, as part of the program. You'd hear a soft beep, and the display would immediately light up with: ERROR 16 IN LINE 20. Checking the list of error notes, you'd find you forgot the right ")" after Y in line 20.

To correct or modify a program, the special editing keys at the top of the keyboard let you make your changes without disturbing the rest of the program. Just recall the text you wish to change — then delete, replace, or insert the appropriate information.

You can FETCH any line in any portion of a program. For example, FETCH 456 will call program line 456 into the calculator display. The calculator keeps track of where it is located on the display with a pointer that is invisible to the user during normal keyboard operations. However, when backspaced, the pointer alternately flashes over a previously keyed-in character.

The editing keys are:

- BACK — moves the pointer to the leftmost portion of the display, one space at a time.
- FORWARD — moves the pointer to the rightmost portion of the display, one space at a time.
- INSERT — inserts a space in the display under the pointer.
- SHIFT INSERT — deletes a space where the pointer is located.

APPROACH WITH CONFIDENCE. The 9830 invites communication. The most inviting thing about the 9830 is the keyboard. The primary means of communication with the 9830 is its typewriter-like keyboard. It's your half of the dialog loop. The other half is the alphanumeric display. You just type in your instructions using English words for commands and arithmetic/algebraic symbols and expressions as operators. The 9830 responds to your inputs through the display.

SPECIAL FUNCTION KEYS. These keys give you the power for single keystroke solutions to the most common problems. You can define each of the 10 keys to perform 2 functions, for a total of 20 functions. The second function is accessed by pressing SHIFT.

EDITING KEYS. These keys, in conjunction with the 9830's automatic error-detection facilities, enable you to find and debug program mistakes, edit text, or correct data rapidly.

ADDING MACHINE PORTION. This part of the keyboard is a convenient tool for scratch pad calculations. Because its functions duplicate those on the typewriter keyboard, it enables you to key in columns of data rapidly.

DISPLAY KEYS. These keys let you rapidly step through the display for editing. As an added feature, these keys enable you to move the plotter pen on the (optional) HP plotter to a specified writing position.

COMPLETE COMPUTING POWER. The combined features of the 9830's keyboard and its central processing unit, memory, tape drive, and HP 9866A/B Page Printer give you a complete computing unit that is ready to turn on to your application.

Tailor It to Solve Your Problems

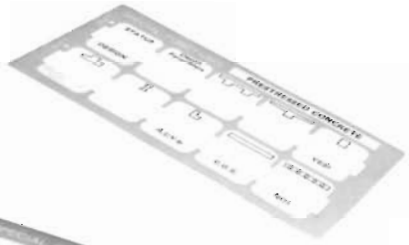
ADAPTABILITY

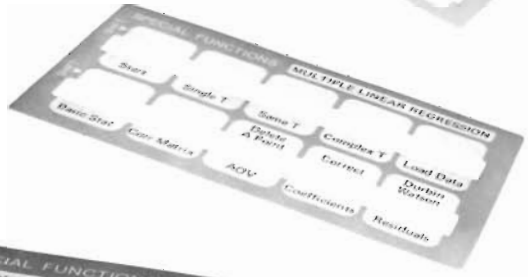
DEFINE YOUR KEYS. You can tailor the 9830 to an exact fit of your specific problem in a variety of ways. First, the Special Function keys can be used to represent text where text is used as a typing aid. Second, these keys can represent an entire program. Third, they can be used to represent functions.

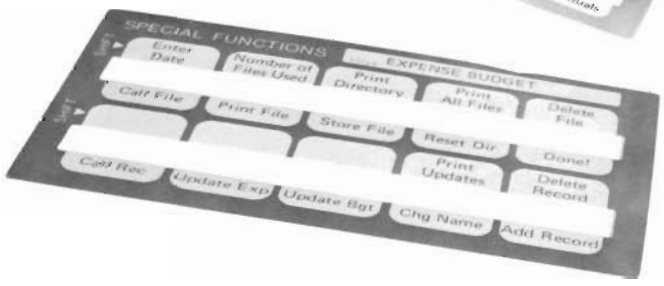
PLUG IN MORE POWER. For increased customization of the 9830 to your particular application, the read-only memories (ROMs) expand the capabilities of the BASIC language in three ways.

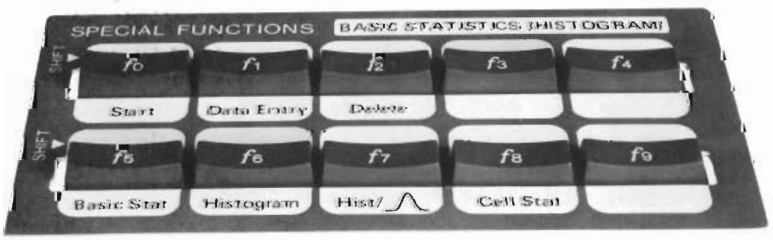
First, you may expand the alphanumeric capabilities of the language. For example, you can add such language-related features as matrix arithmetic, alphanumeric data manipulation, and advanced programming capability.

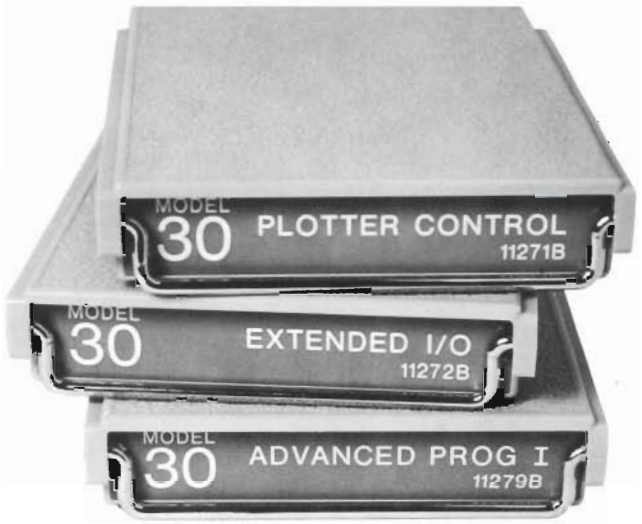
Second, you may expand the input/output capacities of the 9830. The Extended I/O ROM allows you to control a wide variety of peripheral devices with the 9830. For easy presentation of graphic data, the plotting and printing capabilities of the 9830 are enhanced in ROMs that provide a host of flexible, time-saving plotting and labeling commands.











Third, you may want a data communications capability for terminal emulation, data communications interfacing commands, and binary synchronous protocol for communication with larger computing systems.

ADD MORE MEMORY. So that you don't have to cut programming corners, the memory of the 9830 was developed to expand the operating memory with plug-in ROMs without any significant sacrifices of the available read/write memory. This means that there is more room for special programming and operational features, as well as additional read/write memory. The 9830A will accept 8 additional ROMs, 3 in the internal configuration and 5 externally. Each ROM has 2000 bytes, for a maximum of 16,000 bytes of additional hardwired memory.

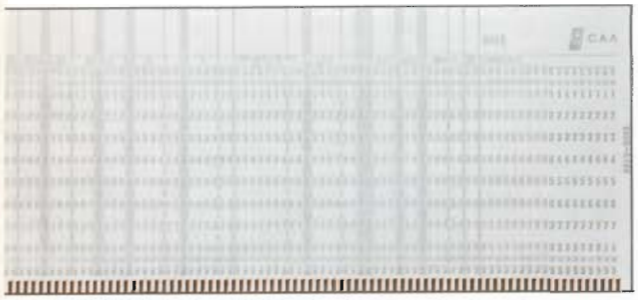
The basic 9830A is equipped with 3520 bytes of read/write memory. Additional read/write memory may be added internally for totals of 7616 or 15,808 bytes. The basic 9830B consists of 15,808 bytes and can be expanded to 30,144 total bytes of read/write memory. If the built-in 15k BASIC compiler and add-on ROMs are considered, the 9830B is actually a 63k-byte computing system.

String Variables and Matrix Operations ROMs are built into the 9830B, which will also accept 5 additional plug-in ROMs and 1 internal ROM in the same manner as the 9830A.

The large memory configuration, plus all the input and output that is brought together in the 9830 package, provides the power required to solve complex problems.

Choose Your Input or Output

INPUT IN THE FORM YOU NEED. Whatever mode you choose to use in your computing system, the 9830 peripherals can provide it. In any environment where flexibility is essential, the ability to add the necessary input device must be a part of any computing system. With the addition of powerful peripherals, the 9830 evolves from a stand-alone computing unit to a comprehensive computing system. For example, if you should need to input on marked or punched cards, HP card readers provide hand-held and hopper-fed capabilities. Whether in a classroom or a technical lab, batch or single card inputs are second nature to the 9830. Providing direct data translation from



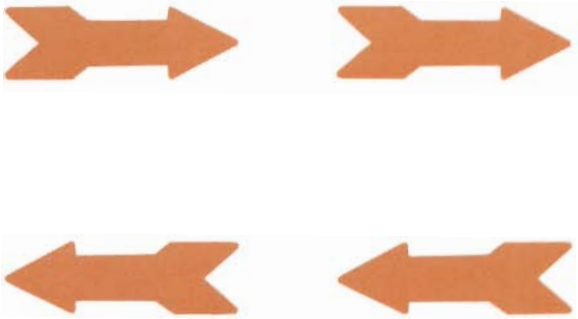
paper tape, the 9830 is as at home in the office as it is in the medical lab. Extending the input capabilities one step further, the digitizer helps surveyors, doctors, and technical experts analyze data that is dependent upon geometric interpretations.

OUTPUT THE WAY YOU USE IT. Getting your data out in the most usable form is seldom a problem for the computing power peripherals that form the output half of the 9800 Series. If you want to produce paper tape, the HP tape punch can give you what you want, quickly and accurately. If you're concerned with output, the high speed of the thermal page printer, CRT, and line printer can format your design data, accounting and management reports, and other data. Should you need a graphic representation of your data, the plotting capabilities of the plotter set a fast pace toward giving you what you need. Occasionally, the touch of a typewritten report may be needed. Crisp and clean copies are supplied by our impact printer. Whatever your application, the flexibility supplied by the available peripherals provides the necessary ingredients for a system tailored to your needs.

STORE PROGRAMS AND DATA OFF-LINE. The 9830 peripherals give you the edge again in the storage of data, easily and reliably. The mass memory can provide quick access to 4.8 million bytes of data or programs stored on its memory cartridges. That's enough storage to keep tabs on most accounting systems. The outboard tape cassette has a lighter touch with up to 64,000 bytes of storage per cassette. Whatever your needs, data/program storage and handling are no farther than your desk.

FLEXI

BILITY



The 9830 is easily configured to provide data communications capability in three ways:

- From 9830-to-time-sharing system,
- From 9830-to-remote batch system,
- From 9830-to-9830.

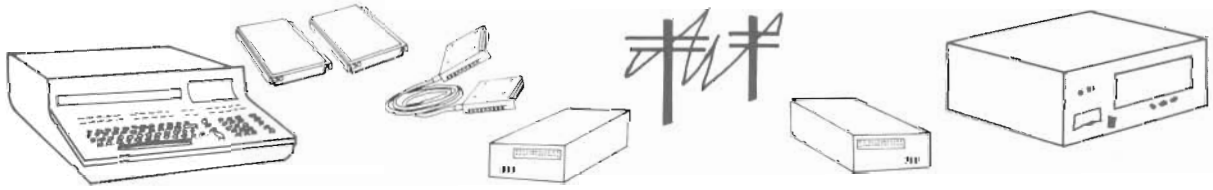
The 9830 is easily programmed to handle unique terminal requirements. Unlike conventional hardwired intelligent terminals, the 9830 is easily reconfigured and reprogrammed when your requirements change or expand. The 9830 can function as a satellite processer to a large computer. It can collect data locally and preprocess information destined for a large computer, or it can be used to write and edit programs off-line for later transmission to a computer.

Communicate with Other Computing Systems

COMMUNICATIONS

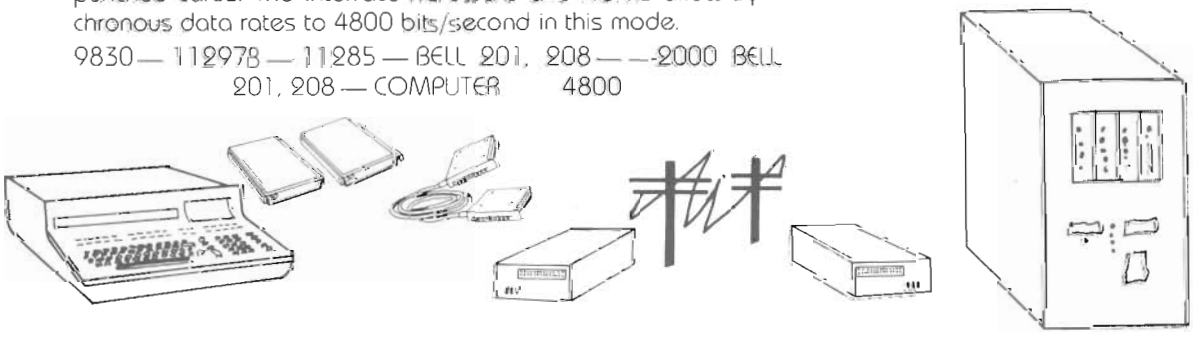
9830-TO-TIME-SHARING SYSTEM. As a terminal-to-time-sharing system, the 9830 is a "teletype compatible" terminal. The easy editing features of the 9830 eliminate the need for lengthy on-line editing or programming, thus minimizing your connect time and reducing your individual job costs.

9830 — 11285 — BELL 103A —— 110 300 BAUD —— BELL 103A — 11285 — TIME-SHARE



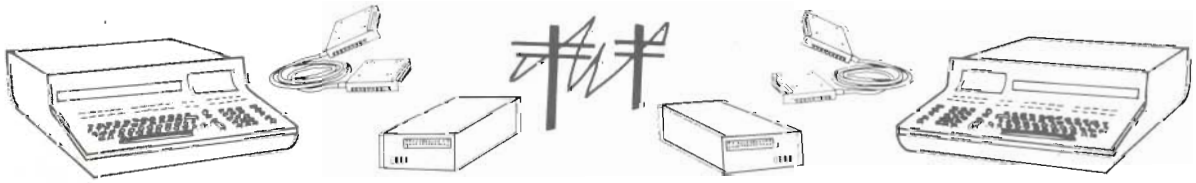
9830-TO-REMOTE BATCH SYSTEM. The flexibility of the computing system is increased by its ability to function as either an interactive or a batch processing terminal. As a remote batch terminal that is compatible with the IBM 2780, the 9830 can send card image data from tape cassette, mass memory, or punched cards. The interface hardware and ROMs allow synchronous data rates to 4800 bits/second in this mode.

9830 — 11297B — 11285 — BELL 201, 208 —— 2000 BELL 201, 208 — COMPUTER 4800



9830-TO-9830. Two 9830's can communicate, for data or message transfer, between themselves. For asynchronous rates up to 1800 bits per second, one 9830 can be used to remotely control another 9830.

9830 — 11285 — BELL 202 —— BELL 202 — 11285 — 9830



Fully Supported Systems

READY-TO-USE SOFTWARE. Once you have your HP computing system, you are only a flick of a switch away from solving a variety of problems.

The math pack for the 9830 has 38 separate programs stored on tape cassette that cover a wide range of math functions. Included within the pack are such programs as: Complex Functions, Lagrangian Interpolation, Function Analysis, Matrix Inversion, Radians-to-Degrees, Degrees-to-Radians, Degrees, Minutes, Seconds, Rectangular/Polar Conversion...

The statistics libraries, currently 11 volumes worth, cover the range of statistical techniques from computing simple means and variances to four-way analysis of variance and stepwise regression. With a continuing effort to expand this library, the 9830 becomes one of the most powerful data analysis tools currently available.

SERVING SPECIFIC APPLICATIONS. The electrical engineering programs for the 9830 provide answers to sophisticated design problems. This software allows you to go from initial concept to finished design almost as fast as you can enter data and read the results in such areas as: Microwave Circuit Design, Digital Simulation, Transformer Design, AC Network Analysis, and State Variables.

The 9830 medical software library puts computing power in clinical labs, radiology, and cardiopulmonary applications.

The 9830 construction engineering library contains 13 volumes of information for the construction engineer. Ranging from multistory moment distribution to pipe network balancing, this library can save you time and money on your construction jobs.

Surveying and numerical control software provides additional capability for the 9830 computing system. However, the computing power does not stop with the scientific software capabilities. Additional power and flexibility are available in our commercial software packs.

Dedicated to giving you fast and accurate answers to monetary considerations, the 9830 commercial application software currently available covers four broad areas. Financial Services, Investment Analysis, Accounting and Budget Monitoring Program packs are designed to give you an easy-to-use and sensible approach to tough calculations.

Utilizing the conversational approach to problem-solving, the 9830 asks for pertinent data and then performs the necessary computation. Results are output to your specifications on the peripheral of your choice. Graphs can be plotted on the HP plotter, and reports can be printed on the HP impact printer or the HP line printer, all of which are designed to provide you with results quickly and efficiently.

PROGRAMS

SUPPORT WHERE YOU NEED IT. The 9830 is a flexible, interactive computing tool that was designed to meet a wide variety of computational needs. Alone on a desk, the 9830 is a complete computing device that combines input, output, memory, storage, and a central processing unit, thus giving you the answers to many sophisticated problems. With the simple addition of ROMs and an interface cable, the 9830 can assume the characteristics of a data communications terminal. Another addition provides the 9830 with interfacing and instrumentation control capabilities. Then, with the addition of peripherals, the 9830 can challenge the computational capabilities of many dedicated scientific and business machines. In short, the 9830 can become a desktop computing system that can change to meet your current needs.

As a leader in the world of programmable calculator technology, HP's Calculator Products Division continues to grow and expand the horizons of fingertip computation. Sales and service offices in more than 170 locations throughout the world assure you of the quality and service you expect in a long-established company. The advances that are made in hardware- and software technology are constantly being updated and published as part of our effort to keep you informed in such publications as KEYBOARD, and Application Summaries and Notes.

Sales and service from 172 offices in 65 countries.
Loveland, Colorado 80537.

Printed in U.S.A.
(8/76) 30M

5952-9083(40)