The Hewlett-Packard Personal Calculator
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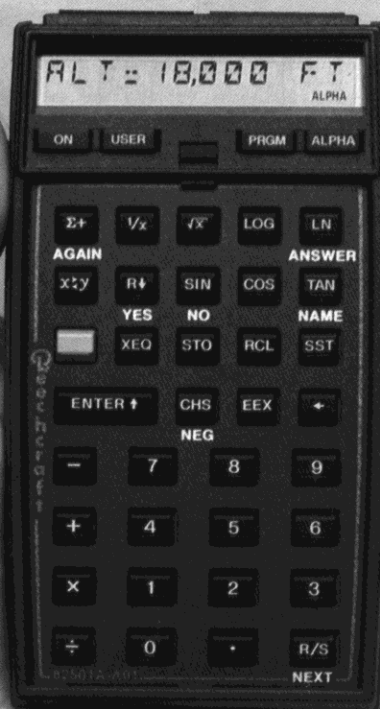
The HP Magazine and Product Catalog Volume Seven, 1980 $2.00

NEW IN THIS ISSUE:
Custom HP-41 C's
Take Off See Page 2.

ALT = 18,000 FT.

A Support System You Can Count On!

When you buy a Hewlett-Packard advanced scientific or financial calculator you are buying far more than just a calculating device. You are buying the confidence that the Hewlett-Packard name brings. Confidence in workmanship, design, and software support that makes your HP calculator a working tool and not just another piece of office or lab equipment. From Owner's Handbooks to Application Pacs—your specific needs are met by a support system you can count on! In addition to English, Owner's Handbook and selected software packages are available in other major languages. Please check with the HP sales office or dealer nearest you for availability information.

Owner's Handbooks

HP's Owner's Handbooks are complete and helpful reference books that go far beyond the usual how-to information. Detailed operational data are provided, along with many suggestions for maximum efficiency. And there is page after page of helpful examples.
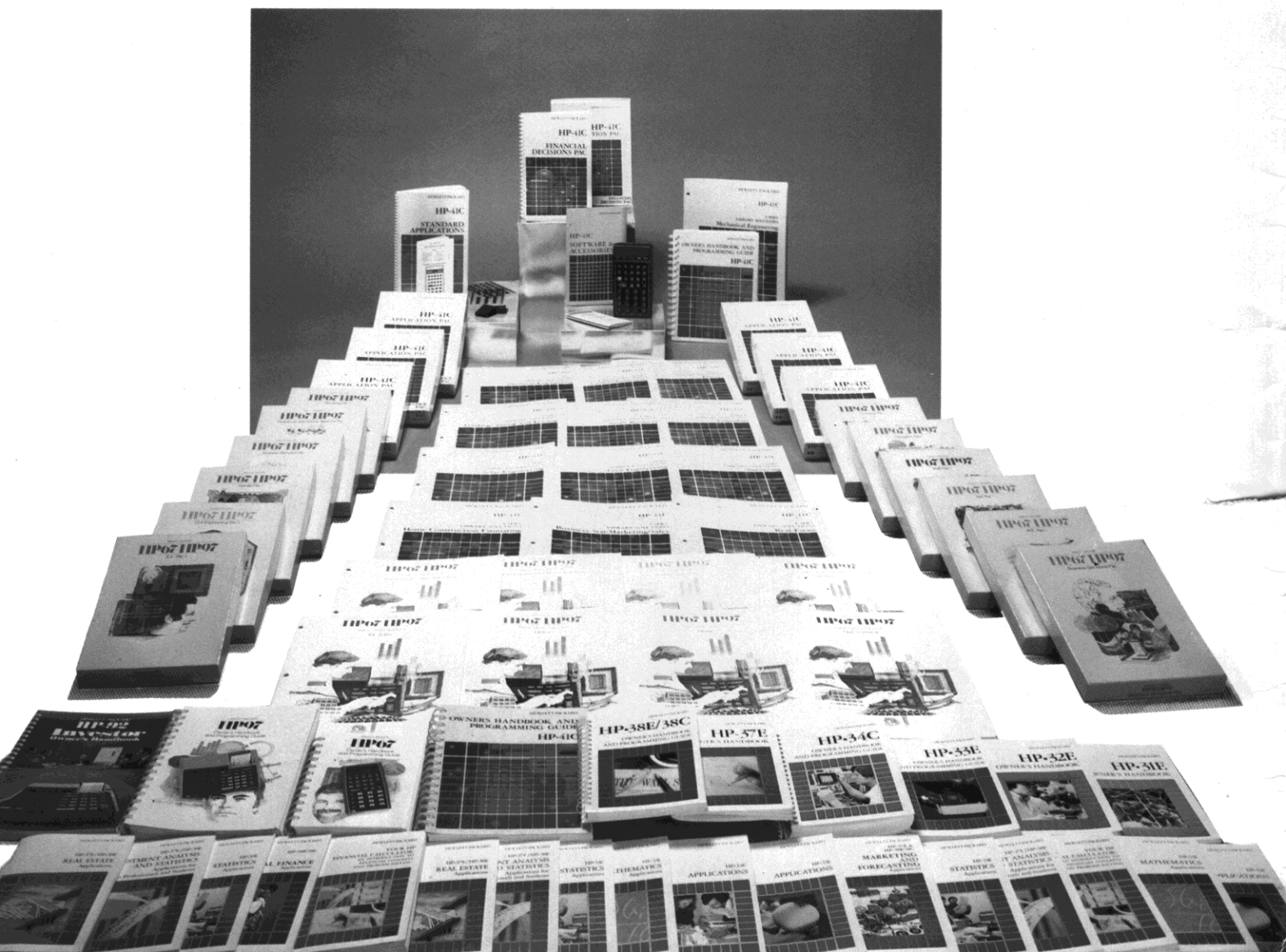
Solutions Books

Timely applications covering the broadest spectrum of disciplines are presented in 46 Hewlett-Packard Solutions Books for the HP-67/97 and HP-41C. Each book is a compilation of 10 to 15 programs selected from thousands of programs submitted by users with professional demands just like yours.

Applications Books

16 Applications Books are available for the Series E/C family of affordable calculators. From Real Estate to Statistics, each book contains many step-by-step programs to solve "real world" problems.

Application Pacs

Hewlett-Packard Application Pacs offer ready-to-use software for the HP-67/97 and HP-41C. Each pac offers over 15 programs accompanied by a detailed manual. There are 10 pacs with magnetic cards for use with the HP-67, HP-97, or HP-41C Card Reader. And there are 16 Application Pacs with easy plug-in modules for use with the HP-41C. Both magnetic cards and modules provide prerecorded solutions in a fast and accurate manner—the way professionals want them.

The Hewlett-Packard Personal Calculator
DIGEST
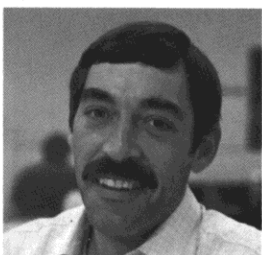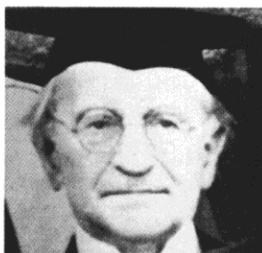
The HP Magazine and Product Catalog   Volume Seven, 1980

Calculator displays in all photography simulate typical appearance.

Features

Catalog

CUSTOM HP-41C'S TAKE OFF

What if . . .

You were the designer and manufacturer of the Beechcraft Super King Air facing the stark reality of today's spiraling fuel costs? Finding and developing methods of fuel conservation for the Super King Air would be of prime importance to your company and its customers.

Or if you were . . .

A large diamond brokerage company employing several thousand sales representatives who's task is to provide accurate information to assist clients in their diamond investing. To handle this task, you need a computer with the capability of storing information and performing calculations exclusive to the diamond industry, yet portable enough to be carried by sales representatives.

Or perhaps . . .

An on-line media research company dedicated to helping the advertiser economize his advertising budget. To accomplish this feat, you need a complete, highly portable micromedia system that provides instant access to every media option on the market (radio, newspaper, TV, and magazine). Plus, a system that also prints on-the-spot reports in plain English, thereby alleviating any guesswork on the clients' part.

These three companies and their needs are not hypothetical—they all exist. And they are solving their unique, individual problems with one tool . . . a customized HP-41C calculating system.

With the recently implemented Custom HP-41C Program, the Corvallis Division of Hewlett-Packard makes it possible for companies to solve complicated and/or repetitive problems easier than ever before! Customers write programs geared to their specific business and technical needs. Hewlett-Packard then loads these programs into 4K or 8K (1K = 1,024 bytes) custom modules and provides the unique keyboard overlay, which shows only the functions and instructions necessary for the customers' application. The end result is a calculator customized for a **specific** application. This can be a very powerful tool since an HP-41C can hold up to 4 modules. Assuming four 8K modules are used—that makes an amazing 32,768 bytes of preprogrammed memory ultimately available. This tremendous memory rivals the capacity of most popular microcomputers on the market!

Theoretically, any customer could order just a single custom module. The cost, however, would be prohibitive. But with an order of 250 modules, the cost plummets, becoming comparable to HP's own Application Pacs. Of course, some companies interested in custom programming will not require such a large volume. Custom magnetic cards and custom bar codes then become the easiest, most economical solution to their problems.

HP-41C's Take to the Air

Aircraft navigation requires substantial, repetitive computations during flight planning. *Beech Aircraft*, working with HP, has developed a permanently preprogrammed module to perform flight planning functions specifically for the Beechcraft Super King Air— the twin-engine jet prop that is the top of the line. The heart of the Beechcraft module is the SAVE program. It accepts information on take-off weight, temperature and elevation, winds, temperature aloft, and destination. Using lengthy navigation formulas and engine-performance curves that are built into the module, SAVE computes the best altitude for minimum flight time or minimum fuel consumption. In only minutes, pilots can make flight decisions that will save thousands of dollars each year. In addition to SAVE, *Beech Aircraft's* "Flight Planning Computer" (custom HP-41C) also does weight-and-balance problems, climb-and-descent profiles, great circle navigation, rhumbline navigation, cruise, and true air speed calculations. The computer also performs engine trend monitoring that aids in reducing maintenance costs.

No special mathematical skill is required to operate the Beechcraft Flight Planning Computer. It communicates with its operator in English and leads the operator through each step of the program. The pilot simply spells out the name of the function desired; e.g., weight, wind, cruise, descent, etc. The Flight Planning Computer then asks questions that the operator in turn answers to give the computer sufficient information to solve the problem. As an added benefit, pilot workload is greatly reduced with *Beech Aircraft's* new Flight Planning Computer.

A Hot New Program That Sparkles

International Diamond Corporation (IDC), working hand-in-hand with HP, has developed the "Diamond Teller"—a totally customized HP-41C system for diamond investments. Sales representatives using the Diamond Teller aid clients in investment planning while demonstrating the value of their product as a hedge against inflation. Various options can be evaluated and future scenarios explored on-the-spot.

With the Diamond Teller, a sales representative can analyze a client's diamond buying program without calling the central office for data calculations. Using price data that is updated frequently with magnetic cards, the Diamond Teller can compute up to 80,000 diamond prices based on such features as weight and clarity.

Another valuable program is profit comparison. The Diamond Teller asks for the amount of investment, rate of appreciation, tax rate, inflation, and number of years. These figures are keyed in by the user, and the calculator sequentially displays the appreciated value of each type of investment. It's just that easy! Imagine

the value of having a sophisticated computer in hand to analyze a client's diamond program in the office or over lunch. No longer will the client be left dangling! *IDC* feels the Diamond Teller will significantly improve the effectiveness of their sales team, plus save valuable time.

Newspaper or Radio? Ask the HP-41C

Interactive Market Systems (IMS), an on-line media research company, saw the potential as well:

"When the HP-41C came out, we started looking at it and saw its capabilities. We saw the ability to add a printer and produce formatted reports, which are *IMS's* pride and joy. Quite frankly, we were very impressed! *IMS* appreciates professional reports that are imminently useful and actionable. A report that decision-makers can read without having to figure out where everything is and what everything means. We saw, for the first time, a machine that could perform very sophisticated calculations—while speaking to our clients in simple English," stated a company representative.

IMS's "System-4" (custom HP-41C) not only turns out professional looking reports, but is an entire computer system with capabilities currently not available on the company's mainline computer. New mathematical modules capable of revolutionizing some aspects of the media research industry, have been implemented in the System-4, making it the most advanced micro-media system ever.

All input is entered in an English-language question and answer mode, with the questions showing on the calculator display. The calculator itself tells the user every move to make, one step at a time. However, the really big

plus is **portability.** *IMS's* system permits salespeople to perform comparative media analyses at the desk of the prospective buyer. Expensive computer time, delays in getting reports and telephone calls are totally eliminated. Not only is System-4 invaluable to media salespeople, but also to media planners and advertising agencies.

Custom HP-41C Pays For Itself

Beech Aircraft, IDC, and *IMS* have already developed their customized systems. Many others are in the process of doing so. A large southwestern utility company anticipates their application to pay for itself in less than 6 months by eliminating a costly timeshare program currently in use. Today, the firm's service technicians call the central office and read information to a clerk, who enters it into a timeshare computer to determine the answers. Tomorrow, the HP-41C, with a custom 8K module, will eliminate the long distance phone call, the data entry personnel, and the cost of the timeshare rental and hookup.

Another customer is a small, very successful European engineering consulting firm. Several years ago they developed and sold a software package for the HP-67/97. They quickly found that the software was not only an enhancement to their consulting business but it also became a significant profit generator in a short time. Now, with the added convenience and cost effectiveness of custom modules, they expect their sales to double in the coming year.

Valuable Sales Tool

Firms using the customized HP-41C as a sales tool have discovered unexpected benefits. The HP-41C's

alpha output allows it to become a sales training tool. Algorithms for making a sales presentation are created with inputs from the best salespeople in the firm. The less-experienced agents are carried step-by-step through the presentation sequence by following the alpha prompting on their custom calculator. And managers find that use of the preprogrammed module dramatically improves the effectiveness of the newer salesperson and bolsters self-confidence.

Hit or Miss Proposition

The applications for custom HP-41C's are as numerous as the firms that buy and sell products and services. *Agrinautics,* a firm that manufactures pumps and valves for agricultural aircraft, with a second division selling computers and programs to support the agricultural industry, is using custom programs to determine the cost and productivity of various methods of crop dusting. Data is requested, the operator keys in the appropriate information, and the computer does the rest! Cost per acre, length of time to complete a job, number of loads and runs, acres per hour, and percentage of profit are now automatically computed. Using *Agrinautics'* custom programs, information is evaluated in seconds and the decision made as to the type of vehicle best suited for the job: a ground rig, small or large plane or a helicopter. The amount of chemical compound needed for each vehicle is also determined. Crop dusting is no longer a "hit or miss" proposition at *Agrinautics* when using the HP-41C custom calculator. It's a modern science, precisely executed to save money, and get the job done right.

A Fortune 500 industrial company

has also found specific applications for custom modules. This well-known company can quickly and accurately advise their clients as to the type of heavy duty equipment best suited to their specific needs with the help of a customized HP-41C. A program is named by the salesperson and the HP-41C calls it up for review. Information is then requested by the calculator in English, and the salesperson enters the appropriate response. In addition to equipment selections, buyers can ascertain, within seconds, the actual cost of the equipment as well as the return it will give them on their investment. The industrial module can also test the capability of an engine when operating with various transmissions, evaluate equipment performance, as well as numerous other functions specific to their industrial application.

In the electronics industry, *Compact Engineering Inc.,* a supplier of computer-aided circuit design software, is developing a module that is extremely sophisticated. The module will contain a series of programs analyzing the response of microwave circuits. These programs will offer capabilities that traditionally required a full-scale computer. With *Compact Engineering's* custom module, solving problems that were formerly prohibitive due to complexity, or computer inaccessibility, will be executed efficiently and without delay.

Endless Applications

The age of the custom calculator and module is just beginning, with many novel and exciting applications emerging. These applications have always been there—but never recognized until now!

Diverse sales organizations will

increasingly utilize custom handheld calculators to:
- Expand the effectiveness of sales personnel
- Take advantage of machine portability to obtain answers on-the-spot
- Convey a professional image
- Increase accuracy
- Provide valuable training for new sales people

Professionals involved in analysis, planning, and design occupations will reap the rewards of immediate access to a sophisticated machine that runs programs exclusively in their area of interest. Their industries are as diverse as irrigation, animal feed mixing, movie making and tax counseling. No longer will it cost the company a fortune in long distance phone calls, timeshare expenses or initial equipment purchases.

Many companies are also using the custom HP-41C to aid in process control. For example, in oil-drilling and chemical manufacturing, workers can monitor equipment performance and make corrections on-the-spot. Other firms are even using the HP-41C for data accumulation and storage where portability is important. Projects are underway for medical applications, insurance, route deliveries and surveying.

Applications for customized calculators and modules are endless. All it takes is observation and imagination. Look around you! Customized HP-41C's may help your organization **save time, save money,** and **increase effectiveness.**

For more information, contact the sales office nearest you. Addresses appear on the back cover.

BIRTH OF A BODY

Thomas Edison said:

"I never did anything worth doing by accident, nor did any of my inventions come by accident. They came by work."

Such are the sentiments of Hewlett-Packard's Industrial Designers. Creating the form and feature for a calculator's entrails is "more than sitting down for half an hour at a drawing table . . . and saying that's it!"

In fact, as a product is conceived in the minds of the Research and Development Engineers and product development begins; an assemblage of Industrial Designers and Marketing Professionals are summoned, briefed, and the operation of giving birth to a calculator body begins. Recaptured below is but a part of the birth of one of HP's most powerful calculators, the HP-41C.

Initially, many conceptualizations were submitted by the Engineers and Industrial Designers. Finally the sleek yet classic wedge shape was selected.

Following the decision on the general shape, a rough foam mock-up was started by Industrial Designers. Typically, high-density foam is used because of its convenience; however, balsa wood, clay, or other easily workable materials may be used. The basic body is then shaped, carved, and sanded for additional refinements.

Hewlett-Packard products generally go thru two or three iterations. Typically, changes occur as a result of product growth and refinement. The HP-41C was no exception. Originally it was spawned as a calculator with medium range problem-solving capabilities. However, with customers requesting a more sophisticated model and HP technology bounding ahead, a new powerful handheld calculator seemed imminent. So it wasn't surprising when the spark ignited—why not make the HP-41C *the most technically advanced calculator* on the market?

Once again size and shape were under investigation; and once again the wedge sculpture emerged as the most workable. The old adage "different isn't necessarily better" proved true. To handle additional calculating functions, the revised HP-41C became a fraction wider and a couple of inches longer than originally planned.

Side-stepping reviews, and re-reviews, the rough foam concept was replaced by a more permanent and detailed rendition of the future product. Working with Polystyrene, Industrial Designers cut, glued, and sanded; creating the look that became a standard for professionals. Nearly 40 hours were required to construct the HP-41C mock-up in Polystyrene. Every detail was formulated to approximate the final product as closely as possible. The mock-up was evenly weighted to

simulate actual heaviness, and texture was added with paint to produce the "feeling in hand." Choosing the perfect color was more of a task than one might think. Originally, beige was selected as the primary color because it accented the body contour. However, a darker color was preferred because . . . darker colors don't show the dirt! Another factor was the continuous availability of certain plastics. Colors were narrowed down, and ultimately a hue called Ink Brown was chosen. Unlike basic black, this color has a warm richness.

Decisions on highly subjective material are made largely on "experienced" intuition. According to Hewlett-Packard designers: "You just know what is right for a product."

Function symbols located on the keys and calculator face are another good example of this "experienced" intuition. Several colors were considered, tested and rejected before settling on blue and gold as the most compatible and eye-pleasing.

With the basic body constructed, sanded, textured, and painted, the keyboard was ready to be snapped into place. But the real crowning glory of the HP-41C prototype was the digital film placed under the LCD display panel to simulate product "on."

Finally, after many months of development and testing, the brainchild of the Research and Development people had a workable body that was durable and visually attractive. A look that became *a new standard for professionals*.
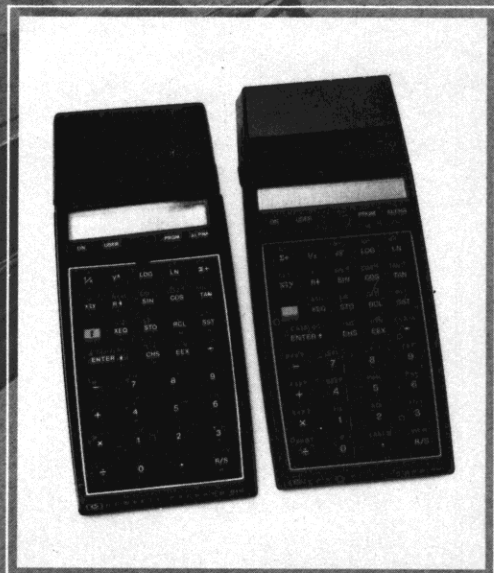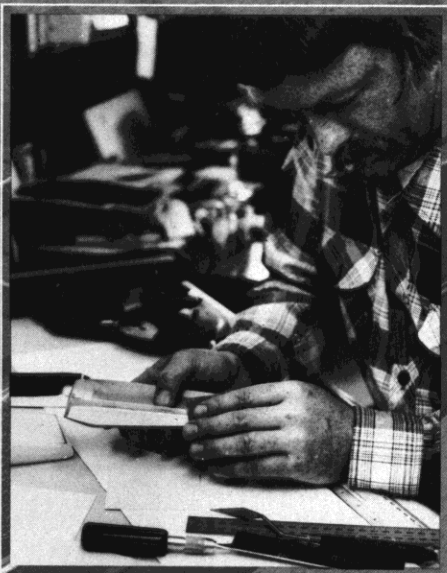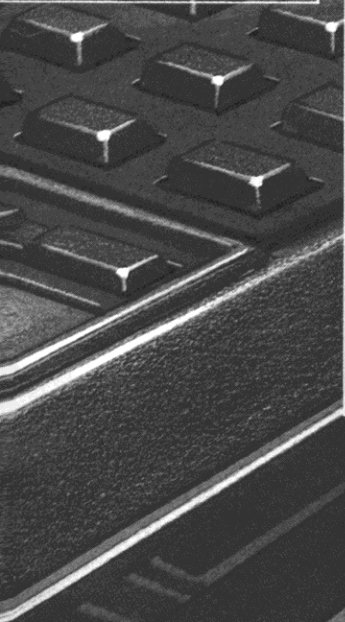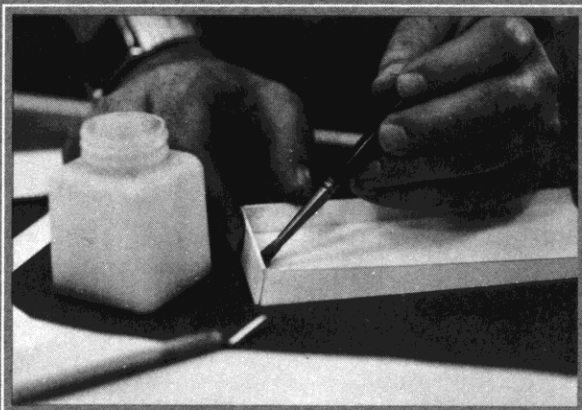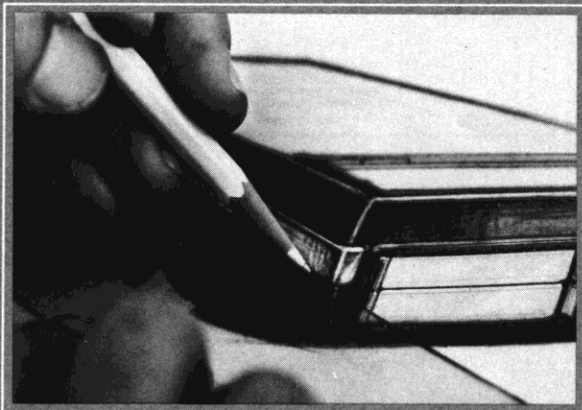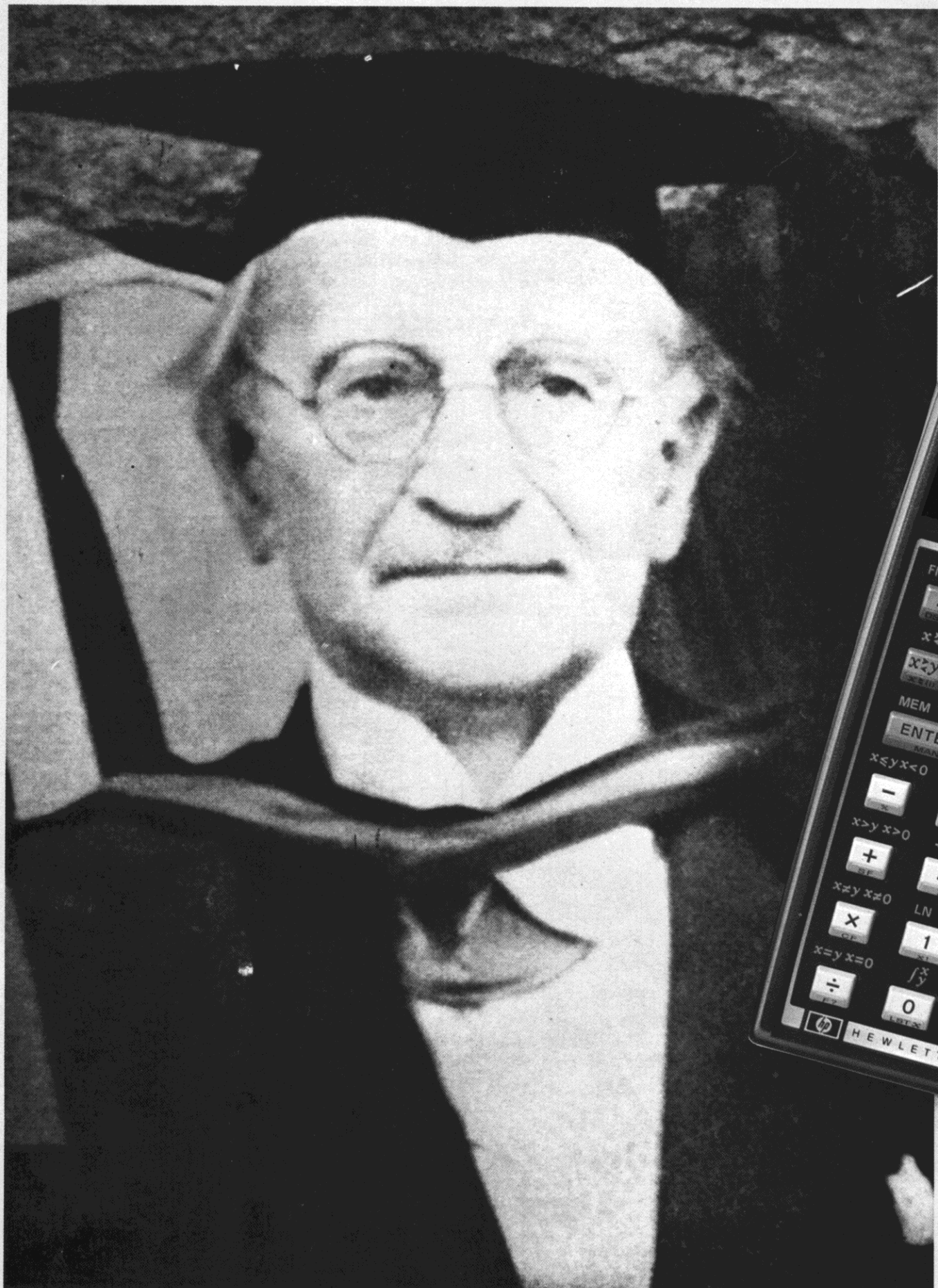
FATHER OF RPN

Jan Łukasiewicz (WookashAYveech) was one of the brightest stars in the constellation of remarkable logicians that emerged in the first decades of this century. His work affected areas of study ranging from the history of Greek philosophy to computer science.

Łukasiewicz was born December 21, 1878 in the Polish city of Lwów, then under Austrian rule, which is now part of the Soviet Union. His father was a captain in the Austrian army. Polish was spoken at home, and Roman Catholic was the practiced religion.

Young Łukasiewicz studied mathematics and philosophy at the University of Lwów, and obtained his Ph.D. in 1902. He remained at that university, advancing rapidly through the faculty ranks, until 1915. He then accepted an invitation to lecture at the University of Warsaw, which was in German occupied territory. Between the World Wars, as a citizen of independent Poland, Łukasiewicz was Minister of Education (1919), professor at the University of Warsaw (1920-1939), Dean of the School of Philosophy, and twice Rector of the university. By the time he left Warsaw, in 1944, he had published approximately eighty works, with articles on psychology, mathematics, and philosophy (mainly logic). His publications also included studies on the history of philosophy, major book reviews, scholarly monographs, and introductory textbooks. Łukasiewicz was a much-admired and gifted teacher. His lucid lectures attracted students from all the departments represented at the University of Warsaw.

Łukasiewicz and his wife Regina endured much suffering during World War II. In the first months of the war, his house was bombed and burned; and his library, including all his manuscripts, was lost. In his own words, "it was impossible to continue the work during the war." Unable to work, he began giving lectures at the underground university in Warsaw. He also helped govern the city under the German occupation.

Shortly before the disastrous Warsaw uprising of August, 1944, friends in Switzerland and Germany helped him out of Poland. He was illegally in the German city of Munster when it was liberated by American troops in April 1945.

In 1946, Łukasiewicz, then exiled in Belgium, accepted the Chair of Logic at the Royal Irish Academy and became a member of the Institute of Advanced Studies—both in Dublin. There he resumed the scholarly work interrupted by the war, producing ten additional publications. Łukasiewicz remained in Dublin until his death on February 13, 1956.

Following early essays on logic principles, Łukasiewicz had arrived, by 1917, at the conception of a three-valued propositional calculus—True, False, and Don't Know. (Propositional calculus is literally a method for calculating the truth value of a sentence, just as algebra is a method of calculating the truth value of a numerical equation.) A notable by-product of this logic was the idea of a "truth table" which now appears in elementary schools all over the world.

Included among Łukasiewicz's major contributions was his development of "Polish Notation." This notation simplifies the evaluation of arithmetic expressions by eliminating parentheses and needless punctuation. Reverse Polish Notation (RPN) is implemented in HP calculators by means of the four-register stack, the Enter key, and the convention of postfix operators. (The term "postfix operators" simply means that you specify the operation to be performed after the entry of one or two variables, rather than before, as provided by Łukasiewicz's notation.) In other words, Łukasiewicz developed the notation; and HP, through extensive research, developed RPN as a workable system for calculators. RPN makes it possible to perform compound calculations with a minimum of special symbols, and no punctuation. The probability of making errors on the RPN system is lower, and error recovery is straightforward and simple. With the elimination of parentheses, and the consistency of the entry convention, the system is designed to accept more of the problem-solving burden, while minimizing the operator's time and energy expenditures.

Łukasiewicz lived long enough to see the emergence of the computer age and the implementation of some of his ideas. In his statement about the philosophy of science and mathematics, he repeatedly emphasized the intrinsic value of this work:

"Just as art grew out of the craving for beauty, science was created by the urge for knowledge. Seeking the goals of science outside the intellectual sphere is as great a mistake as cramping art by considerations of usefulness. The saying 'art for art's sake' and 'science for science's sake' are equally valid."
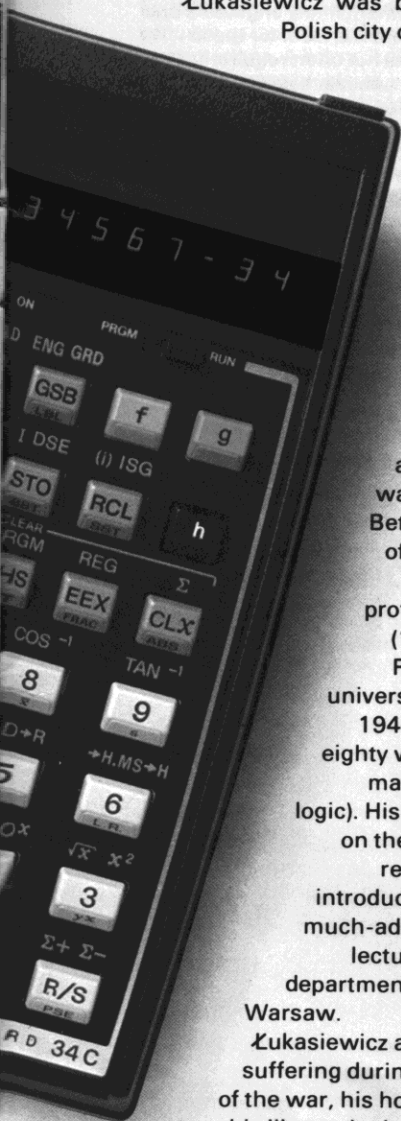
Buyer's Guide

Preprogrammed Financial.

Many business people are significantly extending their professional capabilities by switching from simple four-function calculators to advanced calculators. The preprogrammed calculator is an ideal step-up, even for people who do not think they possess skills in math and statistics. With a few simple keystrokes, the preprogrammed calculator provides fast and accurate solutions to a wide range of financial and statistical problems. If you are interested in the advantages of a preprogrammed financial calculator, you should study the data on this instrument:

HP-37E

Business. Page 22.

Advanced Financial Programmable.

The advanced financial calculator with programmability is ideal for financial analysts, realtors, bankers, and other business professionals. Many basic financial problems can be solved using the built in time and money functions; number of periods (n), interest (i), present value (PV), payment (PMT), and future value (FV). For more complex and repetitive computations, keystroke programming is particularly helpful. And you don't even have to write your own programs. Applications Books provide the solutions. With keystroke programming you can save hours of time. Once a program is keyed into the calculator you can use it over and over with no possibility of human error. And if you use a program frequently, the Continuous Memory feature, which allows you to retain programs and data even with the calculator switched off, will be especially useful. If keystroke programming sounds logical for you, look at the information on this calculator:

HP-38C

Advanced Financial Programmable with Continuous Memory. Page 22.

Preprogrammed Scientific.

A preprogrammed calculator is the first advanced instrument many engineers and scientists use, and it is ideal for those whose work does not often require repetitive computations. It is also a good choice for engineering students who want to shorten the time required for problem solving. If you are interested in a preprogrammed scientific, you should look at the data on this calculator:

HP-32E

Scientific with Statistics. Page 20.

HP-37E

HP-38C

HP-32E

Selecting the right calculator is no longer a simple matter of evaluating features, functions and price. With the wide range of advanced instruments available today, proper selection now depends largely on a careful analysis of your professional needs and— more importantly—your personal growth. Indeed, the selection of a calculator which you feel may be somewhat in advance of your current needs, can significantly speed your growth by expanding your problem-solving capabilities. The information in this BUYER'S GUIDE should make it easy for you to select the HP calculator that will do the best possible job for you.

Keystroke Programmable Scientific.

The keystroke programmable is invaluable for those who frequently deal with complex or repetitive scientific computations. A keystroke programmable can solve these problems automatically when it is programmed to do so. Then, all you have to do is key in your data and let the calculator run the entire computation. For those who use a few programs frequently, the Continuous Memory feature will be especially useful. This feature makes it possible to retain programs and data even when the calculator is turned off. If keystroke programming sounds logical for you, look at the information on these two calculators:

HP-33C

Programmable Scientific with Continuous Memory. Page 20.

HP-34C

Advanced Programmable Scientific with Continuous Memory. Page 19.

Fully Programmable.

The fully programmable is a powerful, flexible and comprehensive advanced calculator. Complex programs can be stored permanently on small magnetic cards and used in the calculator over and over again. Prerecorded program cards are available for a number of areas such as business, math, statistics, medicine, surveying, electrical engineering and many others. If you are looking for a calculator that will provide you with maximum capability, check the data on these two instruments:

HP-67

Handheld Fully Programmable. Page 24.

HP-97

Desktop Fully Programmable Printing. Page 25.
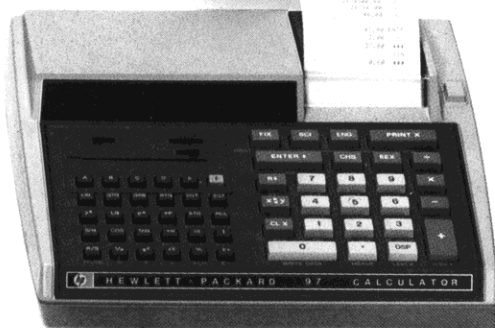
Alphanumeric Fully Programmable.

While the alphanumeric full performance programmable is the most powerful personal advanced calculator, it is remarkably uncomplicated, communicating in familiar words, so operation is simple even for the novice. Alone it is an extraordinary calculating instrument. Yet it also constitutes the heart of an exceptional personal calculating system that is adaptable to your computational needs. When combined with peripherals and modules, you can develop an expanded, growing system matched to virtually any requirement. If you are interested in the advantages of a powerful flexible calculating system, you should look at the information on the HP-41C:

HP-41C

Alphanumeric Full Performance Programmable. Page 12.

HP-67

HP-33C HP-34C

HP-97

HP-41C

HP-41C

Alphanumeric Full Performance Programmable

A Calculator. A System. A Standard for Professionals.

The Calculator.

The HP-41C incorporates the latest in calculator technology to give you the most powerful personal calculator Hewlett-Packard has ever designed. Power that begins with 63 data storage registers or up to 400 lines of program memory and can expand to 319 registers for data storage or over 2,000 lines of program memory. Or any combination. While at the same time, the HP-41C sets a new standard in ease-of-use. Its alphanumeric capabilities provide communication in words as well as numbers, so operation is simple even for the novice. And you can customize the keyboard to meet special needs. Add to this Continuous Memory, new heights in preprogramming ease and sophistication, the added capabilities of optional peripherals, and RPN logic, and you have the HP-41C—a genuine contribution to calculator technology from Hewlett-Packard.

Communication with the HP-41C.

The HP-41C's alphanumeric capability lets you name and label programs, functions, variables, constants—and prompt for data with words or sentences. Status annunciators indicate mode conditions. Messages pinpoint calculation errors and ten different tones provide aural feedback. And the HP-41C utilizes a liquid-crystal display (LCD) that is easy to read whether you're in the office or out in bright sunlight.

Customization to Your Own Design.

There are over 130 separate operations in the function library and 58 functions right on the keyboard. And, you can reassign any standard function, any programs you've written, or programs provided in the Application Modules—to any keyboard location you wish. Blank keyboard overlays let you notate these assignments.

Continuous Memory Saves Everything.

Continuous Memory preserves all your program, data and key assignments even when the calculator is turned off. As a result, you can program frequently needed calculations once and call them up again and again. This capability means reduced power consumption and longer battery life.

Enhanced Programmability.

With the HP-41C there is no complicated language to learn. And alpha capability lets you label programs with easy-to-remember names. Each program is autonomous and each can have up to 99 local labels for branching within a program. The HP-41C also features: up to 6 levels of subroutines, 10 conditional tests, 56 internal flags, powerful loop control, indirect addressing, and local and global branching.

Optional Peripherals.

Adding any or all of the optional plug-in peripherals and modules to the HP-41C expands its capabilities to keep pace with your growing computational requirements.

Physical Specifications:

- Length: 14.4 cm (5.7")
- Width: 7.9 cm (3.0")
- Height: 3.3 cm (1.3")
- Weight: 210 g (7.4 oz)

For a complete list of key features and functions, see the Comparison Chart on page 30.

The HP-41C Alphanumeric Full Performance Programmable Calculator comes complete with:

- HP-41C Owner's Handbook and Programming Guide
- A tough pliable carrying case
- Four type N batteries
- Overlay packet
- HP-41C Quick Reference Card
- HP-41C Standard Applications Book
- Module Holder
- A free, one year subscription to *HP Key Notes,* the HP programmable calculator user's newsletter.
- Subscription form for the Hewlett-Packard Users' Library

The System.

Expand System Capabilities.

Alone, the HP-41C is a powerful programmable problem-solving calculator. Adding optional plug-in peripherals and
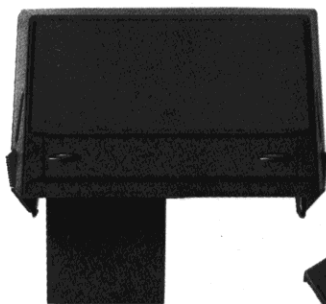
The Card Reader.

Memory Modules.
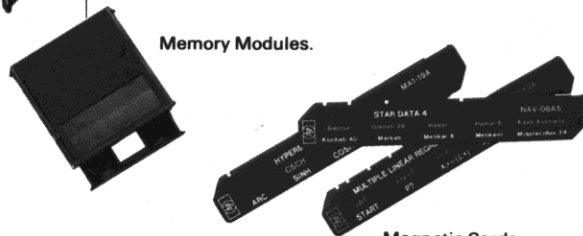
Magnetic Cards.

modules gives the HP-41C increased capability and adds new dimensions in flexibility. It can become a printing calculator, can save hundreds of programs on magnetic cards, or can even become a "specialized" problem-solving machine. You can plug in any number of options, up to four, in any combination that you need.

Self-Contained Peripherals.

Each quick-connect peripheral and module is self-contained, with its own set of functions that can be added to the calculator's existing function library. And each is fully portable, coming complete with what you need for immediate use—including comprehensive instructions.

Memory Modules.

These handy Memory Modules can actually quintuple the HP-41C's memory. Just plug in as many as you need—up to four—to increase data storage and program memory. Each memory module contains 64 data storage registers or up to 400 lines of program memory or any combination you select.

Like the calculator itself the memory modules have Continuous Memory. When installed in the HP-41C, a module maintains data and program lines even when the calculator is turned off.

Card Reader.

The HP-41C Card Reader is a valuable option which lets you save programs and data on small magnetic cards. This extra-smart card reader keeps track of cards as they are read and it even prompts you for the next card. A security feature permits a program to be run but not reviewed or altered through normal operations. An added bonus is that it also accepts program cards from the HP-67 and HP-97, although some programs may require additional memory modules.

Printer

The HP-41C Printer is a whisper-quiet, battery operable thermal printer which easily plugs into the calculator. It gives you numeric, upper- and lower-case alpha, double-wide characters, plotting capability, and intensity control for optimum contrast and readability. It even allows you to define your own "special" characters. Portable and lightweight, the HP-41C printer operates on batteries or ordinary house current, working when and where you need it.

The HP-41C Printer is a valuable aid in editing programs or checking long calculations. You will see everything at once, clearly on tape.

Application Modules.

Each preprogrammed Application Module turns the HP-41C into an answer machine for a particular discipline. Whether you're an engineer or technician, student or scientist, business person or professional, you'll find an Application Module to solve problems in your area of interest. Each comes with a comprehensive manual as well as a keyboard overlay. Areas of application include: Aviation, Clinical Lab and Nuclear Medicine, Circuit Analysis, Financial Decisions, Mathematics, Securities, Statistics, Stress Analysis, Structural Analysis, Surveying, and others . . .

Optical Wand.

The wand allows you to load programs and data into the HP-41C quickly and easily. Plugged into one of the HP-41C ports, the wand reads bar codes from a printed page, translating these codes into HP-41C program and data information and loading it into the calculator. See page 14 for complete information on the Optical Wand.

A Standard for Professionals.

The HP-41C is more than a breathtaking list of functions and options. It is a standard in personal calculators for professionals. Its power, flexibility, and ease-of-use are the result of a remarkable synthesis of the finest state-of-the-art developments and traditional Hewlett-Packard human engineering.
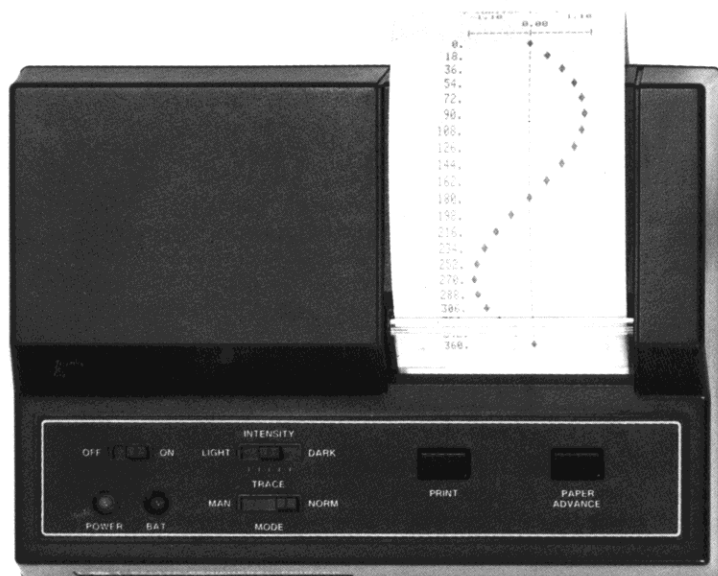
The Printer.

The Optical Wand.

Optical Wand

HP 82153A

The Optical Wand—Unique Input Peripheral for the HP-41C Calculator

The HP 82153A Optical Wand makes possible quick and error-free entry of programs and data for the HP-41C calculator. The Optical Wand reads bar code, a convenient and inexpensive means of inputting and storing HP-41C programs and data. Almost all HP-41C software is available in bar code, including Users' Library programs and Solutions Books.

How Does it Work?

The Optical Wand reads programs and data when the user guides it by hand along a line of HP bar code. The Optical Wand can read up to 30 inches of HP bar code per second and may be scanned from either left to right or right to left, whichever the user prefers.

HP bar code read by the Optical Wand is made up of narrow bars, wide bars and spaces printed on paper, usually black on white. The wand contains a light-emitting diode and photosensor that detects changes in the light reflected from the sheet being scanned. The detected signal is digitized and translated by two integrated circuits into instructions the HP-41C understands. The Optical Wand is designed to provide solid-state reliability in a lightweight, yet rugged, package engineered to fit the hand. A push-to-read switch guards against wasted energy and a energy-efficient design lowers power consumption.

Bar Code: Easy, Efficient and Inexpensive

The wand opens up a world of bar code benefits. For instance, bar code listings are convenient, because most are printed on standard paper and storable in a three-ring binder. And bar code shaves expense by using paper, perhaps the most economical storage medium available. Sharing programs is simple, with duplication possible by offset printing or high quality copier and with distribution handled by normal mailing.

In addition, bar code affords you creative programming flexibility. Pressure-sensitive bar code labels are included, allowing you to immediately create a bar code sequence of your own short program or data file.

The Paper Keyboard: Ease in Function Entry

All the HP-41C's functions are printed on a paper keyboard in bar code. By using this paper keyboard, many HP-41C functions can be entered faster and without key errors. The wand scans a short bar code sequence, executes the function, or loads your command. For example, a command normally requiring nine keystrokes can be accomplished in one quick pass of the wand.

Some users may find the paper keyboard especially valuable as an alternative to keying in programs from listings.

Bar Code Production Service

In order to ensure proper high-quality bar code production, Hewlett-Packard has arranged bar code production service with an independent printer. This service allows you to have your custom programs converted to bar code at a very low cost.

The Wand Advantages

Because the wand offers fast input capability, you should consider the wand's advantages in light of your needs and applications. The wand may be advantageous if:

- You generally rely on existing software.
- You need wide distribution of software and data.
- You seldom need to update software.

The wand puts all the HP-41C Solutions Books and Users' Library Programs right at your fingertips.

The Optical Wand: It speeds up entry, averts errors, saves time.

Specifications:

- Power—Draws less than 50 mA at 5V from the HP-41C's batteries.
- Scan angle and distance—Up to 25° from the vertical with tip in contact with bar code medium (the optimum scan angle is 10° to 20°).
- Temperature and Altitude Operating—0° to 45°C, 32° to 113°F Storage— −20° to 65°C, −4° to 149°F 25,000 feet maximum (non-pressurized cabin)

The HP 82153A Optical Wand comes complete with:

- HP 82153A Wand Owner's Manual
- HP 82153A Wand Paper Keyboard
- Standard Pressure-Sensitive Label Set (10 pages—more than 800 labels)
- Three transparent protective sheets

HP-41C Software

The outstanding HP-41C features free you to focus on solutions. And Hewlett-Packard helps provide those solutions with unparalleled software support. You may find the solutions in your field in the form of Application Pacs or Solutions Books. HP-41C software has been carefully designed to effectively increase your problem-solving potential by adding power, flexibility, and versatility to your calculator. And HP-67 and HP-97 magnetic card pacs are compatible, although some programs require additional memory modules. By utilizing any of these software solutions you can make your calculator a highly specialized tool in seconds.

HP-41C Application Pacs

HP-41C Application Pacs are complete with detailed manuals including examples, and plug-in Application Modules that increase the versatility of the HP-41C—adding to your personal decision-making potential.

Choose from:

Aviation

(00041-15018)
- Flight Management
- General Aircraft Weight and Balance
- Determining In-Flight Winds
- Flight Plan
- Position by One or Two VORs
- Course and Speed Corrections

Clinical Lab and Nuclear Medicine

(00041-15024)
Clinical Chemistry
- Beer's Law
- Body Surface Area
- Creatinine Clearance
- Blood Acid-Base Status
- Oxygen Saturation and Content
- Red Cell Indices

Nuclear Medicine
- Total Blood Volume
- Thyroid Uptake
- Radioactive Decay Corrections

Radioimmunoassay Statistics
- Basic Statistics
- Chi-Square Evaluation and Distribution
- t Statistics
- t Distribution

Circuit Analysis

(00041-15006)
- General Network Analysis
- Ladder Network Analysis

Financial Decisions

(00041-15004)
- Compound Interest Solutions
- Internal Rate of Return
- Modified Internal Rate of Return (FMRR)
- Net Present Value
- Loan Amortization Schedules
- Depreciation Schedules
- Bond Price and Yield
- Days Between Dates

Mathematics

(00041-15003)
- Matrix Operations
- Solution to $f(x) = 0$ on an Interval
- Polynomial Solutions/Evaluation
- Numerical Integration
- Differential Equations
- Fourier Series
- Complex Operations
- Hyperbolics
- Triangle Solutions
- Coordiante Transformations

Securities

(00041-15026)
- Bond/Note Price and Yield
- Routines for Option Writers Using the Black-Scholes Evaluation Method
- Warrant and Option Hedging
- Yield on Call Option Sales
- Butterfly Options
- Bull Spread Option Strategy
- Convertible Security Analysis
- Convertible Bond Investment Analysis
- Stock Portfolio Valuation
- Bond Speculation Using Margin

Statistics

(00041-15002)
- Basic Statistics for Two Variables
- Moments, Skewness and Kurtosis
- Analysis of Variance (One Way)
- Analysis of Variance (Two Way, No Replications)
- Analysis of Covariance (One Way)

- Curve Fitting (Linear, Exponential, Logarithmic, and Power Curve)
- Multiple Linear Regression
- Polynomial Regression
- t Statistics
- Chi-Square Evaluation
- Contingency Table
- Spearman's Rank Correlation Coefficient
- Normal and Inverse Normal Distribution
- Chi-Square Distribution

Stress Analysis for Mechanical Engineers

(00041-15027)
- Section Properties
- Beams
- Simply Supported Continuous Beams
- Columns
- Mohr Circle Analysis
- Strain Gage Data Reduction
- Soderberg's Equation for Fatigue
- RPN Vector Calculator

Structural Analysis for Civil Engineers

(00041-15021)
- Section Properties
- Beams
- Simply Supported Continuous Beams
- Settling of Continuous Beams
- Continuous Frame Analysis
- Steel Column Formula
- RPN Vector Calculator
- Reinforced Concrete Beam
- Concrete Columns
- Effective Moment of Inertia for Concrete Sections

HP-41C Software

Surveying

(00041-15005)
- Traverse, Inverse and Sideshots
- Compass Rule Adjustment
- Transit Rule Adjustment
- Intersections
- Curve Solutions
- Horizontal Curve Layout
- Vertical Curves and Grades
- Resection
- Predetermined Area
- Volume by Average End Area
- Volume of a Borrow Pit
- Coordinate Transformation

Machine Design

(00041-15020)
- Circular Cams
- Generation of a Four Bar System
- Progression of a Four Bar System
- Progression of a Slider Crank
- Gear Forces
- Standard External Involute Spur Gears
- Helical Spring Design Forced Oscilator with Arbitrary Function
- Coordinate Transformation
- Points on a Circle
- Circle by Three Points
- Unit Conversions

Thermal and Transport Science

(00041-15019)
- Unit Management System
- Equations of State
- Polytropic Processes for an Ideal Gas
- Isentropic Flow for Ideal Gases
- Conduit Flow
- Energy Equation for Steady Flow
- Heat Exchangers
- Black Body Thermal Radiation

Home Management

(00041-15023)
- Home Budgeting
- Travel Expense Record
- Stock Portfolio Evaluation
- Your Financial Calculator
- Remaining Balance and Accumulated Interest
- Tax Free Individual Retirement Account (IRA) or Keogh Planning
- The True Cost of an Insurance Policy
- Checking Account Reconciliation
- Home Owner's Equity Analysis

Games

(00041-15022)
- Super Bagles
- Biorhythms
- Craps
- Hangman
- Pinball
- Space War
- Submarine Hunt

Navigation (available early 1981)

(00041-15017)
- Rhumbline and Great Circle Sailing
- Great Circle Course and Distance
- Dead Reckoning
- Sight Reduction
- Perpetual Almanac—Stars, Sun, Planets, Moon
- Almanac Interpolater
- Great Circle Position

Real Estate (available early 1981)

(00041-15016)
- Internal Rate of Return
- Modified Internal Rate of Return
- Net Present Value
- Income Property Analysis
- Wrap-Around Mortgage
- The Rent or Buy Decision
- Present Value of an Increasing/ Decreasing Annuity
- Annual Percentage Rate of a Loan with Fees

Petroleum Fluids (under development)

(00041-15039)

HP-41C Soluticns Books

HP-41C Solutions Books provide complete step-by-step keystroke listings, to help provide you with answers to your general or specialized programs. Printed bar code now available.

Choose from:

Business

Business Statistics/Marketing/ Sales (00041-90094)

- Forecasting Using Exponential Smoothing
- Seasonal Variation Factors (SEVAR)
- Multiple Linear Regression
- Normal, t and f Distributions
- Grouped Statistics
- Moving Average
- Breakeven Analysis
- Compertz Curve
- Experience (learning) Curve for Manufacturing Cost
- Price Elasticity of Demand

Home Construction Estimating (00041-90096)

- Concrete Volume
- Linear to Board Feet Conversions and Costing
- Framing Board Feet
- Lumber Estimate
- Shingle Estimate
- Wall and Ceiling Areas Estimate
- Wallpaper Estimate
- Drywall and Insulation Estimate
- Sheathing and Subfloor Estimate
- Painting Estimate
- Wood Floor Estimate

Lending, Savings & Leasing (00041-90086)

- Constant Payment to Principal Loan
- APR With Fees/Discount
- Rules of 78's
- Amortization Schedule
- Add-on to APR with Odd Days
- Savings Plan
- Interest Conversions
- Lease with Additional Payments in Advance
- Skipped Payments
- Compounding Periods Different from Payment Periods
- Compound Interest Solutions

Real Estate (00041-90136)

- Ellwood Analysis
- Analysis of Income Property
- Wrap-Around Mortgage
- Amount of Equity at Any Time
- Mortgage Yield
- Mortgage Pricing
- Investment Analysis for Property and Land
- Residential Analysis (Rent or Buy)
- Variable Analysis of Real Estate Investment
- IRR
- Shopping Center Rent Projections

Small Business (00041-90137)

- Hourly Payroll
- Invoicing
- Account Posting
- Percentages and Proportions with Tabulator
- Retail Inventory Monitor
- Estimating Inventory
- Inventory Ordering
- Order Point Calculations
- Working Capital Needs—Bardahl Formula
- Depreciation Schedules
- Breakeven Analysis

Computation

Geometry (00041-90084)

- Sine Plate Solutions
- V Notches and Long Radii
- Internal and External Tapers
- Points of Tangency with Circles and Arcs
- Line-Line Intersection
- Points on a Straight Line
- Grid of Points: Calculates All Points
- Grid of Points: Calculates Discrete Points
- Tangent Circle to Two Straight Lines with a Given Radius
- Distance Between Lines in Space

High-Level Math (00041-90083)

- Sine, Cosine, Exponential Integrals
- Eigen Values/Vectors of 3rd Order Systems
- Eigen Values for 3rd Order System
- Chebyshev, Legendre, Hermite, and Laguerre Polynomials
- Sixteen-Point Gaussian Quanratune
- Gamma Function
- Bessel Functions, Error Function
- Characteristic Equation of a 4×4 Matrix
- 4×4 Matrix Operations

Test Statistics (00041-90082)

- One Sample Test Statistics for the Mean
- Test Statistics for the Correlation Coefficient
- Differences Among Proportions
- Behrens-Fisher Statistics
- Kruskal-Wallis Statistic
- Mean-Square Successive
- The Run Test for Randomness
- Intraclass Correlation Coefficient
- Fisher's Exact Test for a 2×2 Contingency Table
- Bartlett's Chi-Square Statistic
- Mann-Whitney Statistic
- Kendall's Coefficient of Concordance

Engineering

Antennas (00041-90093)

- Loaded Vertical Antennas
- Loaded Dipole Antennas
- Gain of a Horizontal Rhombic Antenna at Zero Azimuth
- Azimuth Pattern of Cylindrical Array of Antennas
- Colinear Antenna Gain and Pattern
- Beam Pattern for Uniform Array
- Radar Antenna Beamwidth and Gain
- Antennas
- Parabolic Antenna Calculations

- RF Path Loss, dB
- Antenna Gain or Power of a Remote Transmitter
- Planar Phased Array Radar Beam Positions
- Shortwave Transmission Path Calculations

Chemical Engineering (00041-90100)

- Straight Fin Efficiency
- Conservation of Energy
- Hydrocarbon Combustion
- Heat Transfer through Composite Cylinders and Walls
- Von Kármán Analogy for Heat and Mass Transfer
- Equations of State
- Reversible Polytropic Process for an Ideal Gas
- Conduit Flow
- Fluid Transport Numbers
- Single Stage Equilibrium Flash Calculation
- Weak Acid/Base Titration Curve

Civil Engineering (00041-90089)

- Steel Column Formula
- Reinforced Concrete Beams
- Stress in Thick-Walled Cylinders
- Properties of Special Sections
- Compressive Buckling
- Vectors
- Beams Fixed at Both Ends
- Simply Supported Beams
- Cantilever Beams
- Bolt Torque

Control Systems (00041-90092)

- Frequency Response of a Transfer Function
- Bode of Transfer Function that has Each Pole and Zero Given
- Bode of Third Order Over Fourth Order Transfer Function
- Bode of Third Order Over Third Order Times S**N Transfer Function
- Routh Test for Continuous and Discrete Time System Stability
- Convert Frequency Response—Open Loop, Closed Loop
- Aid to Root Locus Plots I—Real Poles
- Aid to Root Locus Plots II—Complex Poles
- Classical Control Gains
- First Order Regulator
- Second Order Regulator

Electrical Engineering (00041-90088)

- RC Timing
- Frequency Response of a Transfer Function
- Transistor Amplifier Performance
- Class A Transistor Amplifier Bias Optimization

- Active Filter Design
- Butterworth Filter Design
- Chebyshev Filter Design
- Bode Plot of Butterworth and Chebyshev Filters
- Transmission Line Calculations
- Transmission Line Impedance

Fluid Dynamics and Hydraulics (00041-90139)

- Conduit Flow
- Flow with a Free Surface
- Pipe Slide Rule
- Forces at Bends and Fittings
- Valve Sizing
- Pipe Network Analysis
- Restriction Metering Orifice Calculation
- Energy Equation for Steady Flow
- Compressible Flow in Ducts
- Flood Routing and Hydrographs

Heating, Ventilating, and Air Conditioning (00041-90140)

- Overall Heat Transfer Coefficient
- Insulation Break Even Analysis
- Air Flow in Circular Ducts
- Air Duct Conversion
- Equations of State
- Black Body Thermal Radiation
- Psychrometric Properties
- Heat Exchangers
- Decibel Addition and Subtraction
- Temperature Conversions

Mechanical Engineering (00041-90090)

- Gear Forces
- Stress on an Element
- Equations of State
- Soderberg's Equation for Fatigue
- Spring Constant
- Progression of a Slider Crank
- Free Vibrations
- Interference Fits
- Linear or Angular Deformation
- Constant Acceleration

Solar Engineering (00041-90138)

- Solar-Beam Irradiation
- Sun Altitude, Azimuth, Solar Pond Absorption
- Energy Equivalents—Fuels and Prices
- Solar Shading Angles
- Heat Exchangers
- View Factor
- Sun Almanac
- Heat Transfer
- Black Body Radiation

Other

Calendars (00041-90145)

- Calendar Date/Julian Date Conversion
- Day of Year—Day of Week

- Number of Weekdays between Two Dates
- In What Year is a Given Date an M-Day
- Number of M-Days between Two Dates and N^{th} M-Day of Month
- Holidays
- Religious Holidays
- Chinese Years to/from Gregorian Years
- New Moon and Full Moon Day of Month
- Calendar Printout

Cardiac/Pulmonary (00041-90097)

- Pulmonary Functions
- Body Surface Area
- Blood Chem I
- Blood Chem II
- Cardiac Outputs
- Cardiac Shunts
- Contractility and Stroke Work
- Lung Diffusion
- Valve Area
- Ventilator Calculations

Chemistry (00041-90102)

- pH of Weak Acid/Base Solutions
- Acid-Base Equilibrium (Diprotic)
- Weak Acid/Base Titration Curve
- Equations of State
- Van Der Waals Gas Law
- Beer's Law and Absorbtivity Calculations
- Activity Coefficients from Potentiometric Data
- Crystallographic to Cartesian Coordinate Transformations
- Kinetics Using Lineweaver-Burk or Hofstee Plots
- Mixture Viscosities
- Vapor Pressure, Bubble and Dew Point Calculation
- Single-Stage Equilibrium Calculation

Games (00041-90099)

- Hexapawn
- Wari
- Nim_k
- Dice
- 3-D Tic Tac Toe
- Hunt the Wumpus
- Simon
- Planet Lander
- Orbital Lander
- Scatter
- Flip-Flop

Optometry I (General) (00041-90143)

- Aniseikonia
- Crossed Prism Resultant
- Obique Cylinder Sum
- Low Vision; Determination of Activity Demand from Letter Size and Working Distance
- Contact Lens, Telescope Calculations

- Calculation of Needed Magnification, Add, and Working Distance
- Effective, Equivalent and Neutralizing Power
- Lens Power Needed at New Vertex Distance
- Positional Effective Power
- Pratt, Sheard, Percival Methods of Near R_x
- Four Accommodative R_x's and their Average

Optometry II (Contact Lens) (00041-90144)

- Back Vertex Power of PMMP Contact Lens
- Effective Power of Spectacle Lens at Corneal Plane
- Residual Cylinder Induced at Tear/Cornea Interfaced by Contact Lens
- Cylinder Induced by Toric Contact Lens
- Contact Lens Power Necessary to Correct Ametropia
- Toric Contact Lens Parameters
- Tabb Contact Lens of 1st Approximation
- May-Grant Contact Lens of 1st Approximation
- Roggenkamp Specification for Prism Ballast Front Toric or Prism Ballast Contact Lens
- Brungardt I
- Brungardt II

Surveying (00041-90141)

- Spiral Curve Layout
- Two Instrument Radial Survey
- EDM Slope Reduction
- Stadia Reduction
- Three Wire Leveling
- Azimuth of the Sun
- Taping Reduction
- Triangle Solutions
- Traverse for Auto Adjust Routines
- Auto Adjust for Compass Rule
- Auto Adjust for Crandall's Rule

Physics (00041-90142)

- Black Body Thermal Radiation
- Black Hole Characteristics
- Special Relativity Conversions
- Three-Dimensional Special Relativity
- Einstein's Twin Paradox
- Delta-V Orbit Simulator
- Equations of Motion
- Isotope Overlap Corrections
- Semi-Empirical Nuclear Mass Formula
- Clebsch-Gordon Coefficients and 3j Symbols Evaluation
- 32-P Remaining on MM.DDYYYY Given

(Solutions Book titles and program listings subject to change without notice.)

Series E/C

What is Series E/C?

Series E/C is Hewlett-Packard's complete family of affordable scientific and financial calculators specifically designed for the student and the professional. Five calculators make up the Series E/C family—from the basic HP-32E to the advanced HP-34C. Whether business or science, student or professional, there is a Series E/C for every need!

Proven Performance from the Logical Choice

RPN

Series E/C uses RPN—the computer-like logic that is recognized as the most powerful and efficient logic system for solving complex problems. With RPN, or Reverse Polish Notation, you simply treat problems the same way as if you were solving them with pencil and paper. The simplicity of RPN as well as its superior speed in operation, make it the logical choice for user satisfaction.

Time-Tested Function Sets

The most widely used functions are already preprogrammed into Series E/C calculators. This means that to get many complex answers you need press only one key. Solutions to problems like finding the net present value or determining a definite integral are pushbutton easy. And all Series E/C calculators have internal accuracy up to 10 digits—so you can have confidence in your answers.

Continuous Memory

With Continuous Memory, frequently needed calculations and functions are programmed once and remain intact even when the calculator is turned off. It saves time by eliminating program reloading and makes possible the addition of specialized functions.

Total Design Engineering

Designed To Be Used

All Series E/C calculators fit your hand comfortably. There's no twist or play in the case. When you press a key, you'll notice a quiet, positive click. This "positive tactile feedback" lets you know that the calculator has executed your keystroke, thereby eliminating the need to continually monitor the display. The size and shape of the keys let you easily read the symbols on them. The spacing minimizes the chance of pressing more than one key at a time—a distinct possibility on a small keyboard with many keys. The battery compartment door is designed to open easily (but not accidentally), without using a coin or key. And low-level battery indicators help prevent the frustration of an unexpected power loss.

Easy-To-Read Display

To help you read large numbers more easily, commas or periods are automatically inserted, just as you would write them yourself. And the large, bright red digits are tilted forward for easy reading from any working angle.

Instant Problem-Spotting

An internal self-test routine is built right into Series E/C calculators. At the press of two keys, the calculator quickly checks all of its internal circuitry, then flashes −8,8,8,8,8,8,8,8,8,8, to reassure you of correct operation. Also, if you make a mistake in your calculations, special error codes appear in the display to help you track it down.

Software . . . Of Course!

Handbooks that Help

HP's Owner's Handbooks have long been respected for the clear and thorough manner of presentation. Complete step-by-step documentation makes it easy for you to understand all of your calculator's capabilities—and then to apply that capability to your "real-life" problems.

Software Solutions

Sixteen Applications Books are available for the Series E/C family. Such subjects as: Mathematics, Surveying, Real Estate, Student Engineering, and Investment Analysis & Statistics are among the many offerings.

And Afterwards . . .

All Series E/C calculators come with a one-year warranty. And should your calculator need service or repair, you'll be in good hands. HP's service and repair facilities reflect the highest level of customer support—and rapid turnaround time.

Series E/C is all of this and much, much more. It's rigid quality assurance testing to ensure the high standards expected from Hewlett-Packard. It's continual support to meet your expanding needs. It's a full line of accessories which give you the flexibility and convenience you desire. It's **Excellence by Design** from Hewlett-Packard.
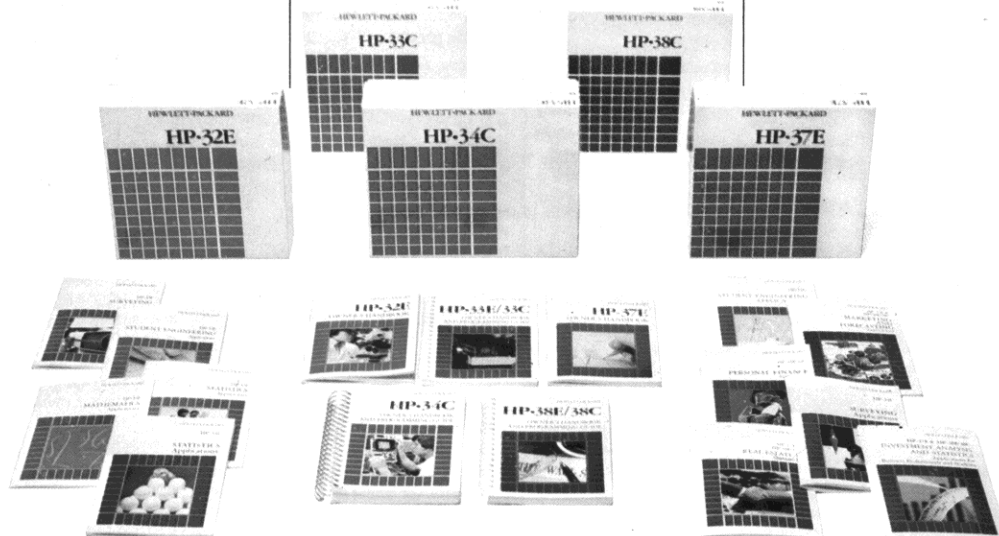
HP-34C

Advanced Programmable Scientific with Continuous Memory

Advanced keystroke programming plus computer strength Solve and Integrate keys.

Designed for technical professionals and students who need the flexibility and power of advanced programming to handle their frequent and repetitive problems, as well as a full set of preprogrammed scientific functions including "Solve" and "Integrate." And Continuous Memory, so you can key data and programs in once, and retain them even when the calculator is turned off.

Solve and Integrate.

The Solve and Integrate operations are the most advanced and powerful ever found on a handheld calculator. Yet both feature an ease of operation that must be seen to be appreciated. Solve finds the real roots of equations, and Integrate finds the definite integrals of any function which can be keyed into program memory. To use either Solve or Integrate begin by simply keying in the function you wish to evaluate. Then . . .

. . . to find a root, enter two guesses and put Solve to work for you. Even if your guesses don't bracket the root, Solve's sophisticated algorithm expands the search automatically. The HP-34C's ability to find a root is one of the most advanced ever created—even compared to full scale computers. Imagine, *this* power in a personal, handheld product!

. . . to calculate an integral, enter the limits of integration and let the HP-34C take care of the laborious computations. The HP-34C's ability to find an integral was previously found only in large computer systems—it has never been this easy.

Dynamic Memory Allocation.

The HP-34C's memory allocation begins with 70 lines of program memory and 21 data storage registers. When you need more than 70 lines of program memory, the HP-34C *automatically* converts data registers, one at a time, to a maximum of 210 program lines—as you need them. And you don't have to remember current memory allocation. The HP-34C does that for you.

Programming and Editing.

Each fully-merged program instruction, whether one, two, or three keystrokes, requires only one line of program memory. This means the HP-34C's maximum of 210 program lines are comparable to as many as 370 program lines on other calculators. And editing is no problem. The HP-34C's editing keys let you easily review programs and insert or delete instructions as needed.

More Programming Features.

The HP-34C's 12 reusable address labels let you easily create branches and subroutines. With the conditional test set of four x/y comparisons, four x/0 comparisons, four flags, plus the increment/decrement loop counter, you can program the HP-34C to make a wide range of program control decisions. And, with the versatile I-register, you can indirectly address data and program locations.

Compare the HP-34C's new functions to any other and see if you don't agree—Hewlett-Packard has made another major contribution to technical problem-solving.

Physical Specifications:
- Length: 140 mm (5.6")
- Width: 75 mm (3.0")
- Height: 30 mm (1.2")
- Weight: 220 g (7.7 oz)

For a complete list of key features and functions, see the Comparison Chart on page 30.

The HP-34C Advanced Programmable Scientific with Continuous Memory comes complete with:

- HP-34C Owner's Handbook and Programming Guide
- Solving Problems with your Hewlett-Packard Calculator
- HP-34C Standard Applications Book
- HP-34C Quick Reference Card
- Recharger/AC Adapter
- Rechargeable Battery Pack
- Soft Carrying Case
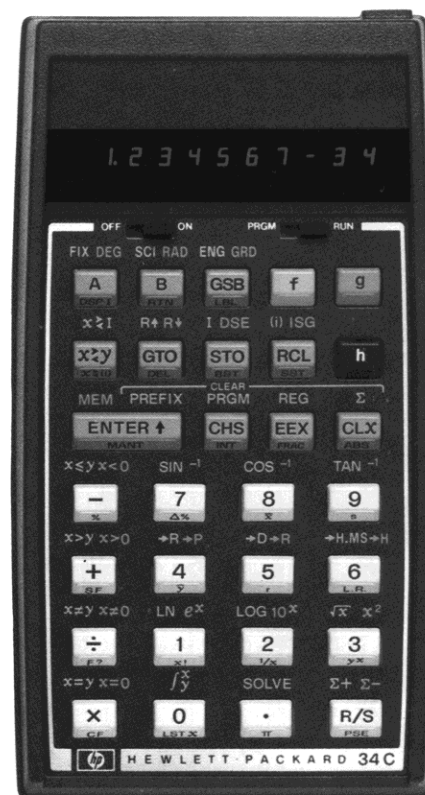
HP-33C
Programmable Scientific with Continuous Memory

HP-32E
Scientific with Statistics

Extraordinary problem-solving power plus an unparalleled combination of keyboard and display functions.

HP-33C

The HP-33C is a keystroke programmable calculator with fundamental programming capability as well as a complete set of preprogrammed scientific functions. Plus Continuous Memory, so you can key data and programs in once, and retain them even when the calculator is turned off.

Programming is Easy.

Programming the HP-33C is simple—just switch to PRGM and press a problem-solving series of keystrokes to be renumbered by the calculator. Then switch to RUN, key in any known data, and hit the run/stop key. The HP-33C does the rest, executing those keystrokes in a few seconds over and over. There's no complicated programming language to learn.

49 Lines of Program Memory.

The HP-33C remembers your program in a special memory—49 lines of it. And no matter whether a keyboard operation is one, two or three keystrokes, it occupies only a single line of memory, so you can easily load programs of 100 keystrokes or more.

More Programming Features.

The HP-33C has a variety of specialized functions to make your programming useful, powerful, and even more fun:

Go To.

The GTO (go) command transfers an executing program to a specified line of memory—permitting you to create branches and loops in your programs.

Powerful Decision-Making Capability.

Fundamental to the operation of even the largest computer is its ability to make a decision. The HP-33C has eight conditionals which actually compare two values and make a decision based on the outcome of the comparison.

Three Levels of Subroutines.

Using the GSB (go to subroutine) instruction, you can save memory and make your programs much more efficient. After a section of memory has been called up as a subroutine, a RTN (return) instruction then returns execution to the next line after the GSB call.

Fast, Easy Editing.

Besides being able to go to any line number with GTO, you can also use SST and BST to single-step or back-step through a program, *without* execution, to any point you want in program memory. Changing a program is easy too—you just key in a new instruction and it automatically replaces the old one.

Pause.

The PAUSE function in a program actually lets you see a result or an intermediate answer for a second before resuming execution.

Eight Addressable Storage Registers.

In addition to the 49-line program memory, the four-register stack, and the LAST X register, the HP-33C has 8 addressable storage registers for data. And you can perform storage register arithmetic on these addressable registers too.

HP-32E

The HP-32E offers sophisticated statistics, as well as thorough scientific capability, at the touch of a key.

One or Two Variable Means and Standard Deviations.

The HP-32E calculates the means of one or two variables, or the sample standard deviations of these data sets—with a keystroke.

Linear Regression and Linear Estimate.

The HP-32E calculates the slope and y-intercept of a least-squares line. It also computes the "correlation coefficient" to measure "goodness of fit", and can predict new values along the line.

Normal Distribution

The HP-32E has both normal and inverse normal distribution functions.

Data Accumulation and Correction.

$\Sigma+$ automatically accumulates Σx, Σy, Σxy, Σx^2, and Σy^2 in designated storage registers. Correcting a data pair is easy.

15 Addressable Storage Registers.

The HP-32E has 15 addressable storage registers. In addition to storing and recalling data, you can also perform arithmetic operations on the contents of the registers.

Trigonometric Functions Including Hyperbolics.

Besides providing sine, cosine, and tangent and their inverses, the HP-32E also computes hyperbolic trigonometric function (sinh, cosh, tanh and their inverses).

Rectangular/Polar Conversions and Vector Arithmetic.

The HP-32E quickly converts rectangular coordinates (x,y) to polar coordinates (r, θ), or vice versa. And vector arithmetic is easy using the rectangular/polar functions.

HP-33C and HP-32E Physical Specifications:

- Length: 140 mm (5.6")
- Width: 75 mm (3.0")
- Height: 30 mm (1.2")
- Weight: 220 g (7.7 oz)

For more details on features, see the Comparison Chart on page 30.

The HP-33C and HP-32E come complete with:

- Owner's Handbook
- Solving Problems with your Hewlett-Packard Calculator
- Recharger/AC Adapter
- Rechargeable battery pack
- Soft carrying case
- Quick Reference Card (**HP-33C only**)
- Standard Applications Book
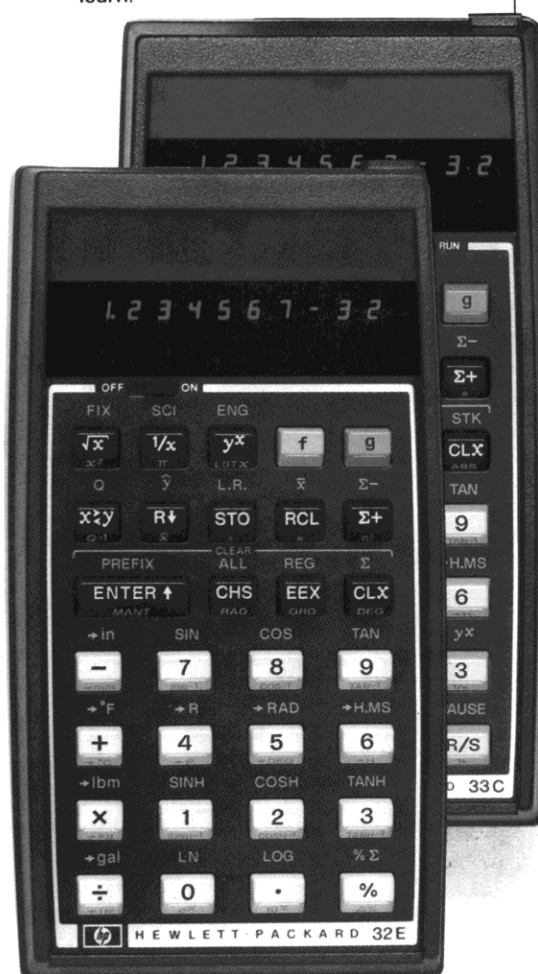
HP-34C
HP-33C Software

Software

The solutions you require for scientific problems may already exist in the Applications Books available for the HP-34C and HP-33C. The Applications Books provide simple explanations and list the step-by-step procedures necessary to arrive at the solutions you need.

HP-34C Applications Books

Mathematics (00034-90032)

- System of Linear Equations with Three Unknowns
- Determinant and Inverse of a 3 × 3 Matrix
- Differential Equations
- Vector Operations
- Coordinate Transformation
- Complex Operations
- Numerical Integration by Discrete Points
- Triangle Solutions
- Circle Determined by Three Points
- Base Conversions

Statistics (00034-90033)

- Basic Statistics for Two Variables
- Factorial, Permutations and Combinations
- Chi-Square Distribution
- t Distribution
- f Distribution
- Chi-Square Evaluation
- Contingency Table
- Normal and Inverse Normal Distribution
- Chi-Square Distribution
- t Statistic

Surveying (00034-90034)

- Azimuth-Bearing Conversions
- Traverse, Inverse and Sideshots
- Traverse Adjustment
- Offset and Bearing-Distance Intersections
- Curve Solutions
- Horizontal Curve Layout
- Bearing-Bearing and Distance-Distance Intersections

Student Engineering (00034-90035)

- Ohm's Law
- Reactance Chart
- Impedance of a Ladder Network
- Series-Parallel Resistor Adding and Standard Resistance Values
- Ideal Gas Equation of State
- Equations of Motion
- Mohr Circle for Stress
- Simply Supported Beams
- Static Equilibrium at a Point
- Conduit Flow
- Kinetic Energy
- Section Properties

HP-33C Application Books

Mathematics (00033-90030)

- Quadratic Equation
- Determinant and Inverse of a 2 × 2 Matrix
- Number in Base b to Number in Base 10
- Number in Base 10 to Number in Base b
- Newton's Method Solution to $f(x) = 0$
- Hyperbolic Functions
- Circle Determined by Three Points
- Complex Arithmetic ($+, -, \times, \div$)
- Complex Functions ($|z|$, z^n, and $z^{1/n}$)
- Simultaneous Equations in 2 Unknowns
- Vector Cross Product
- Numerical Integration, Simpson's Rule
- Inverse Hyperbolic Functions
- Intersection of Line and Line

Statistics (00033-90031)

- Covariance and Correlation Coefficient
- Moments and Skewness
- Factorial Probability
- Random Number Generator
- Normal Distribution
- Exponential Curve Fit
- Power Curve Fit
- t Statistic for Two Means
- Partial Correlation Coefficients
- Permutation Probability
- Combination Probability
- Inverse Normal Integral Distribution
- Logarithmic Curve Fit
- Chi-Square Evaluation
- Paired t Statistic

Student Engineering (00033-90032)

- Ohm's Law and Reactance Chart
- Exponential Growth or Decay
- Black Body Thermal Radiation
- Equations of Motion
- RPM/Torque/Power
- Static Equilibrium at a Point
- Angle Between, Norm and Dot Product of Vectors
- Resistors in Series of Parallel
- Ideal Gas Equation of State
- Natural Frequency of Oscillators
- Kinetic Energy
- Vector Cross Product

Surveying (00033-90033)

- Azimuth-Bearing Conversions
- Bearing Traverse
- Field Angle Traverse
- Compass Rule Adjustment
- Bearing-Bearing Intersection
- Distance-Distance Intersection
- Offset from a Point to a Line
- Curve Solutions
- Elevations Along a Vertical Curve
- Inverse from Coordinates
- Sideshots
- Coordinate Transformation
- Earthwork: Volume by Average End Area
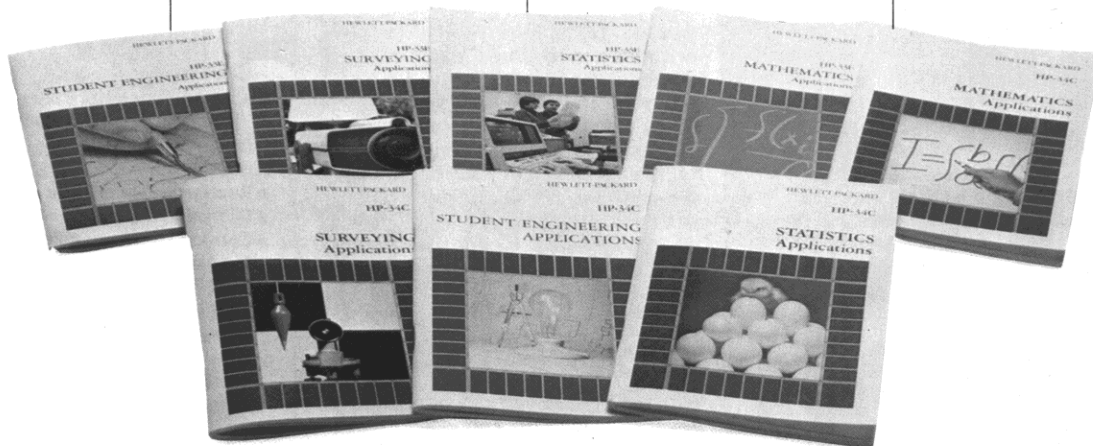
HP-38C
HP-37E

Advanced Financial Programmable With Continuous Memory

Business

Provides an ideal combination of the financial, retail, and statistical capabilities you need in modern business.

HP-38C

The HP-38C is a powerful financial calculator which provides capabilities that are invaluable to managers, financial analysts, consultants, commercial real estate agents, and advanced business students. The HP-38C offers all the financial capability of the HP-37E plus Continuous Memory, so you can key data and programs in once, and retain them even when the calculator is turned off.

Powerful Discounted Cash Flow Analysis.

The HP-38C calculates net present value (NPV) and internal rate of return (IRR) even with uneven cash flows. NPV and IRR let you weigh a leasing situation against buying, balance the worth of an investment against desired yield, or compare investment alternatives.

Easy, Instant Programming.

The HP-38C is so easy to use you'll be writing programs in minutes—or keying in prewritten programs available from one of the optional applications books. By programming the HP-38C you can save hours of time wasted in long, tedious calculation. And once that program is written into the calculator, there is no possibility of human error.

Dynamic Memory Allocation.

The HP-38C's memory allocation begins with 70 lines of program memory and 21 data storage registers. When you need more than 70 lines of program memory, the HP-38C *automatically* converts data registers, one at a time, to a maximum of 210 program lines—as you need them. And you don't have to remember current memory allocation. The HP-38C does that for you.

A Handy 2000-Year Calendar.

The built-in HP-38C calendar can easily calculate the actual number of days between two dates on a 360- or 365-day year, day of the week, or a past or future date.

Statistics at the Press of a Key.

The HP-38C offers all of the statistical capability of the HP-37E plus linear estimate of x for a known y and x_w (weighted average).

HP-37E

The HP-37E is a Series E/C calculator designed specifically for the residential real estate, retailing, and business professionals who need to make fundamental business and financial decisions quickly and accurately.

Simple, Complete Financial Functions.

In addition to built-in price and percent functions and advanced statistical functions, the HP-37E features the basic time and money functions; number of periods (n); interest (i); present value (PV); payment (PMT); and future value (FV). Ordinary or annuity due problems can also be directly calculated at the flip of a switch. The HP-37E's ability to modify the variables in a problem makes it ideal for those "what if?" situations so common in business.

Easy-to-Use Cash Flow Sign Convention.

With the HP-37E you can state any financial problem in a simple, intuitive manner, so you don't have to remember handbook instructions. With this system you can easily solve complex problems such as the yield of a loan with a balloon or the payment on a lease with a buy back option.

Amortization Schedules.

The HP-37E calculates an amortization schedule for any number of time periods.

Retail-Style Percent Functions.

Whether you're solving for percent, percent change, or percent of total, you'll appreciate the logical, consistent operation of the HP-37E. And the unique PRICE function calculates the selling price if you know the cost and the margin.

Seven Addressable Storage Registers.

Besides the five financial registers and the Hewlett-Packard four-register automatic memory stack, the HP-37E is equipped with seven other memories in which you can store or recall constants, answers, or any number you want to save during your calculations.

Statistics at Your Fingertips.

For research and analysis, the HP-37E is packed with useful statistical functions. The $\Sigma+$ key automatically accumulates the values needed to calculate the means (averages) and standard deviations for one or two sets of data.

The HP-37E also provides a linear regression, or trend line function and can compute the correlation coefficient. A factorial function is also available.

HP-38C and HP-37E
Physical Specifications:

■ Length:	140 mm (5.6")
■ Width:	75 mm (3.0")
■ Height:	30 mm (1.2")
■ Weight:	220 g (7.7 oz)

For a complete list of key features and functions, see the Comparison Chart on page 30.

The HP-38C and HP-37E Calculators come complete with:

- Owner's Handbooks
- Your HP Financial Calculator: An Introduction to Financial Concepts and Problem-Solving
- Recharger/AC Adapter
- Rechargeable battery pack
- Soft carrying case
- Coupon for your choice of one of the following applications books:
  Real Estate
  Real Estate II
  Investment Analysis & Statistics
  Lending, Savings & Leasing
  Marketing & Forecasting
  Personal Finance (HP-38C only)

HP-38C
HP-37E Software

Software

The solutions you require for financial problems may already exist in the Applications books available for the HP-38C and HP-37E. The Applications books provide simple explanations and list the step-by-step procedures necessary to arrive at the solutions you need.

HP-38C, HP-37E Applications Books

Real Estate (00038-90024)

- Price of a Mortgage Traded at a Discount/Premium
- Yield of a Mortgage with Balloon Payment One Period After Last Payment
- Equity Investment Value and Present Value
- Modified IRR—Varying Reinvestment Rate (FMRR)
- Number of Periodic Payments to Fully Amortize a Mortgage
- Depreciation (Straight-Line, Declining Balance, and Sum-of-the-Years-Digits)
- Annual Percentage Rate Calculations with Fees
- Refinancing
- Periodic Payment Amount
- Effective Interest Rate (Yield)
- Deferred Annuities
- Present Value of Increasing/Decreasing Annuity

Real Estate II (Income Property Analysis) (00038-90051)

- Before-Tax Cash Flows
- Before-Tax Reversions (Resale Proceeds)
- After-Tax Cash Flows with Multiple Mortgages
- Mortgage Calculation of Basic Rate and Overall Rate
- Calculation of Equity Dividend Rate, Re
- Mortgage Calculation of Value (Present Worth) with Dollar Amounts Given
- Mortgage Calculation of Capital Appreciation or Depreciation on Resale
- Present Worth
- Profitability Index
- Payback Period
- Mortgage Calculation of Cash Throw-Off to Equity, CTO
- Mortgage Calculation of Equity Yield Rate (y) from Dollar Figures
- Feasibility Tests
- Internal Rate of Return

Lending, Savings & Leasing (00038-90025)

Lending

- Annual Percentage Rate Calculations with Fees
- Price & Yield of a Mortgage Traded at a Discount/Premium
- Add-On Interest Rate Converted to APR
- Price of a Mortgage Traded at a Discount/Premium
- Interest Rebate
- Loans with a Constant Amount Paid Towards Principal

Savings

- Nominal Rate Converted to Effective Rate
- Nominal Rate Converted to Continuous Effective Rate
- Initial Deposit with Periodic Deposits
- Compounding Periods Different from Payment Periods
- Effective Rate Converted to Nominal Rate
- Periodic Deposits and Withdrawals

Leasing

- Advance Payments with Residual
- Skipped Payments
- Advance Payments

Investment Analysis & Statistics (00038-90026)

Investment Analysis

- Modified IRR—Varying Reinvestment Rate (FMRR)
- Lease vs Purchase
- Break-Even Analysis
- Bond Purchased Between Coupons
- Bonds Purchased on Coupon Date
- Annual Coupon Bonds

Statistics

- Exponential Curve Fit
- Logarithmic Curve Fit
- Exponential Smoothing
- Mean, Standard Deviation, Standard Error for Grouped Data
- Chi-Square Statistics
- Normal Distribution
- Power Curve Fit
- Standard Error of the Mean
- Random Number Generator

Marketing & Forecasting (00038-90049)

- Simple Moving Average
- Season Variation Factors Based on Centered Moving Averages
- Exponential Curve Fit
- Gompertz Curve Trend Analysis
- Forecasting With Exponential Smoothing
- Breakeven Analysis
- Profit and Loss Analysis
- Markup and Margin Calculations
- Queuing and Waiting Theory
- Operating Leverage
- Calculation of List and Net Prices with Discounts
- Learning Curve for Manufacturing Cost
- Cash Flow Loader
- Percentage Tabulator

Personal Finance (HP-38C only) (00038-90052)

- Tax Free Individual Retirement Account (IRA) or Keogh Plan
- Stock Portfolio Evaluation and Analysis
- True Annual Growth Rate of an Investment Portfolio
- Real Estate Equity Investment Analysis
- True Annual Percentage Interest Rate on a Mortgage With Fees
- Rent Versus Buy
- U.S. Treasury Bill Valuation
- Bond Purchased Between Coupons
- Homeowner's Monthly Payment Estimator
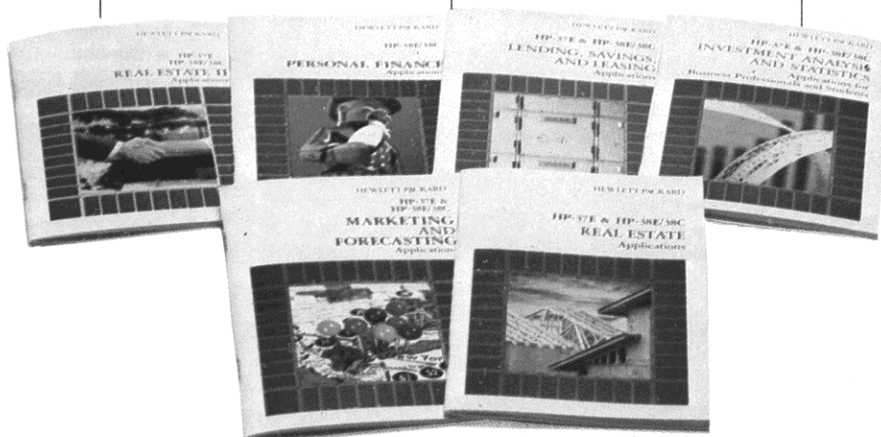
HP-67

Handheld Fully Programmable

Proven Performance in Fully Programmable Calculators.

This proven performance calculator is designed for the most demanding professionals and students who require programming power and versatility to handle multiple and lengthy business and scientific programs. The HP-67 provides the identical power of the HP-97 in the classic handheld size.

Exceptional power easily handles your lengthy, repetitive problems.

The HP-67/97 lets you write programs of up to 224 lines. Every function (one, two or three keystrokes) is merged to take only one line of program memory. And there are 26 data storage registers to provide the memory you need for your problems. You can record the contents of either program memory or the data storage registers on a magnetic card. Later, you can load all or part of them back into the calculator. The "smart" card reader of the HP-67/97 can handle either job. The HP-67 and HP-97 are also completely compatible. Programs recorded on one unit may be loaded and executed on the other.

So easy to use you'll write programs the first day.

Keystroke programming makes programming the HP-67/97 as simple as pressing the keys needed to calculate answers manually. Merged operations further simplify the task (and expand memory power) by letting you see the complete operation right in the display.

Because many programs require editing of some kind, we added useful features enabling you to easily review programs forward or backward, to easily jump to any line in the program, and to easily insert lines or delete them. RPN logic and the four-register automatic memory stack combine for more efficient problem solving. And RPN logic also helps when you program, because you don't use parentheses that waste valuable program memory.

And there are no pending operations that make editing difficult. RPN lets you slide through the most complicated programs the same easy way it lets you slide through complex calculations—with complete confidence.

The HP-67 and HP-97 give you exceptional programming power you won't outgrow.

"Smart" magnetic card reader.

With the magnetic card reader in both the HP-67 and the HP-97 you can load the entire program memory, or selected portions, either manually or under program control.

You can record data from all registers onto a magnetic card. You can also load every data storage register or selected registers.

When recording programs, the HP-67 and HP-97 automatically record the angular mode setting, the display setting and the status of the four flags.

10 User-Definable Keys.

There are ten user-definable keys you can use for any special function you may require—such as defining portions of your program for subroutines or branches. In addition, there are ten numerical labels (LBL 0 thru LBL 9).

GTO **GSB**

You can perform a direct branch or subroutine to a label specified.

A GSB instruction can also be used with a subroutine to a depth of three levels.

Conditional Branching

$x{\neq}y$, $x{=}y$, $x{\leq}y$, $x{>}y$,

$x{\neq}0$, $x{=}0$, $x{<}0$, $x{>}0$

These keys allow your program to make decisions for you by testing the values in the X- and Y-registers or by testing the value in the X-register against zero as indicated.

Flags

You can use the four flags in the calculator for tests in your programs. They can be set, cleared, or tested.

Indirect Addressing.

GTO **(i)** **GSB** **(i)**

You can perform a direct branch or subroutine to a label specified by the current positive number in the I-register using these keys. When the number in the I-register is a negative number these instructions perform a direct branch (GTO (i)) or a subroutine (GSB (i)) backward the number of lines specified.

STO **(i)** **RCL** **(i)**

You can also use the I-register to specify the address of a storage register for storing and recalling data or for storage register arithmetic.

ISZ **(i)** **DSZ** **(i)**

You can also increment (ISZ (i)) or decrement (DSZ (i)) the contents of the storage register specified by the value in the I-register and then test against zero.
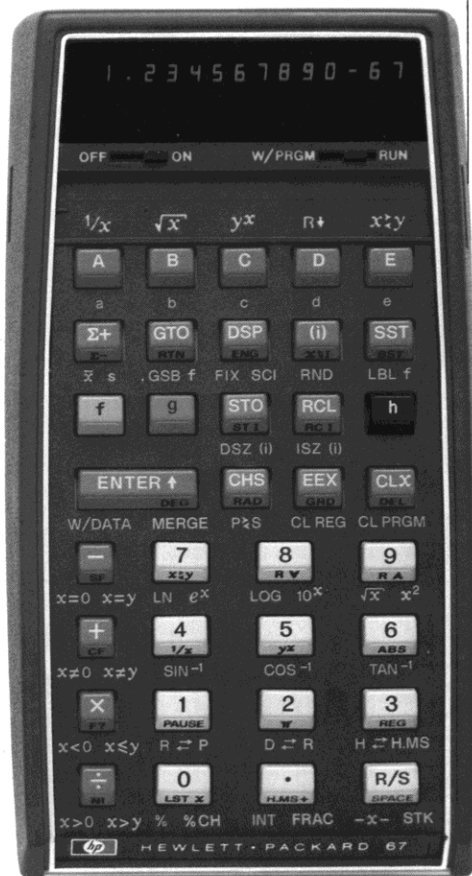
HP-97

Desktop Fully Programmable Printing

The HP-97 provides battery-operation and thermal printing—in one self-contained unit.

The HP-97 Fully Programmable Printing Calculator combines exceptional programming power and the great usefulness of a quiet thermal printer. What's more, the HP-97 operates on batteries as well as AC—so you can have a printed record whenever and wherever you need it. In addition, there's an extra-large display for easy readability and a buffered keyboard so data may be keyed in at high speed.

Quiet thermal printer lists your programs on tape for checking and editing.

With the HP-97, you can list a program (line number, key mnemonic and, optionally, the keycode), contents of the automatic memory stack, or the contents of the data storage registers. And you have three printing modes to choose from.

The printer is a valuable aid in editing programs or long calculations. You don't have to remember what you've done or what remains to be done. You see everything at once clearly, on tape.

Compact in design and light in weight for easy portability.

Total weight of the HP-97 without AC adapter/recharger is only 1.13 kg (2½ pounds). It's so small it will fit into a standard briefcase so you can take it with you, and operate it in airplanes, taxis, anywhere. For security, a built-in metal tab lets you secure it to your desk easily with a cable or bolt.

An unparalleled program of owner support.

You can supplement your own programs with the extensive HP program library. The Standard Application Pac, with 15 programs in various disciplines, comes free with either calculator.

To get a better idea of the capabilities of the HP-67 and HP-97 in relation to your own needs, take the time to review the programs listed in the HP Application Pacs and Solutions Books. In many cases one of our professionally programmed and documented solutions may already exist to solve your problem.

Also available are a one-year subscription to the Users' Library and a free Newsletter to keep you abreast of current information.

HP-67 Physical Specifications:

- Length: 152.4 mm (6")
- Width: 81 mm (3.2")
- Height: 18 to 34 mm (0.7 to 1.4")
- Weight: 298 g (10.5 oz.)
- Recharger weight: 241 g (8.5 oz.)
- Shipping weight: 2.3 kg (5.1 lb.)
- Operating temperature range: 10°C to 40°C (50°F to 140°F)
- Charging temperature range: 10°C to 50°C (50°F to 122°F)
- Storage temperature range: −40°C to 55°C (−40°F to 131°F)
- AC Power Requirement: 86-127V or 172-154V, 50 to 60 Hz
- Battery Power Requirement: 3.75 Vdc nickel cadmium rechargeable battery pack

HP-97 Physical Specifications:

- Width: 228 mm (9")
- Depth: 203 mm (8")
- Height: 63 mm (2.5")
- Weight: 1.13 kg (2.5 lb.)
- Recharger weight: 268 g (9.5 oz.)
- Shipping weight: 4.3 kg (9.5 lb.)
- Paper temperature range 10°C to 40°C (50°F to 104°F)
- AC Power Requirement: 90-120V or 220 ± 10%, 50 to 60 Hz

- Battery Power Requirement: 5.0 Vdc nickel cadmium rechargeable battery pack

For a complete list of features and functions, see the Comparison Chart on page 30.

The HP-67/97 Fully Programmable Calculators come complete with:

- Illustrated Owner's Handbook and Programming Guide.
- Quick Reference Card. (HP-67 only)
- Standard Pac complete with 40 cards, card holder, and manual.
- Battery pack that under normal use provides about 3 hours of continuous operation.
- Recharger/AC adapter that lets you operate the calculator on AC while the battery pack is recharging.
- Soft carrying case.
- Programming pad.
- Users' Library and newsletter subscription card.
- 2 rolls of thermal paper (HP-97 only).
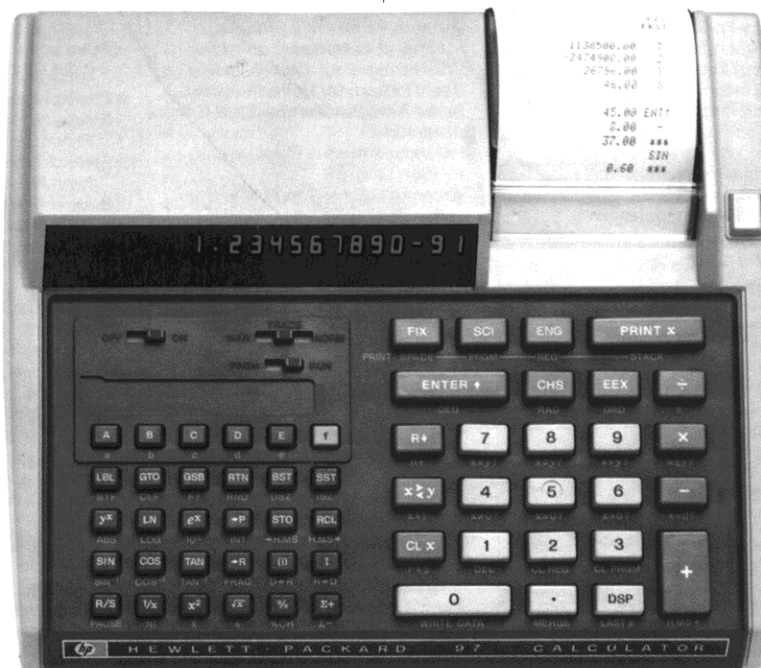
HP-67/97 Software

Solutions Books

These HP-67/97 books contain between 10 and 15 programs each. Simply record the programs on your own magnetic cards. Listed below are samples of the many programs available.

Business

■ **Options/Technical Stock Analysis (00097-14009)**
Put & Call Option Fair Values (Black-Scholes)
Call Option Evaluation
Routines for Option Writers
Empirical CBOE Call Pricing
Warranty & Option Hedging
Bull Spread Option Strategy
Butterfly Options
Stock Price 30-Week Moving Average with Data Storage
Exponential Smoothing
Multiple Linear Regression
Curve Fitting

■ **Portfolio Management/Bonds & Notes (00097-14010)**
Stock Portfolio Valuation
Portfolio Data Card
Stock Portfolio Beta Coefficient
True Annual Growth Rate of an Investment Portfolio
Convertible Bond Portfolio Premium Evaluation
Yield on Call Option Sales
Bond Price and Yield
Days Between Dates
Bond Yield to Maturity
Interest at Maturity/Discounted Securities
U.S. Treasury Bill Valuation
Convertible Security Analysis

■ **Real Estate Investments (00097-14012)**
Mortgage Yield
Mortgage Pricing
Yearly Amortization Schedule
Amount of Equity at Any Time
Ellwood Income Valuation for Income Property Appraisal
Income on Property Analysis
Return on Equity Rental Property
Real Estate Investment Analysis
Internal Rate of Return
Depreciation Schedules

■ **Home Construction Estimating (00097-14033)**
Concrete Volume
Linear to Board Feet Conversion & Costing
Framing Board Feet
Lumber Estimate
Shingle Estimate
Wall & Ceiling Areas Estimate
Wallpaper Estimate
Drywall & Insulation Estimate
Sheathing & Subfloor Estimate
Painting Estimate
Wood Floor Estimate

■ **Marketing/Sales (00097-14032)**
Forecasting Using Exponential Smoothing
Financial Trend Analysis
Seasonal Variation Factors (SEVAR)
Price Elasticity of Demand
Experience (Learning) Curve for Manufacturing Cost
Breakeven Analysis
Income Statement (P & L) Analysis
Internal Rate of Return—Groups of Cash Flows
Sales Force Requirements
Cost & Pricing Computations

■ **Home Management (00097-14031)**
Income Tax Planning—I
True Cost of Insurance Policy
Automobile Cost/Tire Cost Comparison Shopping
Time & Charges Running Total
Reconcile Checking Account
Savings Account Compounded Daily
Accumulated Interest/Remaining Balance
Stock Portfolio Valuation & Data Card
True Annual Growth Rate of an Investment Portfolio
Diet Planning

■ **Small Business (00097-14039)**
Hourly Payroll
Invoicing
Account Posting
Percentages & Proportions with Tabulator
Retail Inventory Monitor
Estimating Inventory
Inventory Ordering
Order Point Calculation
Depreciation Schedules
Yearly Amortization Schedule
Federal Corporate Income Tax
Working Capital Needs (Bardahl)

Engineering

■ **Antennas (00097-14021)**
Loaded Vertical Antennas
Loaded Dipole Antennas
Gain of a Horizontal Rhombic Antenna at Zero Azimuth
Azimuth Pattern of Cylindrical Array of Antennas
Colinear Antenna Gain & Pattern
Beam Pattern for Uniform Array
Radar Antenna Beamwidth & Gain
Antennas
Parabolic Antenna Calculations
RF Path Loss, dB
Antenna Gain or Power of a Remote Transmitter
Planar Phased Array Radar Beam Positions
Radar Parameter Unit Conversions
(Television) Antenna Length & Channel Frequency

■ **Thermal & Transport Sciences (00097-14023)**
Psychrometric Properties
Psychrometric Calculations for Water in Air
Equations of State
Isentropic Flow for Ideal Gases
Saturated Steam Properties
Conduit Flow
Parallel & Counter Flow Heat Exchangers
Energy Equation for Steady Flow
Flow With a Free Surface
Pipe Slide-Rule
Force at Bends & Fittings

■ **EE (Lab) (00097-14025)**
Wire Table
Ohm's Law
Reactance Chart (Nine Equations)
Coil Calculations
Complex Impedance Calculator— AC Circuit Calculator
Wye-Delta Transformations
RC Timing
Series R-L-C Circuit Analysis Program
Passive High & Lowpass Composite Filter Design
"L" Attenuator (Generator Impedance Greater than Load Impedance)
1% Resistor Value Subroutine
Wheatstone Bridge

■ **Industrial Engineering (00097-14035)**
Discounted Cash Flow/Present Value Analysis
Depreciation Schedules
Invoicing & Inventory Control
Production Monitor & Record
Learning Curve
x & R Control Chart
Single- & Multi-Server Queues
Two-Way Analysis of Variance with Replications Fixed Effects Model
Multiple Linear Regression for 3 Independent Variables
Simultaneous Equations in Six Unknowns

■ **Beams & Columns (00097-14027)**
Compressive Buckling
Eccentrically Loaded Columns
Reinforced Concrete Beams
Concrete Beam Deflection
Torsion-Concentrated Load-Steel Beams (Wide Flange)
Torsion-Uniform Load-Steel Beams (Wide Flange)
A.I.S.C. Steel Column Formula
Concrete Columns Ultimate Strength Design
Column Strength
Beam on Elastic Foundation with Point Load—Any Location

■ **Control Systems (00097-14026)**
Frequency Response of a Transfer Function
Bode of Transfer Function That Has Each Pole & Zero Given
Bode of Second-Order Over Third-Order Transfer Function
Bode of Second Order Over Second-Order Times $s^{**}n$ Transfer Function
Pole-Zero to Group Delay
Routh Test for Continuous & Discrete Time System Analysis
Convert Frequency Response— Open Loop, Closed Loop
Aid to Root Locus Plots—Real Poles, Complex Poles
Classical Control Gains
First Order Regulator
Second Order Regulator

Computation

■ **High-Level Math (00097-14011)**
Eigenvalues for 3rd Order System
Eigenvalues/Vectors of 3rd Order Systems
Matrix Algebra
Characteristic Equation of a 4×4 Matrix
One Card Determinant & Inverse of a 5×5 Matrix
Simultaneous Equations in Six Unknowns
Roots of Polynomials
Miscellaneous Special Functions A
Miscellaneous Special Functions B
Incomplete Gamma Function
Incomplete Beta Function
Incomplete Elliptic Integrals

■ **Test Statistics (00097-14008)**
One Sample Test Statistics for the Mean
Test Statistics for the Correlation Coefficient
Differences Among Proportions
Behrens-Fisher Statistic
Kruskal-Wallis Statistic
Mean-Square Successive
The Run Test for Randomness
Intraclass Correlation Coefficient
Fisher's Exact Test for a 2×2 Contingency Table
Bartlett's Chi-Square Statistic
Mann-Whitney Statistic
Kendall's Coefficient of Concordance

■ **Geometry (00097-14007)**
Sine Plate Solutions
V Notches & Long Radii
Internal & External Tapers
Points of Tangency with Circles & Arcs
Line-Line Intersection/Grid Points
Points on a Straight Line
Grid of Points: Calculates All Points & Discrete Points
Tangent Circle to Two Straight Lines with a Given Radius
Distance Between Lines in Space

Other

■ **Chemistry (00097-14006)**
pH of Weak Acid/Base Solutions
Acid-Base Equilibrium (Diprotic)
Weak Acid/Base Titration Curve
Equations of State
Van Der Waals Gas Law
Beer's Law & Absorbtivity
Activity Coefficients from Potentiometric Data
Crystallographic to Cartesian Coordinate Transformations
Kinetics Using Lineweaver-Burk or Hofstee Plots
Mixture Viscosities
Vapor Pressure, Bubble & Dew Point Calculation
Single-Stage Equilibrium Calculation

■ **Energy Conservation (00097-14029)**
Air Cooling System Design
Black Body Thermal Radiation
Economic Insulation Thickness
Heat Transfer through Composite Cylinders & Walls
Steady State Conduction Heat Transfer, Heat Load & Logarithmic Mean Temperature Difference
Sun Altitude, Azimuth, Solar Pond Absorption

To concentrate the capabilities of the HP-67 or HP-97 in your field of interest you can select from a variety of preprogrammed solutions. Choose a Solutions Book with documented programs or an Application Pac with programs prerecorded on magnetic cards.

Total Daily Amount of Solar
   Radiation
Transient Temperature Distribution
   in a Semi-Infinite Solid
Temperature or Concentration
   Profile for a Semi-Infinite Solid
   with Convection Boundary
   Condition
Conservation of Energy

■ **Games (00097-14013)**
Risk
Blackjack with a Permanent Bank
Bell-Fruit (Mills Standard)
Turn the Die
Word Encoder
Word Game Subroutine
Hangman Word Game
Pro Football Simulation
Contract Bridge Score Pad
Duplicate Bridge Score with
   Running Totals

Application Pacs

Application Pacs contain 15 to 26 preprinted, prerecorded program cards, a program card holder and a manual of complete documentation.

EE Pac (00097-13131)

- Network Transfer Functions
- Reactive L-Network Impedance
  Matching
- Class A Transistor Amplifier Bias
  Optimization
- Transistor Amplifier Performance
- Transistor Configuration
  Conversion
- Parameter Conversion: S⇌Y, Z, G, H
- Fourier Series
- Active Filter Design
- Butterworth or Chebyshev Filter
- Bode Plot of Butterworth and
  Chebyshev Filters
- Resistance Attenuator Design
- Smith Chart Conversions
- Transmission Line Impedance
- Microstrip Transmission Line
  Calculations
- Transmission Line Calculations
- Unilateral Design: Figure of Merit,
  Maximum Unilateral Gain Circles
- Bilateral Design: Stability Factor,
  Maximum Gain, Optimum Match
- Bilateral Design: Gain and Stability
  Circles, Load and Source Mapping

Business Decisions Pac (00097-13144)

- Internal Rate of Return
- Internal Rate of Return—Groups of
  Cash Flows
- Discounted Cash Flow Analysis
- Direct Reduction Loans—Sinking
  Fund
- Accumulated Interest/Remaining
  Balance
- Wrap-Around Mortgage
- Constant Payment to Principal Loan
- Add-on Rate Installment Loan/Rule
  of 78's
- Savings Plan-Leases
- Advance Payments

■ Savings—Compounding Periods
  Different from Payment Periods
■ Simple Interest/Conversions
■ Depreciation Schedules
■ Days Between Dates
■ Bond Price and Yield
■ Interest at Maturity/Discounted
  Securities
■ Linear Regression—Exponential
  Curve Fit
■ Multiple Linear Regression
■ Break-Even Analysis
■ Invoicing
■ Payroll
■ Inventory

Clinical Lab and Nuclear Medicine Pac (00097-13165)

- Beer's Law
- Protein Electrophoresis
- LDH Isoenzymes
- Body Surface Area
- Urea Clearance
- Creatinine Clearance
- Amniotic Fluid Assay
- Blood Acid-Base Status
- Oxygen Saturation and Content
- Red Cell Indices
- Total Blood Volume
- Schilling Test
- Thyroid Uptake
- Radioactive Decay Corrections
- Radioimmunoassay
- Basic Statistics
- Chi-Square Evaluation and
  Distribution
- t Statistics
- t Distribution

CE Pac (00097-13195)

- Vector Statics
- Section Properties (2 Cards)
- Properties of Special Sections
- Stress on an Element
- Bending or Torsional Stress
- Linear or Angular Deformation
- Cantilever Beams
- Cantilever Beams—Trapezoidal
  Load
- Simply Supported Beams
- Simply Supported Beams—
  Trapezoidal Loads
- Beams Fixed at Both Ends
- Beams Fixed at Both Ends—
  Trapezoidal Loads
- Propped Cantilever Beams
- Propped Cantilever Beams—
  Trapezoidal Load
- Six-Span Continuous Beams
- Steel Column Formula
- Reinforced Concrete Beams
- Bolt Torque

Navigation Pac (00097-13205)

- Estimated Time of Arrival
- Great Circle and Rhumb Line
  Navigation
- Dead Reckoning
- Velocity Triangle and Course to
  Steer
- Star Sight Planner (2 cards)
- Almanac Interpolater
- Sun Line of Position
- Star Line of Position (7 cards)

■ Bearing Line of Position
■ Two-Angle Line of Position
■ Fix from Two Lines of Position
■ Radar Plotting Closest Point of
  Approach
■ Beating to Windward
■ Distance by Horizon Angle

Surveying Pac (00097-13175)

- Traverse, Inverse and Sideshots
- Traverse Adjustment
- Intersections
- Curve Solutions
- Horizontal Curve Layout
- Spiral Curve Layout
- Vertical Curves and Grades
  Resection
- Two Instrument Radial Survey
- EDM Slope Reduction
- Stadia Reduction/3-Wire Leveling
- Taping Reduction/Field Angle
  Check
- Azimuth of the Sun
- Predetermined Area
- Earthwork
- Coordinate Transformation
- State Plane Coordinates—Lambert
- State Plane Coordinates—
  Transverse Mercator
- State Plane Coordinates—Alaska
  Zones 2-9

Stat Pac (00097-13111)

General Statistics
■ Basic Statistics for Two Variables
■ Factorial, Permutation, and
  Combination
■ Moments, Skewness, and Kurtosis
  (For Grouped or Ungrouped Data)
■ Random Number Generator
■ Histogram

Analysis of Variance
■ Analysis of Variance (One Way)
■ Analysis of Variance (Two Way)
■ Analysis of Covariance (One Way)

Distribution Functions
■ Normal and Inverse Normal
  Distribution
■ Chi-Square Distribution
■ t Distribution
■ f Distribution

Curve Fitting
■ Multiple Linear Regression
■ Polynomial Approximation

Test Statistics
■ t Statistics
■ Chi-Square Evaluation
■ Contingency Table
■ Spearman's Rank Correlation
  Coefficient

Quality Control
■ x and R Control Chart
■ Operating Characteristic Curves

Queueing Theory
■ Single- and Multi-Server Queues

Math Pac (00097-13121)

■ Factors and Primes
■ GDC, LCM, Decimal to Fraction
■ Base Conversions
■ Optimal Scale for a Graph; Plotting
■ Complex Operations

■ Polynomial Solutions
■ 4 × 4 Matrix Operations (2 cards)
■ Solution to f(x) × 0 on an Interval
■ Numerical Integration
■ Gaussian Quadrature
■ Differential Equations
■ Interpolations
■ Coordinate Transformations
■ Intersections
■ Circles
■ Spherical Triangles
■ Gamma Function
■ Bessel Functions, Error Function
■ Hyperbolics

ME Pac (00097-13155)

- Vector Statics
- Section Properties (2 cards)
- Stress on an Element
- Soderberg's Equation for Fatigue
- Cantilever Beams
- Simply Supported Beams
- Beams Fixed at Both Ends
- Propped Cantilever Beams
- Helical Spring Design
- Four Bar Function Generator (2
  cards)
- Progression of Four Bar System
- Progression of Slider Crank
- Circular Cams
- Linear Cams
- Gear Forces
- Standard External Involute Spur
  Gears
- Belt Length
- Free Vibrations
- Vibration Forced by $F_0 \cos \omega t$
- Equations of State
- Isentropic Flow for Ideal Gases
- Conduit Flow
- Heat Exchangers (2 cards)

Games Pac (00097-13185)

■ Game of 21
■ Dice
■ Slot Machine
■ Submarine Hunt
■ Artillery
■ Space War
■ Super Bagels
■ Nim_k
■ Queen Board
■ Hexapawn
■ Tic-Tac-Toe
■ Wari
■ Racetrack
■ Teaser
■ Golf
■ The Dealer
■ Bowl Scorekeeper
■ Biorhythms
■ Timer

***Note**—67/97 programs will also work in the HP-41C. Lengthy programs may require additional memory modules.

Accessories

Designed to protect and increase the versatility of Hewlett-Packard calculators.

Hewlett-Packard provides the most extensive software and accessories for professional calculators.

Software:

A. HP-41C Application Pacs— Refer to page 15 for a complete listing of HP-41C Application Pacs.

B. HP-41C Solutions Books— Refer to page 16 for a complete listing of HP-41C Solutions Books.

C. HP-67/97 Application Pacs—Refer to page 27 for a complete listing of HP-67/97 Application Pacs.

D. HP-67/97 Solutions Books—Refer to page 26 for a complete listing of HP-67/97 Solutions Books.

E. Series E/C Application Books
- HP-34C Application Books— Refer to page 21 for a complete listing of HP-34C Application Books.
- HP-33C Application Books— Refer to page 21 for a complete listing of HP-33C Application Books.
- HP-38C, HP-37E Application Books—Refer to page 23 for a complete listing of HP-38C, HP-37E Application Books.

F. Owner's Handbooks
- HP-32E
  00032-90001
- HP-33E/33C
  00033-90039
- HP-34C
  00034-90001
- HP-37E
  00037-90001
- HP-38E/38C
  00038-90038
- HP-41C
  00041-90001
- 82104A Card Reader
  82104-90001
- 82143A Printer
  82143-90001
- HP-67
  00067-90011
- HP-97
  00097-90001

Accessories: Optional and Replacement

G. HP-41C Accessories
- HP-41C Memory Module
  82106A
- HP-41C Standard Module
  00041-15001
- HP-41C Overlay Kit
  82152A
- HP-41C Module Holders (2)
  82151A
- Multipurpose Rechargeable Battery Pack
  82120A

H. Battery Pack
- HP-31E, HP-32E, HP-33E, HP-33C, HP-34C, HP-37E, HP-38E, HP-38C
  82109A
- HP-10, HP-19C
  82052A
- HP-21, HP-22, HP-25, HP-25C, HP-27, HP-29C
  82019B
- HP-35, HP-45, HP-55, HP-65, HP-67, HP-70, HP-80
  82001B
- HP-91, HP-92, HP-97, 82143A Printer
  82033A

I. Reserve Power Pac
Keeps a spare battery pack fully charged. Comes complete with a spare battery pack. A built-in light emitting diode tells you that the battery pack is recharging.
- HP-31E, HP-32E, HP-33E, HP-33C, HP-34C, HP-37E, HP-38E, HP-38C, 82103A
- HP-35, HP-45, HP-55, HP-65, HP-67, HP-70, HP-80 82004A
- HP-21, HP-22, HP-25, HP-25C, HP-27, HP-29C 82028B
- HP-91, HP-92, HP-97, 82143A Printer 82037A

J. Recharger/AC Adapter
- HP-31E, HP-32E, HP-33E, HP-33C, HP-34C, HP-37E, HP-38E, HP-38C
  82087B (110 Vac)
  82090B (220 Vac)
- HP-35, HP-45, HP-55, HP-65, HP-67, HP-70, HP-80
  82002A (110/220 Vac)
- HP-10, HP-19C, HP-91, HP-92, HP-97, 82120A, 82143A Printer
  82059B (110 Vac)
  82066B (Euro 220 Vac)
- HP-21, HP-22, HP-25, HP-25C, HP-27, HP-29C
  82041A (110 Vac)
  82026A (110/220 Vac Switchable)

K. DC Adapter/Recharger
Lets you recharge and operate your calculator in your car, boat, or plane. Includes two power cables: one for plugging into an automobile cigarette lighter receptacle and one for fastening directly to a 12-volt DC battery.

- HP-31E, HP-32E, HP-33E, HP-33C, HP-34C, HP-37E, HP-38E, HP-38C
  82144A
- HP-21, HP-22, HP-25, HP-25C, HP-27
  82055A
- HP-35, HP-45, HP-55, HP-65, HP-67, HP-70, HP-97
  82054A

L. Security Cradle/Cable
When leaving your HP calculator unattended in the office or lab you can help guard it against theft or unauthorized borrowing by means of a ruggedly constructed security cradle or cable. The security cradle may be attached to your desk via: four corner screws, center screw attachment allowing 360° rotation, removable six-foot steel cable, or extremely hard to remove adhesive tape. (All are supplied.)

- Security Cradle for HP-67, HP-65
  82015A
- Security Cable for HP-10*, HP-19C*, HP-91, HP-92, HP-97, 82143A Printer (Cable)
  82044A
- Security Cradle for HP-21, HP-22, HP-25, HP-25C, HP-27, HP-29C
  82029A
- Security Cradle for HP-35, HP-45, HP-55, HP-70, HP-80
  82007A

M. Hard Leather Case
Using your HP calculator outdoors? Help protect it by carrying it in this hard leather field case. It guards your calculator against normal environmental conditions in the field—dust, dirt, rain, snow, bumps and jars. Calculator removal is easy with the snap open flap and contoured front opening.

- HP-35, HP-45, HP-55, HP-70, HP-80
  82006A
- HP-65, HP-67
  82016A

N. Soft Case
- HP-31E, HP-32E, HP-33E, HP-33C, HP-34C, HP-37E, HP-38E, HP-38C
  82110A
- HP-41C (Plus Card Reader 82104A)
  82111A
- HP-67, HP-65 (Soft Vinyl)
  82053A
- HP-91, HP-92, HP-97
  82035A
- HP-29C
  82027A
- HP-10, HP-19C
  82064A

O. Calculator/Printer Supplies
Blank Program Cards
- HP-65, HP-67, HP-97, 82104A Card Reader
  40 card pac with holder
  00097-13141
  120 card pac with 3 holders
  00097-13143
  1000 card pac (no holders)
  00097-13206
  Thermal Printing Paper (6 rolls)
- HP-10, HP-19C
  82051A
- HP-91, HP-92, HP-97, 82143A Printer
  82045A

Program Card Holders (3)
- HP-65, HP-67, HP-97, 82104A Card Reader
  00097-13142
  Program Pad
- HP-19C, HP-25, HP-25C, HP-29C, HP-33E, HP-33C, HP-34C, HP-38E, HP-38C, HP-55, HP-65, HP-67, HP-97
  00097-13154

*Available only for later models with spring-loaded latch.

Comparison Chart

	HP-37E Page 22	HP-38C Page 22	HP-67/97 Pages 24-25	HP-41C Pages 12-14	HP-34C Page 19	HP-33C Page 20	HP-32E Page 20
Type of Calculator							
Business/Financial	■	■	m	mr			
Scientific/Engineering			■	■	■	■	■
Programmable		■	■	■	■	■	
Operating Features							
RPN logic system	■	■	■	■	■	■	■
Automatic 4-memory stack	■	■	■	■	■	■	■
Error recovery (Last x)		■	■	■	■	■	■
Stack manipulation	■	■	■	■	■	■	■
Maximum number of storage registers	7	20	26	319	21	8	15
Continuous Memory		■		■	■	■	
Maximum number of digits displayed	10	10	10	10	10	10	10
Number of digits used in computation	10	10	10	10	10	10	10
Rechargeable batteries/AC recharger		■	■		■	■	■
Long-life disposable batteries				■			
Software Support							
Application Pacs (with modules)				■			
Application Pacs (with mag cards)			■				
Solutions Books			■	■			
Users' Library programs			■	■			
Applications books	■	■		■	■	■	
Accessory Support							
Memory modules				■			
Reserve power pack	■	■			■	■	■
Security cradle/cable			■				
Multipurpose Battery Pack				■			
One-year limited warranty	■	■		■	■	■	■
Display separates 1,000's	■	■			■	■	■
Diagnostic self-check	■	■	m	■	■	■	■
Error codes/messages	■	■		■	■	■	■
Reassignable keyboard				■			
Alpha mode/display				■			
Alpha prompts				■			
Status annunciators				■			
Automatic power off				■			
Catalog of functions, programs and peripheral functions				■			
Audible tones				■			
Programming Features							
Maximum number of program lines		99	224	2000	210	49	
Memory allocation		■		■	■		
Redefinable keyboard				■			
Alpha program labels				■			
Single character program labels			10	56	2		
Numeric program labels			10	99	10		
Program review (single step, back step)		■	■	■	■	■	
Insert/delete editing				■			
Unconditional branching		■	■	■	■	■	
Levels of subroutines			3	6	6	3	
Conditional tests		2	8	10	8	8	
Flags			4	56	4		
Pause		■	■	■	■	■	
Controlled Looping			■	■	■		
Indirect control of:							
Data storage and recall			■	■	■		
Alpha storage and recall				■			
Storage register arithmetic			■	■	■		
Branching, looping, and display			■	■	■		
Flags				■			
Integer/fraction truncation		■	■	■	■	■	
Alpha string manipulation				■			

This chart has been designed for your convenience in making direct comparisons of the features and functions of the HP calculators described in the preceding pages. For your convenience, page numbers of catalog listings are indicated for each calculator.

	HP-37E	HP-38C	HP-67/97	HP-41C	HP-34C	HP-33C	HP-32E
	Page 22	Page 22	Pages 24-25	Pages 12-14	Page 19	Page 20	Page 20

Input/Output Devices

"Smart" card reader			■	p			
Program card compatibility			c	c			
Records private programs				p			
Whisper-quiet printer			97	p			
Battery operable			97	p			
Manual/trace/normal modes			97	p			
Alpha and special characters				p			
Plotting capability				p			
Optical wand (bar code reader)				p			

General Features

+, −, ×, ÷, y^x, $\sqrt{x}$, 1/x, CHS
Ln x, e^x
Log x, 10^x
x^2
π
Absolute value
Storage register arithmetic

Business Features

Maximum number of financial registers	5	5					

Solves for:
Number of periods (n), Compound interest (i), Present value (PV), payment (PMT), Future value (FV) — m — mr — a — a
Simple interest — m — a
Amortization — m — mr — a
Net present value and internal rate of return — m — mr — a
Price
Beginning of period/End of period selection — m — mr — a
Calendar functions — m — mr

Scientific Features

Solve (rootfinder) — m — mr
Integrate (numerical integration) — m — mr
Metric conversions — m — mr
Trigonometric functions
Modes (degrees, radians, grads)
Sin, Sin^{-1}, Cos, Cos^{-1}, Tan, Tan^{-1}
Hyperbolics and inverses — m — r — a — a
Rectangular coordinates ⟷ Polar coordinates
Decimal angle ⟷ angle in degrees (hrs)/min/sec
Degrees ⟷ radians
Fixed and scientific notation
Engineering notation
Automatic overflow/underflow into scientific
Decimal-octal conversion — a — a

Statistical Features

Percent
Percent change
Percent of total
Mean/standard deviation (1 or 2 variable)
Summation (Σx, Σx^2, Σy, Σy^2, Σxy, n)
Linear regression/estimate — m — mr
Correlation coefficient — m — mr
Normal distribution — a — m — mr — a — a
Factorial function — a
Gamma function — m — m

Symbols

m Available on prerecorded magnetic program cards.
r Available with ROM (read only memory) Application Pac.
p Available with peripheral.
c 67/97 ⟷ 67/97, 67/97 ⟶ 41C, 41C ⟷ 41C.
a Available program in application book.
■ Built-in function.
— Not available.