HEWLETT *hp* PACKARD

POCKET CALCULATOR CATALOG AND BUYING GUIDE

**HEWLETT-PACKARD
MAKES THE MOST ADVANCED
POCKET-SIZED CALCULATORS
IN THE WORLD**

SPRING, 1975

Hewlett-Packard pocket calculators —for people who need *more* than the ordinary

If you use a pocket calculator for professional purposes—whether it's science, engineering or business—you need something more than one that just adds, subtracts, multiplies and divides—and perhaps calculates square roots and percentages.

You need a pocket calculator that not only handles your simple problems quickly and easily but has the reserve power to solve even the lengthy, complex or repetitive problems with just a few keystrokes.

You need a calculator designed and built for *you*—a professional calculator rugged enough for day-in, day-out use, with features you need and use the most.

HP pocket calculators meet these requirements—and more—with:

- Advanced capabilities—pre-programmed functions and superior HP memory power so you can solve more types of problems faster, easier and more accurately, and with confidence.

- HP's famous RPN "logic" system—a consistent and efficient logic system for solving complex problems.

- Hewlett-Packard quality—innovative design, high quality components and precision assembly are combined to produce calculators that are second to none.

Therefore, before you select any calculator, take a few minutes to explore within the pages of this catalog, Hewlett-Packard's professional pocket calculators with the reserve power we think professionals like yourself need most. Prove to yourself—as more than half-a-million others already have—that if you work with numbers, it makes sense to buy a Hewlett-Packard pocket calculator.

CONTENTS

Uncompromising quality is the standard at Hewlett-Packard.

And here are examples to back up that statement...

1. Every key is double injection molded. The symbol goes through the entire key, so it won't wear off—no matter how often the key is pressed.

2. Every key has a positive click action, so you know for sure that the function has registered.

3. Every key is tested twice. A quality control inspector presses the keys to make sure they *feel* right, then a specially-designed machine *exercises* them to make sure they *function* right.

4. The numbers in the light-emitting diode (LED) display are bright red and tipped forward (recessed in the HP-21), so you can read them clearly and without distortion. All digits appear as continuous lines, not broken segments.

5. The OFF/ON switch is lubricated with silicone, so that it slides smoothly. And it slides in a horizontal, rather than a vertical, plane to prevent it from moving accidentally when you put the calculator in its carrying case or in your shirt pocket.

6. Under the keyboard is a moisture-proof polyurethane barrier to help protect the inside of the calculator from coffee spills and similar hazards.

7. The heavy gauge plastic case is contour-designed to fit the hand comfortably, and rugged enough to withstand a tumble to a hard floor. (One HP pocket calculator even withstood an accidental journey through a snow blower.)

8. The top case or keyboard assembly is welded, so it won't come apart accidentally and to keep dust and moisture from entering.

9. The battery compartment door opens easily (but not accidentally), without using a coin or key, so you don't have to worry about nicks or, worse, damage that could prevent the door from being opened or closed.

10. The specially-engineered rechargeable battery pack—included with each HP pocket calculator—is a single unit, so you can replace it quickly and easily.

11. The socket for the adapter/recharger plug is recessed to ensure a positive connection, so it won't accidentally become loose in the middle of a calculation. And it's designed so there's no way to connect the wrong plug by mistake.

12. Critical internal connections are goldplated, for maximum efficiency.

13. Every single HP calculator must meet stringent quality control standards, or it's rejected. Only in this way can Hewlett-Packard produce pocket calculators that provide better performance . . . and lasting value.

The Hewlett-Packard Warranty

Each Hewlett-Packard pocket calculator is warranted against defects in materials and workmanship for one (1) year from the date of delivery. During the warranty period, Hewlett-Packard will repair or, at its option, replace components that prove to be defective when the calculator is returned, shipping prepaid, to a Hewlett-Packard Customer Service Facility.

This warranty does not apply if the calculator has been damaged by accident or as a result of service or modification by any person other than at an authorized Hewlett-Packard Customer Service Facility.

No other warranty is expressed or implied. Hewlett-Packard is not liable for consequential damage.
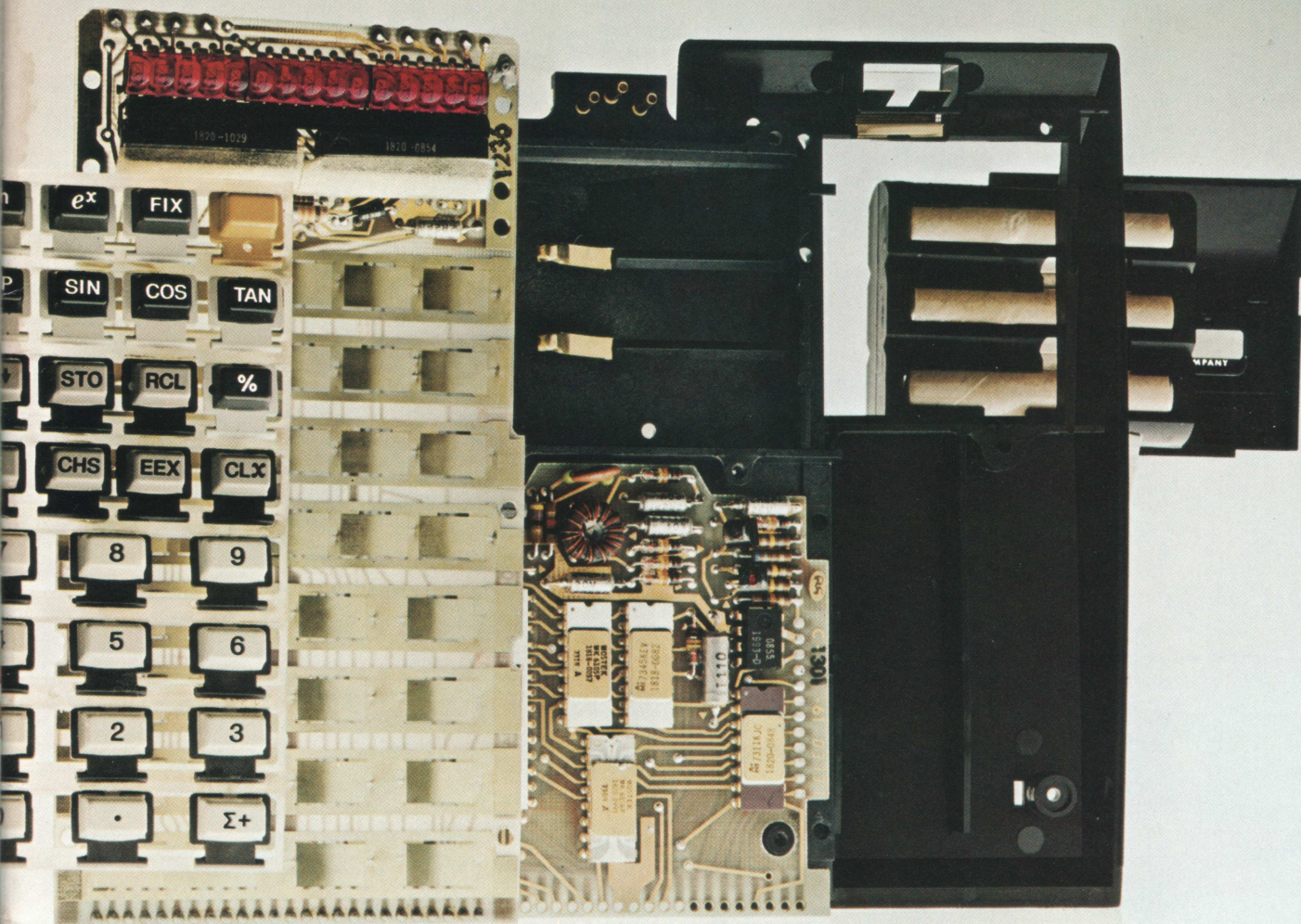
> "The success and prosperity of our company will be assured only if we offer our customers superior products that fill real needs and provide lasting value, and are supported by a wide variety of useful services—both before and after the sale."

—Statement of Corporate Objectives
Hewlett-Packard

When William R. Hewlett and David Packard founded Hewlett-Packard in 1939, they offered only one product—an audio oscillator. But it was superior to all others available at the time. And their policy—of introducing only products that fill a need and provide lasting value—has continued for 36 years.

Today, Hewlett-Packard offers more than 3,000 different products, ranging from microscopic components to complete computer systems. The company is one of the world's leading designers and manufacturers of electronic, medical, analytical and computing instruments and systems.

The product line includes the atomic clocks used by most observatories in the world as a primary time standard; patient monitoring equipment and diagnostic instruments for the medical field; communications equipment; electronic surveying instruments, and analytical products such as gas chromatographs, spectrometers and instruments for precisely measuring pressure and temperature.

Calculators are a major line

In the data processing field, Hewlett-Packard offers the most extensive range of computing alternatives for science and engineering. Beginning with mini-computers for science and engineering, HP went on to design and manufacture electronic, programmable desktop calculators; computer systems for business, industry and education; the first small-scale computer system with multi-programming and multi-lingual capabilities, and an extensive selection of peripherals (disc memories, plotters, etc.) and software.

Then HP utilized this knowledge and experience to introduce the first pocket-sized scientific calculator—the HP-35, which set the standard for all other brands and models. As you will see in this catalog, Hewlett-Packard now offers a complete line of scientific, engineering, business and multi-purpose pocket calculators designed for professional use. Their owners include Nobel laureates, astronauts, business people, doctors, scientists and engineers in every field, educators and students—more than half a million persons throughout the world.

R&D is extremely important

In order to carry out the company's program of providing innovative products, an unusually high percentage (approximately 7%) of annual sales revenue is invested into research and development.

More than 1,500 engineers and scientists work full time in R&D, developing original concepts and designing new and more advanced products. As a result of their efforts, fully one-half of HP's current business is represented by products that didn't exist a few years ago, including all the calculators in this catalog.

To manufacture, market and service Hewlett-Packard products, the company has grown into a multinational corporation with over 28,000 employees. HP has manufacturing facilities in the United States, Germany, Scotland, France, Japan, Malaysia and Singapore and 172 sales and service offices in 65 countries throughout the world.

Hewlett-Packard is also . . .

Electronic instruments and systems for medicine.

Automated systems for testing and analyzing.
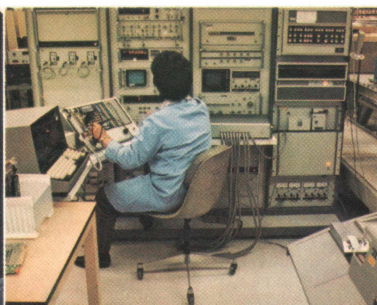
Programmable desktop systems for science, engineering, business.

Mini-computer systems for industry, and business.

Hewlett-Packard Scientific Pocket Calculators...

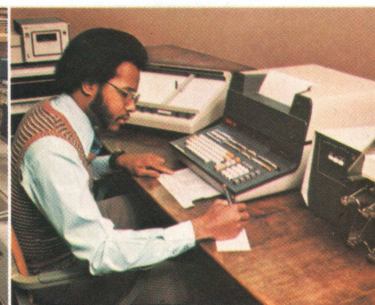## Select the one calculator that best fits your needs today...and tomorrow

Are you considering the purchase of your first scientific pocket calculator . . . or are you planning to move up to a more advanced model?

Either way, it's important that you select a calculator that not only can solve the problems you're facing today, but also can solve the problems you're likely to face tomorrow . . . in the days, months or years ahead.

The proper selection of a scientific calculator can literally open up a whole new world of information to you—by solving problems that were too complex or time-consuming for you to solve before.

As you read about the five scientific pocket calculators (and the scientific desktop calculator) offered by Hewlett-Packard, compare the pre-programmed functions, the memory power and the other features each model provides. Then imagine how *each* of these functions or features can help you do your job better, faster, easier and/or more accurately.

For example, if your main concern is general math—addition, subtraction, multiplication and division—with an occasional need for log or trig functions, the *HP-21* or the *HP-35* may be just perfect for you.

However, think how much *more* you can do—and how much faster and easier you can do it—by using the advanced trig, statistical or conversion capabilities, or the addressable memories, offered by the *HP-45 Advanced Scientific Pocket Calculator* . . . or by the *HP-46* desktop version.

And if you occasionally solve repetitive or iterative problems, there's an HP pocket calculator practically "custom made" for you— the *HP-55 Programmable.*

For the ultimate in problem-solving power—in *any* field— Hewlett-Packard offers you the famous "pocket computer"—the *HP-65 Fully Programmable Pocket Calculator.* It makes problem-solving almost automatic, because you can program it yourself from the keyboard (and save your programs on magnetic cards) or you can use it with pre-recorded program cards, available in a wide range of disciplines—including engineering, finance, mathematics, medicine, statistics and navigation.

Whichever HP scientific calculator you finally select, you can be assured that it's the *finest* in its class . . . because HP's standards of quality permit nothing *less.*

Since you're investing in a calculator that fits your needs today— and tomorrow—carefully read the descriptions of each HP scientific calculator, and check off the functions and features that particularly appeal to you. Then, turn to the Comparison Guide on page 30 to help you compare models.

HP-55
Programmable Scientific

Designed with the power to solve complex, repetitive or iterative problems
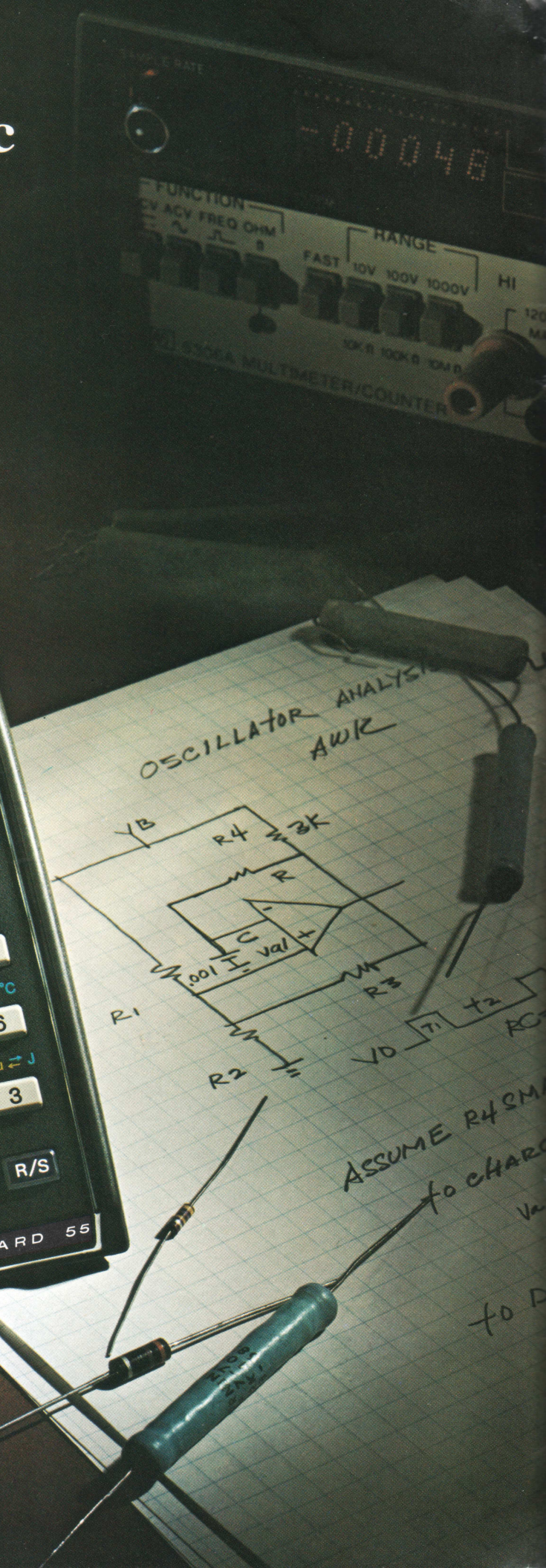
Featuring keystroke programming...
86 keyboard commands...20 addressable
memory registers...*and* a built-in timer

Here is a scientific pocket calculator with more keyboard power than any other ever made, to solve *all* types of problems faster, easier and more accurately.

And because it's programmable—capable of retaining and repeating keystroke routines—the HP-55 solves repetitive or iterative problems in far less time than conventional calculators.

Unconventional, too, is the inclusion of a digital timer—to time lab experiments or other procedures with split-second accuracy.

Keystroke programming . . . so you can create the exact programs you need—on the spot

To solve a problem with an ordinary calculator, a certain sequence of keystrokes is required—and all the keys must be pressed again every time the problem is worked with different data. Not so with the HP-55.

Simply set the HP-55 to PROGRAM and enter the keystrokes needed to solve the problem. (But don't enter the data.) Your program—up to 49 keystrokes in sequence—is retained in the HP-55's program memory.

| R/S |

To solve the problem, switch to RUN and enter the data. Then press the "Run/Stop" key to run your program. In seconds, the HP-55 gives you your answer. To solve other problems using the same program, just enter new data and press the "Run/Stop" key again.

Because your program does your calculation automatically, there's far less chance for error than if you had to do it manually. And it takes but a fraction of the time.

It's also easy to review, edit or test your program . . .

| BST | SST | GTO |

The program memory consists of 49 steps, numbered 01 through 49. To review the entire memory—one step at a time—press the "Back STep" or "Single STep" key. Or press the "Go TO" key plus the number of the step you want. To test your program, a step at a time, switch to RUN and press "SST" repeatedly.

The program memory uses a simple numeric code, based on the position of each key on the keyboard. For example, "41" means "4 rows down, 1st key"—the "ENTER" key. When you single-step through a program, the code numbers are visible on the HP-55 display.

| 04. 41 |

Step number   Keystroke code

Want to change your program . . . or part of it? Switch to PROGRAM and enter a new sequence of keystrokes to overwrite the previous program or any section of it. Your program remains stored for as long as you leave the HP-55 turned on.

You can even program the HP-55 to do computer-like branching

Like a computer, the HP-55 can actually be programmed to make decisions . . . because it can do conditional branching.

You can program it to test the relationship between two values, via these tests:

$$x \le y \qquad x = y$$

Depending on the outcome of the tests, the HP-55 will *automatically* branch to the specified step of the program . . . or continue through the program in sequence.

Or, using the "Go TO" key, you can program the HP-55 to branch directly to a specified step, and then continue executing the program.

Both conditional and direct branching are useful in solving iterative problems.

86 keyboard commands

The HP-55 offers 86 keyboard functions and operations—more than in any other pocket calculator—and all but a few may be incorporated into your programs.

Extra trigonometric capability

$$R \rightleftarrows P$$

Coordinate conversions: Convert polar coordinates to rectangular coordinates, or vice versa. This lets you do vector arithmetic quickly and accurately.

$$D \rightleftarrows R$$

Angle conversions: You can convert directly from degrees to radians, or from radians to degrees.

$$H \rightleftarrows H.MS$$

Angle (time) conversion: In any of three angular modes, you can convert decimal angles (hours) into angles (times) in degrees (hours)/minutes/seconds . . . or vice versa.

$$H.MS\pm$$

Angle (time) arithmetic: You can add or subtract angles (times) in degrees (hours)/minutes/seconds.

Extra statistical capability

$$\Sigma -$$
| $\Sigma +$ |

Summations: Useful when working with vectors as well as statistics, this key automatically calculates and stores for recall or further use: n, Σx, Σx^2, Σy, Σy^2 and Σxy. Data may be deleted via the "$\Sigma -$" key.

$$\bar{x} \qquad s$$

Mean and standard deviation: The HP-55 simultaneously calculates the means and standard deviations of both the x and y values.

$$L.R.$$
| $\hat{y}$ |

Linear regression: After two or more data points are accumulated with the "$\Sigma +$" key, you can quickly calculate linear regression with the "L.R." key (via the least squares method). Then, using the "$\hat{y}$" key, you can calculate other data points on the curve.

Extra metric conversion capability

$$in \rightleftarrows mm \qquad ft \rightleftarrows m \qquad gal \rightleftarrows l$$

$$lbm \rightleftarrows kg \qquad lbf \rightleftarrows N \qquad °F \rightleftarrows °C$$

$$Btu \rightleftarrows J$$

Not just constants, but true direct two-way conversions between U.S. and metric units are fast and easy—and exceedingly accurate.

20 addressable memory registers!

The more memory registers a calculator has, the less writing down and re-entering of numbers *you* have to do . . . and the less chance for error.

That's why the HP-55 has more memory registers than *any* other pocket calculator—20!

They're all fully addressable, too. This means you can store and retrieve data (*e.g.*, a constant or intermediate solution) push-button fast from the keyboard or automatically in your program. And, with 10 of the registers, you can do register arithmetic (*i.e.*, directly add to, subtract from, divide into, or multiply the contents of a register).

Data manipulation is extremely easy even when working the most complex mathematical problems.

Plus other quality HP features . . .

In addition to the 20 addressable memory registers, the HP-55 has a four-register stack—which makes possible the famous RPN "computer logic" system and a "Last x" register (see pages 20, 21).

Light-emitting diode display: Displays up to 10 significant digits, plus two-digit exponent and appropriate signs. Two selectable display modes: fixed point, with automatic overflow and underflow into scientific, and scientific with dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Selective round-off; range: 0-9 decimal places. Flashing display indicates improper operation; flashing decimal points indicate low battery.

Functions and features

Programming:
Program writing capability • Single step execution or inspection of a program • Program editing capability • $x \le y$, $x = y$ conditional branching • Direct branching

Keyboard commands:
Trigonometric functions: 3 angular modes • Sin x • Arc sin x • Cos x • Arc cos x • Tan x • Arc tan x • Rectangular coordinates $\leftrightarrow$ Polar coordinates • Decimal angle $\leftrightarrow$ Angle in degrees/minutes/seconds • Decimal time $\leftrightarrow$ Time in hours/minutes/seconds • Angle in degrees $\leftrightarrow$ Angle

in radians • Vector arithmetic • Angle arithmetic

Logarithmic functions: Log x • Ln x • e^x • 10^x

Statistical functions: Mean and standard deviation (one or two variable) • Linear regression (two variable) • Linear estimate • Factorial • Positive and negative summation giving n, Σx, Σx^2, Σy, Σy^2, Σxy

Metric conversion functions: Btu $\leftrightarrow$ J • lbm $\leftrightarrow$ kg • lbf $\leftrightarrow$ N • in $\leftrightarrow$ mm • ft $\leftrightarrow$ m • gal $\leftrightarrow$ l • °F $\leftrightarrow$ °C

Other functions: y^x • $\sqrt{x}$ • $1/x$ • π • x^2 • % • Register arithmetic in 10 addressable memories • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations

Data Storage and positioning operations: Data entry • Stack roll down • x, y interchange • Data storage • Data recall • Change sign • Exponent entry

Memory:
4-register stack • "Last x" register • 20 addressable memories • Program memory for storage of up to 49 keystrokes.

Timing:
Digital timer • 0-100 hour range • $\pm.01\%$ accuracy • Displays hours/minutes/seconds/hundredths • Times for up to 10 events may be stored in addressable memories

Specifications

Power: AC: 115 or 230 V, $\pm10\%$, 50-60 Hz. Battery: 500 mw nickel-cadmium rechargeable battery pack

Weight: HP-55: 9 ounces (255 g) with battery pack • Recharger: 5 ounces (142 g) • Shipping weight: approx. 4.5 lbs. (2.0 kg)

Dimensions: Length: 5.8 inches (14.7 cm) • Width: 3.2 inches (8.1 cm) • Height: 0.7 to 1.3 inches (1.8 to 3.3 cm)

Operating temperature range: 32°F to 122°F (0°C to 50°C)

The HP-55 outfit includes:

HP-55 Programmable Scientific Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/recharger • Soft carrying case • Safety travel case • Illustrated Owner's Handbook • Quick Reference Guide • Pad of programming worksheets

HP-55 Outfit $395⁰⁰

HP-45 Advanced Scientific

Acclaimed by scientists and engineers as the standard of the industry

With 48 math, trig, log, stat and data manipulation functions... and 9 addressable memories

Known as the scientific pocket calculator against which all others are judged, the HP-45 can quickly and accurately solve just about any type of complex problem you're likely to face. Just press the keys to use the HP-45's general math, trig, log, stat, metric/U.S. unit constants, rectangular/polar coordinate conversion, or vector arithmetic functions.

Its four dozen pre-programmed functions and data manipulation operations—plus nine addressable memories—give it more power than any other non-programmable scientific pocket calculator.

Advanced trigonometric capabilities

→R
→P

Coordinate conversions—convert polar coordinates to rectangular coordinates, or vice versa. This lets you do vector arithmetic quickly and accurately.

DEG   RAD   GRD

Angle mode—You can calculate trig functions in any of three angular modes—degrees, radians or grads. You can also convert from an angle in one mode to an angle in another mode with a few keystrokes.

→D.MS   D.MS→

Angle (time) conversion—In any of three angular modes, you can convert decimal angles (times) into angles (times) in degrees (hours)/minutes/seconds . . . or vice versa.

Advanced statistical capability

Σ−
Σ+

Summations—Useful when working with vectors as well as statistics, this function automatically calculates and stores for recall or further use: n, Σx, Σx^2, Σy and Σxy. Data may be deleted via the "$\Sigma-$" key.
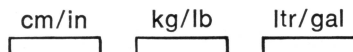
$\overline{x}$, s

Mean and standard deviation—The HP-45 simultaneously calculates the mean and standard deviation of the x value.

n!

Factorial—Press this key to calculate the factorial of positive integers, for rapid calculations of combinations and permutations.

Advanced conversion capability

cm/in   kg/lb   ltr/gal

Metric/U.S. unit conversion constants—Just press these keys for constants to convert U.S. units to metric units, or vice versa. Ten-digit accuracy.

Advanced memory power

Nine addressable memories—more than any other pocket calculator except the HP-55—means that you have far less writing down and re-entering to do, and far less chance for error. Data manipulation in and out of registers is fast and easy, and you can even do register arithmetic.

Plus other quality HP features . . .

The HP-45 also includes a four-register stack—which makes possible the famous RPN "computer logic" system—and a "Last x" register (see pages 20, 21).

Light-emitting diode display: Displays up to 10 significant digits, plus two-digit exponent and appropriate signs. Two selectable display modes: fixed point, with automatic overflow and underflow into scientific, and scientific with dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Selective round-off; range: 0-9 decimal places. Flashing display indicates improper operation; flashing decimal points indicate low battery.

Functions and features

Keyboard commands:

Trigonometric functions: 3 angular modes • Sin x • Arc sin x • Cos x • Arc cos x • Tan x • Arc tan x • Rectangular coordinates ↔ Polar coordinates • Decimal angle ↔ Angle in degrees/minutes/seconds • Decimal time ↔ Time in hours/minutes/seconds • Vector arithmetic

Logarithmic functions: Log x • Ln x • e^x • 10^x

Statistical functions: Mean and standard deviation (one variable) • Factorial • Positive and negative summation giving n, Σx, Σx^2, Σy, Σxy

Metric conversion constants: cm/in • kg/lb • ltr/gal

Other functions: y^x • $\sqrt{x}$ • $1/x$ • π • x^2 • % • $\triangle\%$ • Register arithmetic • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations

Data storage and positioning operations: Data entry • Stack roll down • x, y interchange • Data storage • Data recall • Change sign • Exponent entry

Memory:
4-register stack • "Last x" register • 9 addressable memories

Specifications

Power: AC: 115 or 230 V, $\pm10\%$, 50-60 Hz • Battery: 500 mw nickel-cadmium rechargeable battery pack
Weight: HP-45: 9 ounces (255 g) with battery pack • Recharger: 5 ounces (142 g) • Shipping weight: Approx. 2 lbs. (900 g)
Dimensions: Length: 5.8 inches (14.7 cm) • Width: 3.2 inches (8.1 cm) • Height: 0.7 to 1.3 inches (1.8 to 3.3 cm)
Operating temperature range: 32° F to 122° F (0° to 50° C)

The HP-45 outfit includes:

HP-45 Advanced Scientific Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/recharger • Soft carrying case • Illustrated Owner's Handbook • Quick Reference Guide

HP-45 Outfit . . . . 245^{00}
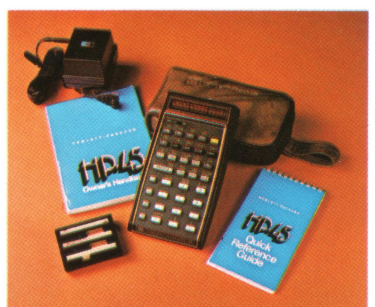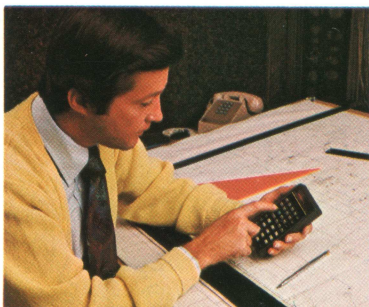
HP-21 Scientific

A smaller scientific calculator with more functions than our HP-35

32 pre-programmed functions . . . an addressable memory . . . and famous HP quality— all in a unit so small it comfortably fits in a shirt pocket.

The HP-21 is the lowest-priced scientific pocket calculator HP offers, yet it has all the functions and features you'd expect to find in a scientific pocket calculator—even more than in the HP-35.

More trigonometric capabilities
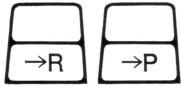
→R	→P

Coordinate conversions—Convert polar coordinates to rectangular coordinates, or vice versa. This lets you do vector arithmetic quickly and easily.

DEG �■ RAD

Angular mode selection—Just flip a switch to perform trig operations in either of two angular modes: degrees or radians. You can also convert angles from one mode to the other push-button fast.
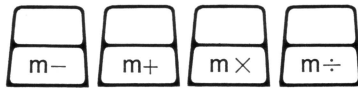
SIN	COS	TAN
SIN-1	COS-1	TAN-1

Standard trig functions—The HP-21 gives you all of the standard trig functions: Sin x, Arc sin x, Cos x, Arc cos x, Tan x and Arc tan x.

Logarithmic capabilities

e^x		
LN	LOG	10^x

Standard log functions—The HP-21 also gives you all of the standard log functions: log x, ln x, e^x and 10^x.

Full register arithmetic

m–	m+	m×	m÷

Register arithmetic—The HP-21 has an addressable memory for storing constants or other data, for use later on in a calculation. Any of the four arithmetic operations may be performed directly upon this stored data.

Plus other quality HP features

The HP-21 also includes a four-register stack, which makes possible the famous RPN "computer logic" system (see pages 20, 21).

Light-emitting diode display—Recessed for better contrast in harsh lighting. Displays up to 10 significant digits (eight plus two-digit exponent in scientific notation), and appropriate signs. Two selectable display modes: fixed point, with automatic overflow and underflow into scientific, and scientific with a dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Selective round-off; range: 0-10 (in scientific, 0-8). "ERROR" appearing in display indicates improper operation. Lighted decimal points indicate low battery condition.

Functions and features

Keyboard commands:
Trigonometric functions: 2 angular modes • Sin x • Arc sin x • Cos x • Arc cos x • Tan x • Arc tan x • Rectangular coordinates ↔ Polar coordinates
Logarithmic functions: Log x • Ln x • e^x • 10^x
Other functions: y^x • $\sqrt{x}$ • 1/x • π • Register arithmetic • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations
Data storage and positioning operations: Data entry • Stack roll down • x, y interchange • Data storage • Data recall • Change sign • Exponent entry

Memory:
4-register stack • Addressable memory

Specifications:

Power: AC: 115 or 230 V, ±10%, 50-60 Hz • Battery: 350 mw nickel-cadmium rechargeable battery pack
Weight: HP-21: 6 ounces (170 g) with battery pack • Recharger: 5 ounces (142 g) • Shipping weight: Approx. 1½ lbs. (680 g)
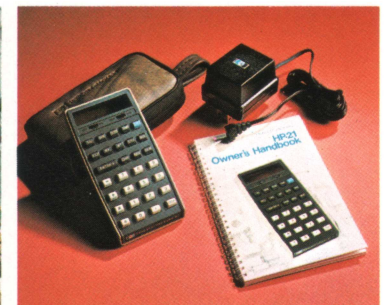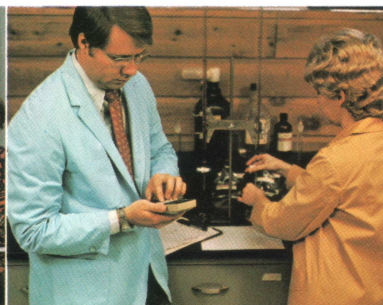*Dimensions:* Length: 5.1 inches (13.0 cm) • Width: 2.7 inches (6.18 cm) • Height: 1.2 inches (3.0 cm)
Operating temperature range: 32° F to 113° F (0° C to 45° C)

The HP-21 outfit includes:
HP-21 Scientific Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/recharger • Soft carrying case • Illustrated Owner's Handbook

HP-21 Outfit $125⁰⁰

HP-35 Scientific

The original electronic slide rule that performs basic log, trig and exponential functions

Just press the keys, and the HP-35 performs all basic arithmetic, trigonometric, logarithmic and exponential functions *automatically*—without your having to refer to tables—thanks to its pre-programmed functions.

The HP-35 also incorporates an addressable memory, in addition to the quality features found in more powerful Hewlett-Packard pocket calculators.

Pre-programmed log and trig functions

| LOG | LN | e^x |
| ARC | SIN | COS | TAN |
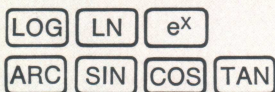
Pre-programmed into the HP-35 are the functions for natural log and antilog, common log, sine, arc sine, cosine, arc cosine, tangent and arc tangent. Simply enter your number and press one key (or two with arc) to activate any function. There's no need to refer to log or trig tables . . . no need to interpolate. Entries and answers are expressed in decimal degrees.

Also pre-programmed are . . .

| x^y | $\sqrt{x}$ | $1/x$ | π |

These, too, are single keystroke functions, to save time and effort.

An addressable memory stores constants

| STO | RCL |

Press "STOre", and the number in the HP-35's display is immediately stored in the addressable memory. Press "ReCaLl" and it reappears in the display, for review or for another calculation.

Plus other quality HP features . . .

The HP-35 also incorporates a four-register stack and HP's famous RPN "computer logic" system (see pages 20, 21).

Light-emitting diode display: Displays up to 10 significant digits, plus two-digit exponent and appropriate signs. Two display modes: fixed point and scientific with dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Automatically converts to scientific notation when number is too large or too small to be displayed in fixed point notation. Flashing display indicates improper operation; flashing decimal points indicate low battery.

Functions and features

Keyboard commands:
Trigonometric functions: Decimal mode • Sin x • Arc sin x • Cos x • Arc cos x • Tan x • Arc tan x
Logarithmic functions: Log x • Ln x • e^x
Other functions: x^y • $\sqrt{x}$ • $1/x$ • π • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations
Data storage and positioning operations: Data entry • Stack roll down • x, y interchange • Data storage • Data recall • Change sign • Exponent entry

Memory:
4-register stack • Addressable memory

Specifications

Power: AC: 115 or 230 V, ±10%, 50-60 Hz • Battery: 500 mw nickel-cadmium rechargeable battery pack
Weight: HP-35: 9 ounces (255 g) with battery pack • Adapter/recharger: 5 ounces (142 g) • Shipping weight: Approx. 2 lbs. (900 g)
Dimensions: Length: 5.8 inches (14.7 cm) • Width: 3.2 inches (8.1 cm) • Height: 0.7 to 1.3 inches (1.8 to 3.3 cm)
Operating temperature range: 32° F to 122° F (0° C to 50° C)

The HP-35 outfit includes:

HP-35 Scientific Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/recharger • Soft carrying case • Illustrated Owner's Handbook

HP-35 Outfit $195.00
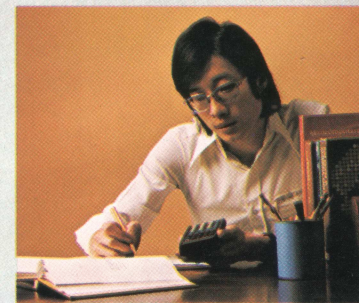
1.

It operates on pre-recorded program cards that turn complex or lengthy calculations into a few simple steps anyone can do quickly . . .

2.

Or you can actually program it yourself— without learning "computer language"—to create your own highly specialized "answer machine" . . .

3.

And it's also an advanced scientific pocket calculator—with numerous functions already built in!

HP-65
Fully Programmable
The exceptionally versatile "personal computer" for science, engineering and business

It's like having a "computer" in your pocket!

Only the HP-65 offers *full programmability* in a pocket calculator . . . because only the HP-65 can permanently store programs on tiny magnetic program cards.

It's the closest thing yet to a personal, portable computer!

Like a computer, the HP-65 accepts and memorizes programs (fed in via the keyboard or tiny, magnetic program cards) . . . it executes programs (up to 100 steps long) with just a few keystrokes . . . and it uses computer logic to solve even extremely complex problems in seconds, with exceptional accuracy.

Once the HP-65 is programmed to solve a problem, you can run the program any number of times with different data. And since you can feed in a new program card in only two seconds, you can rapidly customize the HP-65 to meet your *specific* needs of the moment.

Yet you don't have to know a thing about computers to operate it!

The HP-65's programming system is based on the everyday English language. All the keys are labeled with either recognized symbols (*e.g.,* $\sqrt{x}$) or abbreviations for words or phrases (*e.g.,* "LBL" means "LABEL"). You don't have to learn "computer language!"

The program itself is usually nothing more than a normal keystroke sequence you would use to solve a problem with provisions for entering data.

And you can operate it anywhere— on rechargeable batteries or AC—to give you answers to complex problems *the moment you need them.* No computer—and certainly no ordinary calculator—can give you the portable power you get with the HP-65!

1 Pre-recorded program cards quickly transform the HP-65 into a special-purpose calculator... to solve your complex problems at just the touch of a few keys.

Like a computer, the HP-65 can be programmed so that it goes through a step-by-step routine at just the touch of a few keys—to solve even extremely complex, lengthy or repetive problems quickly, easily and accurately.

But instead of bulky reels of tape or stacks of keypunch cards, the HP-65 uses tiny, magnetic program cards, less than one-half inch by three inches in size.

Each card contains a program directing the HP-65 to perform a pre-determined routine, to solve a specific problem or series of problems.

A particular program can be a relatively simple or intricate sequence of steps. Each card stores a program of up to 100 steps. If a program greater than 100 steps is required, it may be stored on two or more program cards.

Because the program card has all of the steps pre-recorded, you only have to feed in the known data—the HP-65 will do the work!

Hundreds of pre-recorded program cards, packaged in Application Pacs (shown at left and listed on pages 18 and 19), are available from Hewlett-Packard. Each Pac contains up to 40 pre-recorded programs, plus a manual with step-by-step instructions for running each program.

Individual Application Pac programs, and programs contributed by HP-65 owners, are available through the HP-65 Users' Library*(see page 17).

MEAN, STANDARD DEVIATION, STANDARD ERROR   STD 02A

ACTUAL SIZE
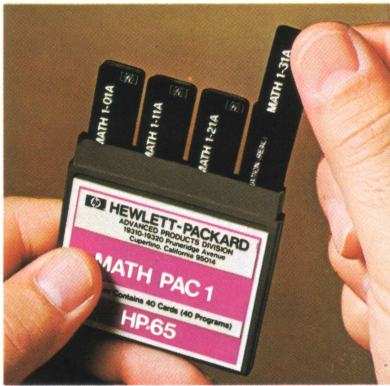
Here's how easy it is to operate the HP-65 with pre-recorded program cards

Select the card needed for the problem you're working and insert it into the HP-65's magnetic card reader. In less than two seconds . . .
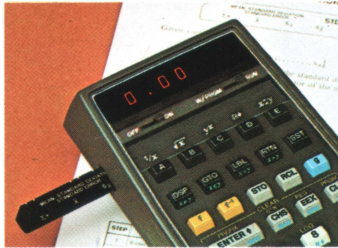
. . . the card's entire program is duplicated in the HP-65's program memory. Then the card exits for further use at another time.
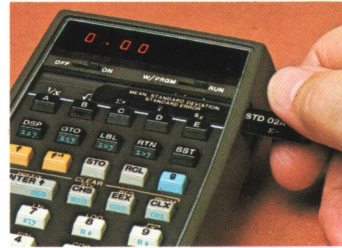
To identify the "User Definable Keys" (top row of the HP-65), insert the program card in the window slot directly above the keys.
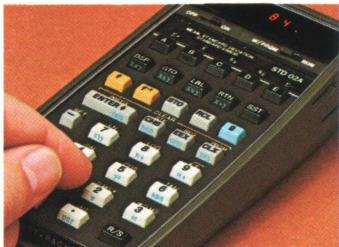
Key in your known data, and run the program as described in the instructions furnished for the program. No special training is required.
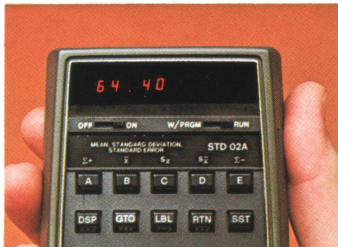
The HP-65 will give you the answer in just seconds, with accuracy up to 10 digits. And it's all done automatically!

To solve the same problem with different data, simply key in the new data and rerun the program. For other problems, insert different program cards.

2 Or you can create your own time-saving programs—without learning "computer language" —and save them on blank cards.

Since the HP-65 is a *personal* "computer," you can easily create your own program cards—and you don't have to learn "computer language" to do it!

Whatever your field, you can write programs (a keystroke sequence of up to 100 steps) incorporating the specific equations, constants and/or procedures you need, for easy and rapid calculation of all types of numeric problems. You can even incorporate any of the HP-65's powerful built-in functions, some of which are shown on the next page.

For repeated use, you can store your custom-made program on blank program cards (supplied). Then you —or anyone—can insert the card to customize the HP-65 to solve that specific problem.

Because entire sequences of keystrokes are stored as programs, then executed by merely pressing a few keys (to enter the data and run the program), the chance of manual keystroke error is substantially reduced. So in addition to saving time and effort, the HP-65 program cards greatly insure accuracy.

And it's easy to create your own program cards, using only the HP-65 and blank cards. Just follow the simple steps shown on this page.

Any program may be easily reviewed, and keystrokes can be added or deleted via the HP-65's unique editing capabilities.

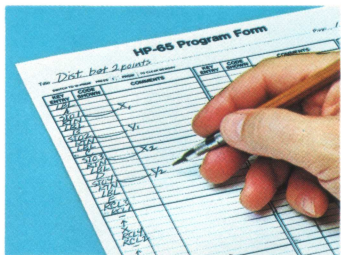Depending on your needs, a program can be simple or complex. If more than 100 steps are required for your program, just store the intermediate data in the HP-65's memory registers and use an additional program card. A program can even direct the HP-65 to make logical decisions, with the aid of one or two flags (described below), or to make any of four numeric comparison tests. Therefore, if you want to skip certain steps or branch to another part of the program—based on whether or not certain conditions are met—it can be done . . . *automatically.*

It does take time to write a program, but you need do it only once . . . you'll never have to rethink those solutions again. And you can create *all types* of programs.

## No separate keyboard needed... no key punching.

On a piece of paper, or a program form (supplied), make a step-by-step list of the keystrokes needed to solve your problem.

Then, with the HP-65 set in the "WRITE PROGRAM" mode, press the keys (except those for entering data) in the proper sequence.

The resulting program is stored in the program memory until the HP-65 is turned off, but can also be permanently recorded on a blank card.
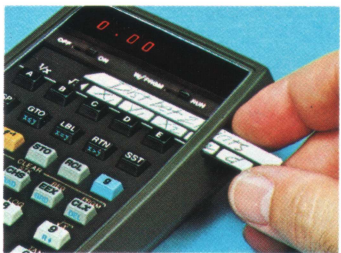
Label the program card and insert it in the slot directly above the User Definable Keys to identify how they are to be used.

With the HP-65 set in the "RUN PROGRAM" mode, key in the known data for the problem you want to solve, and run the program.

You can change any part of the program by deleting keystrokes and adding new ones. Or clip a corner of the card to prevent erasure or modification.

These keyboard controls give you full programmability in a pocket calculator . . .

These keys take the HP-65 out of the realm of the calculator and into the sophisticated world of computer technology. They permit you to write, record, save and read back your programs. They also set in motion the HP-65's other powerful programming functions.

To write or run your program . . .

W/PRGM ▐▌▐▌▐▌▐▌ **RUN**

Set this switch to "WRITE PROGRAM" to enter or change any steps in the program memory and for recording programs, without altering any data stored in the four-register automatic memory or the addressable registers.
Set to "RUN" for all other operations.

To structure your program . . .

LBL This "LABEL" key enables you to indicate and identify a series of steps within your program. Up to 15 labels are available by pressing this key and any digit (0-9) or letter (A-E) key.

GTO This "GO TO" key, in conjunction with a digit key, sets off a search in the program memory for the label with the same digit. It can be used from the keyboard when editing, or as part of a program.

A **B** **C** **D** **E**

These User Definable keys are just what their name implies. They are letter labels for parts of your program which can be executed directly from the keyboard. Or, they can be used to call a sub-routine when used within a program.

RTN When this "RETURN" key is pressed, it enables you to start at the beginning of your program again. If this key is used as part of your stored program, it stops execution of your program and returns control to the keyboard for manual operation. When used as part of a letter subroutine, it returns control to the calling program.

R/S When this "RUN/STOP" key is included in your stored program, it will halt execution of the program and return control to the keyboard for manual operation. When used from the keyboard, it can stop a running program or start a stopped program at the next step.

To include conditional functions in your program . . .

SF1 **SF2**

Like a computer, the HP-65 can take alternate computational paths based on the condition of the two flags. With the "SET FLAG 1" and "SET FLAG 2" keys, the flags can be set or cleared manually from the keyboard or automatically by an appropriate program step.

TF1 **TF2**

The condition of the flags can be tested automatically at any point in your program by using these "TEST FLAG 1" and "TEST FLAG 2" keys to include an appropriate test flag instruction. Your program will either advance sequentially or skip over the next steps, depending on the condition of the tested flag.

x≠y **x≤y** **x=y** **x>y**

These keys allow you to compare the values in the X and Y registers. If the test condition is not met, the program skips over the next two steps. If the test condition is met, the program continues with the next step. This allows the HP-65 to perform conditional branches based on the results of the test.

DSZ The "DECREMENT AND SKIP ON ZERO" key subtracts a "1" from the integer previously stored in addressable register 8, then advances your program depending on the value remaining in the register. If the value in register 8 is not equal to zero, the program advances to the next step. If it does equal zero, it skips the next two steps. "DSZ" allows you to loop through a portion of your program a predetermined number of times.

NOP If this "NO OPERATION" key is included in your stored program, it will advance the program to the following step. It is often used in conjunction with conditional-skip instructions.

To edit your program . . .

PRGM

Use this "PROGRAM" key to clear the entire 100-step program memory, so you can begin keying in a new or revised program you have developed.

DEL This "DELETE" key erases a single program step and automatically moves the remaining steps up one place in the program memory to fill the resulting gap. To insert the corrected step, just key it in and the following steps will move down automatically.

SST When the HP-65 is in the "WRITE PROGRAM" mode, this "SINGLE STEP" key lets you step through each program instruction in the program memory, as the display shows a number for each step. This number represents the location (row and column) of the key corresponding to that particular instruction. For example, "34" refers to the key in row 3, column 4—"RCL." (Exception: digit keys are represented by the numbers 00 to 09.)
If the "SST" key is used with the HP-65 in the "RUN" mode, you can execute a program one step at a time.

3 The HP-65 is also an advanced scientific pocket calculator, with all these functions and features built in

"Shift" keys multiply the functions of many keys

| f | f⁻¹ | g |
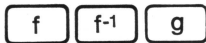
To save space, many of the built-in functions are shown on the keyboard as alternate functions, and are indicated either above a key (in gold) or on the underside of a key (in blue). To activate them, first press the appropriate prefix "shift" key. Note that f⁻¹ performs the inverse of the labeled gold functions.

Advanced trigonometric capability

R → P

Coordinate conversions—Convert polar coordinates to rectangular coordinates, or vice versa. This lets you do vector arithmetic quickly and accurately.
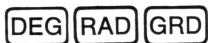
DEG RAD GRD

Angle modes—You can calculate trig functions in any of three angular modes—degrees, radians or grads. You can also convert from an angle in one mode to an angle in another mode with a few keystrokes.

→ D.MS

Angle (time) conversions—In any of three angular modes, you can convert decimal angles (times) into angles (times) in degrees (hours)/minutes/ seconds . . . or vice versa.

D.MS±

Angle (time) arithmetic—You can add or subtract angles (times) in degrees (hours)/minutes/seconds.

Other specialized functions

INT

Truncation—To truncate the contents of the X register to its integer value, press "f", then this key. To truncate it to a decimal fraction, first press "f⁻¹". By using the decimal key and this key, you can save memory storage space by retaining two numbers within a single register. This is often used in programs.

→ OCT

Octal conversion—Press the "f" key and this key to convert a decimal integer to octal. Press the "f⁻¹" key first to convert an octal integer to decimal.

Advanced memory power for faster, easier problem-solving

In addition to the 100-step program memory, the HP-65 incorporates nine addressable memories.

These nine addressable memories make data manipulation easy. You can store data in any register . . . retrieve data from any register . . . and even do register arithmetic ($+ - \times \div$), using or modifying data in any register.

The addressable registers are not only useful when operating the HP-65 as a scientific calculator—to accumulate sums, or to store constants or intermediate results—but are equally useful when working with a program. Data may be stored in any register, then retrieved—either manually or automatically, as part of a program.

Plus other quality HP features . . .

The HP-65 also includes a four-register stack—which makes possible the famous RPN "computer logic" system—and a "Last x" register (see pages 20 and 21).

Light-emitting diode display—Displays up to 10 significant digits, plus two-digit exponent and appropriate signs. Two selectable display modes: fixed point, with automatic overflow and underflow into scientific, and scientific with a dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Selective round-off; range: 0-9 decimal places.

Flashing display indicates improper operation; flashing decimal point indicates low battery.

Functions and features

Programming:

Magnetic card reader/writer • Program writing capability • Unique single-step, insert/delete editing features • $x \neq y$, $x \leq y$, $x = y$, $x > y$ relational tests for conditional branching • Direct branching • Built-in decrementer • Two flags for skip or no-skip programming or branching to another part of program • Five User Definable Keys • Subroutines (1 level) • 15 labels

Keyboard commands:

Trigonometric functions: 3 angular modes • Sin x • Arc sin x • Cos x • Arc cos x • Tan x • Arc tan x • Rectangular coordinates ↔ Polar coordinates • Decimal angle ↔ Angle in degrees/minutes/seconds • Decimal time ↔ Time in hours/minutes/ seconds • Decimal angle ↔ Angle in degrees, radians or grads • Degrees (hours)/minutes/seconds arithmetic • Vector arithmetic *Logarithmic functions:* Log x • Ln x • e^x • 10^x *Other functions:* y^x • $\sqrt{x}$ • $1/x$ • π • x^2 n! • Integer/fraction truncation •

Register arithmetic • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations • Decimal ↔ Octal *Data storage and positioning operations:* Data entry • Stack roll down and roll-up • x, y interchange • Data storage • Data recall • Change sign • Exponent entry

Memory:

4-register stack • "Last x" register • 9 addressable memory registers • Program memory for storage of up to 100 keystrokes (a program)

Specifications

Power: AC: 115 or 230 V, ±10%, 50-60 Hz, 5 watts. Battery: 500mw nickel-cadmium rechargeable battery pack

Weight: HP-65: 11 ounces (342 g) with battery pack. Recharger: 5 ounces (142 g). Shipping weight: approx. 3 lbs. (1.4 kg) *Dimensions:* Length: 5.8 inches (14.7 cm). Width: 3.2 inches (8.1 cm). Height: 0.7 to 1.4 inches (1.8 to 3.4 cm) *Temperature ranges:* Operating: 32°F to 104°F (0°C to 40°C). Card reader: 50°F to 104°F (10°C to 40°C)

The HP-65 outfit includes:

HP-65 Fully Programmable Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/ recharger • Soft carrying case • Safety travel case • Illustrated Owner's Handbook • Quick Reference Guide • Pad of programming worksheets • Standard Pac of pre-recorded program cards (see page 17) • "Key Note" newsletter and Users' Library Catalog subscriptions (see page 17).

HP-65 Outfit $795⁰⁰

These three HP-65 extras extend the versatility of the calculator at no extra charge...
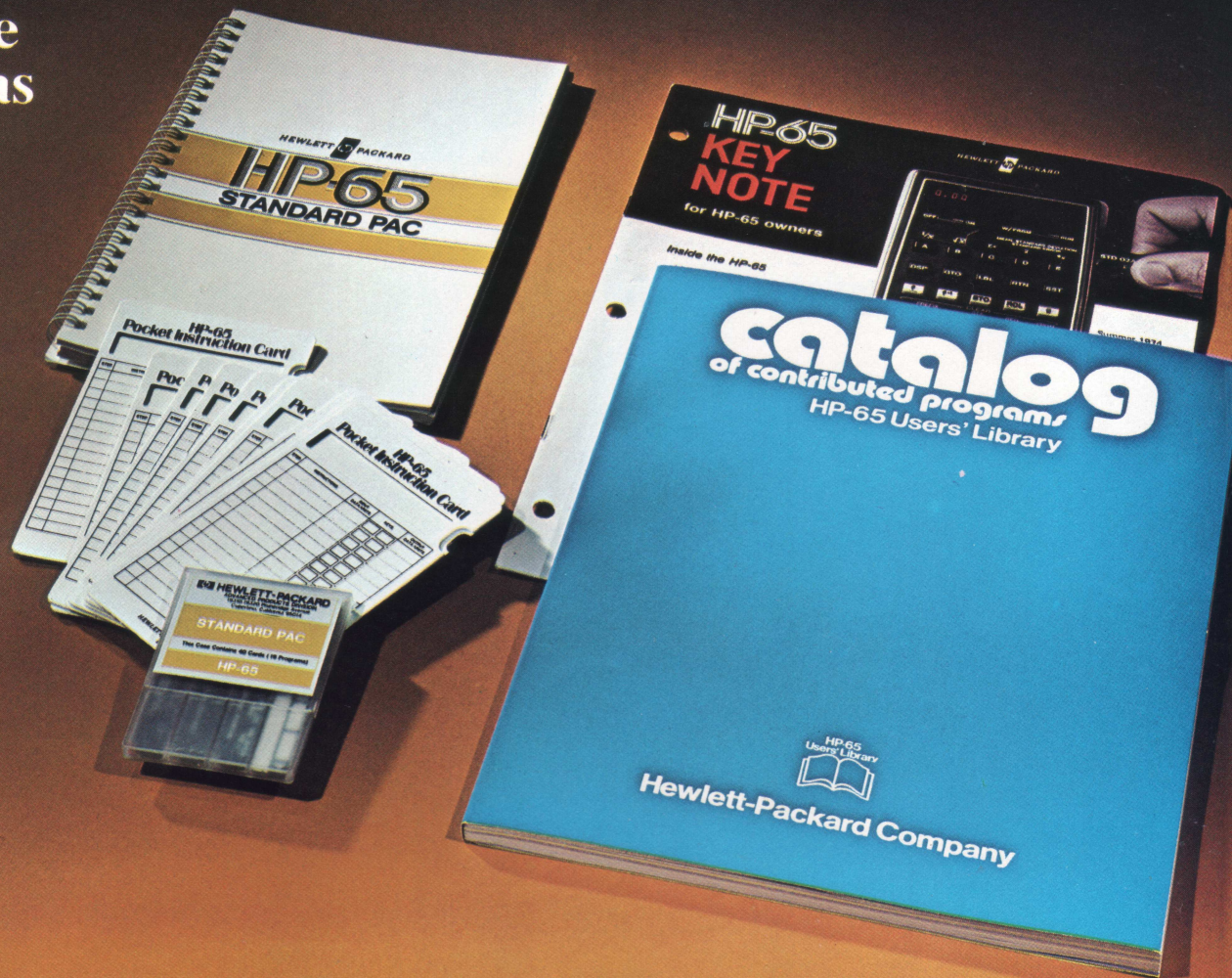
When you purchase the HP-65 Fully Programmable Pocket Calculator, it's just the beginning of a working relationship that can last a lifetime . . . with new and fantastic capabilities unveiled with regularity.

On the first day, you are introduced to the HP-65's remarkable versatility via the Standard Application Pac—a selection of pre-recorded program cards that demonstrate the versatility of the "pocket computer."

You are also entitled to a one-year subscription to the *Catalog of Contributed Programs*—an introduction to the HP-65 Users' Library—and a subscription to *Key Note*, the HP-65 newsletter.

The Standard Pac, the *Catalog* and the *Key Note* subscription are yours without extra cost when you purchase the HP-65.

1. You start with the Standard Pac

. . . a sampling of 17 pre-recorded program cards, plus three other cards to help insure the smooth operation of the HP-65. The pre-recorded cards are:
- Day of the week
- Mean, standard deviation, standard error
- Great circle navigation
- Integer base conversion
- Body surface area (Boyd)

- Pi network impedance matching
- EDM slope reduction—given elevation
- Temperature conversion
- Weight-mass conversion
- Volume conversions
- Compound interest
- Loan repayment
- Reconcile checking account
- Iterative solution of f(x)=0
- Quadratic equation
- Areas and solutions of right triangle
- The game of NIMB (a game of logic you play against the HP-65)

Plus two diagnostic cards:
- User diagnostic program I
- User diagnostic program II

These two cards check the operating condition of the HP-65.

Also included is a special card to (occasionally) clean the program read/write head of the HP-65, and 20 blank program cards for do-it-yourself programming. Included, too, is a detailed manual on the Standard Pac, plus a set of 20 two-sided blank Pocket Instruction Cards (each having room for two program cards and their program instructions).

2. You're welcomed to the HP-65 Users' Library *

. . . and given a subscription to the *Catalog of Contributed Programs.* The Users' Library contains hundreds of programs—from a wide range of fields and application areas—contributed by HP-65 users, in addition to those developed and tested by Hewlett-Packard.

All of the programs are listed and described in the *Catalog of Contributed Programs,* which is periodically updated. This sectionalized catalog makes it easy to select the particular program that will help you quickly obtain the answer(s) to your specific problem. The *Catalog* is indexed according to application area, key word *and* author.

In addition, there is a section containing a short abstract of each program. The abstract provides information to help you determine whether a particular program will meet your needs, or you can use it to compare programs against each other when selecting between two or more alternatives.

Any of the programs listed in the Catalog may be ordered from Hewlett-Packard, and—if you wish—you may record them on blank program cards for repeated use.

3. You also receive a subscription to "Key Note" *

. . . the HP-65 newsletter which will keep you abreast of current information to help you get the most out of your "pocket computer."

Key Note, published quarterly, announces new Application Pacs, describes new HP-65 accessories, passes along programming hints, and carries other news and information of interest to HP-65 users. Also, frequently-asked questions about the HP-65 will be answered in *Key Note.* (This is in addition to the continuing program of information and assistance available from HP on a one-to-one basis, via the phone or by mail, at no charge.)

and here's what you can add ▶ ▶ ▶

The HP-65 can be "tailor made" for your profession

Pre-recorded programs let you transform your HP-65 into a specialized calculator—in seconds

To concentrate the capabilities of the HP-65 in your field of interest, you can select from an ever-expanding variety of pre-recorded magnetic program cards packaged in Application Pacs. Each Pac contains cards for up to 40 programs, a detailed manual on the Pac, and a set of Pocket Instruction Cards for listing your program instructions.

FINANCE PAC 1

These 38 programs (on 40 pre-recorded cards) help give you fast answers to complex problems in investment analysis, loans, leasing, savings and annuities, business statistics and other business and financial applications. Included are programs for:

- COMPOUND AMOUNT
- DIRECT REDUCTION LOAN
- DIRECT REDUCTION LOAN WITH BALLOON PAYMENT
- SINKING FUND

Other programs are:

- PERIODIC SAVINGS, ANNUITY DUE
- PRESENT VALUE, ANNUITY DUE
- PRESENT VALUE, ANNUITY DUE WITH BALLOON PAYMENT
- SAVINGS-COMPOUNDING PERIODS DIFFERENT FROM PAYMENT PERIODS
- NOMINAL TO EFFECTIVE/EFFECTIVE TO NOMINAL RATE CONVERSION
- DIRECT REDUCTION LOAN; ACCUMULATED INTEREST/REMAINING BALANCE
- DIRECT REDUCTION LOAN; AMORTIZATION SCHEDULE
- ADD-ON RATE INSTALLMENT LOAN
- CONSTANT PAYMENT TO PRINCIPAL LOAN AMORTIZATION SCHEDULE
- INTEREST REBATE—RULE OF 78'S
- INTERNAL RATE OF RETURN, UNEVEN CASH FLOWS
- DISCOUNTED CASH FLOW ANALYSIS, NET PRESENT VALUE
- STRAIGHT LINE DEPRECIATION SCHEDULE
- SUM-OF-THE YEAR'S DIGITS DEPRECIATION SCHEDULE
- VARIABLE RATE DECLINING BALANCE DEPRECIATION SCHEDULE
- CROSSOVER POINT-DECLINING BALANCE TO STRAIGHT LINE
- DAYS BETWEEN DATES
- BOND PRICE AND YIELD
- ACCRUED SIMPLE INTEREST
- LINEAR REGRESSION (Trend Line)
- EXPONENTIAL CURVE FIT (Growth Curve)
- TOTAL, AVERAGE AND PERCENT OF TOTAL
- MOVING AVERAGES
- INVOICING

00065-67044 . . . . **$45.00**

MATH PAC 1

This basic series of 40 programs (on 40 pre-recorded cards) speeds the handling of problems in algebra, trigonometry, analytic geometry and calculus. It covers:

- HYPERBOLIC FUNCTIONS
- FIRST ORDER DIFFERENTIAL EQUATION
- SOLUTION OF A TRIANGLE (Given a, b, c or a, b, C)
- 3 x 3 MATRIX INVERSION
- FIFTH DEGREE POLYNOMIAL EQUATION
- FACTORS OF AN INTEGER

Other programs are:

- GREATEST COMMON DIVISOR, LEAST COMMON MULTIPLE
- ARITHMETIC AND HARMONIC PROGRESSIONS
- GEOMETRIC PROGRESSION
- FUNCTIONS OF x AND y
- QUADRATIC EQUATION
- CUBIC EQUATION
- FOURTH DEGREE POLYNOMIAL EQUATION
- SIMULTANEOUS EQUATIONS IN TWO UNKNOWNS
- SIMULTANEOUS EQUATIONS IN THREE UNKNOWNS
- SYNTHETIC DIVISION
- RECTANGULAR, SPHERICAL CONVERSIONS
- TRANSLATION AND/OR ROTATION OF COORDINATE AXES
- ANGLE CONVERSIONS
- SECONDARY VALUES OF $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$
- TRIGONOMETRIC FUNCTIONS
- INVERSE HYPERBOLIC FUNCTIONS
- SOLUTION OF A TRIANGLE (GIVEN a, A, C or a, B, C)
- SOLUTION OF A TRIANGLE (GIVEN B, b, c)
- SPHERICAL TRIANGLES
- AREA OF A TRIANGLE
- AREA OF A POLYGON
- CIRCLE DETERMINED BY THREE POINTS
- EQUALLY SPACED POINTS ON A CIRCLE
- POLYGONS INSCRIBED IN AND CIRCUMSCRIBED ABOUT A CIRCLE
- UNIT CONVERSIONS: C → F; ft, in → cm; lb → kg
- UNIT CONVERSIONS: mi → km; gal → ltr; yd → m; ac → ft²
- POLYNOMIAL EVALUATION (Real)
- LINEAR AND LAGRANGIAN INTERPOLATIONS
- FINITE DIFFERENCE INTERPOLATION
- NUMERICAL INTEGRATION (Discrete Case)
- SIMPSON'S RULE FOR NUMERICAL INTEGRATION
- ROOTS OF f(X) = 0 IN AN INTERVAL
- DETERMINANT AND CHARACTERISTIC EQUATION OF A 3 x 3 MATRIX
- 2 x 2 MATRIX OPERATIONS

00065-67001 . . . . **$45.00**
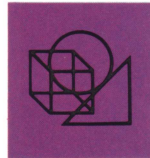
MATH PAC 2

A variety of advanced mathematical functions is provided by the 37 programs (40 pre-recorded cards) in this Pac. The programs are:

- BASE CONVERSION
- COMPLEX FUNCTIONS $|z|$, z^2, $\sqrt{z}$, $1/z$
- GAUSSIAN QUADRATURE FOR $\int_a^b f(x)dx$
- BESSEL FUNCTION J
- COMPLETE ELLIPTIC INTEGRALS

Other programs are:

- COMPLEX ARITHMETIC
- COMPLEX TRIGONOMETRIC AND HYPERBOLIC FUNCTIONS
- COMPLEX INVERSE TRIGONOMETRIC AND HYPERBOLIC FUNCTIONS
- OCTAL ARITHMETIC
- INTEGER BASE CONVERSION
- COMPLEX FUNCTIONS z^n, $z^{1/n}$
- COMPLEX FUNCTIONS e^z, $\ln z$, a^z, $\log_a z$
- COMPLEX FUNCTIONS z^w, $z^{1/w}$, $\log_z w$
- POLYNOMIAL EVALUATION (Complex)
- INTERSECTIONS OF A LINE AND A CONIC SECTION
- VECTOR PRODUCTS AND ANGLE BETWEEN VECTORS
- PARTIAL SUM AND PARTIAL PRODUCT
- GAUSSIAN QUADRATURE FOR $\int_a^\infty f(x)dx$
- KELVIN FUNCTIONS
- EULER Φ FUNCTION
- GAMMA FUNCTION
- INCOMPLETE GAMMA FUNCTION
- ERROR FUNCTION AND COMPLEMENTARY ERROR FUNCTION
- CONFLUENT HYPERGEOMETRIC FUNCTION
- GAUSSIAN HYPERGEOMETRIC FUNCTION
- CHEBYSHEV POLYNOMIAL
- LEGENDRE POLYNOMIAL
- HERMITE POLYNOMIAL
- LAGUERRE POLYNOMIAL
- SINE INTEGRAL
- COSINE INTEGRAL
- EXPONENTIAL INTEGRAL
- FRESNEL INTEGRALS

00065-67002 . . . . **$45.00**
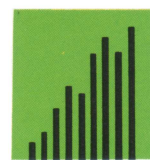
STAT PAC 1

Basic and advanced functions—37 programs (40 pre-recorded cards)—selected from the areas of general statistics; distribution functions; curve fittings; and test statistics. Programs included in this Pac are:

- MEAN, STANDARD DEVIATION, STANDARD ERROR
- RANDOM NUMBER GENERATOR
- ANALYSIS OF VARIANCE (One Way)
- MULTIPLE LINEAR REGRESSION
- 2 x k CONTINGENCY TABLE
- SUMS FOR TWO VARIABLES
- BASIC STATISTICS (Two Variables)

Other programs are:

- MEAN, STANDARD DEVIATION, STANDARD ERROR (Grouped Data)
- PERMUTATION AND COMBINATION
- ARITHMETIC, GEOMETRIC, HARMONIC AND GENERALIZED MEANS
- MOMENTS, SKEWNESS AND KURTOSIS (Grouped or Ungrouped Data)
- NORMAL DISTRIBUTION
- INVERSE NORMAL INTEGRAL
- CHI-SQUARE DISTRIBUTION
- t DISTRIBUTION
- F DISTRIBUTION
- BIVARIATE NORMAL DISTRIBUTION
- LOGARITHMIC NORMAL DISTRIBUTION
- WEIBULL DISTRIBUTION
- BINOMIAL DISTRIBUTION
- NEGATIVE BINOMIAL DISTRIBUTION
- HYPERGEOMETRIC DISTRIBUTION
- POISSON DISTRIBUTION
- LINEAR REGRESSION
- EXPONENTIAL CURVE FIT
- POWER CURVE FIT
- LOGARITHMIC CURVE FIT
- LEAST SQUARES REGRESSION OF $y = cx^a + dx^b$
- PARABOLIC CURVE FIT
- PAIRED t STATISTIC
- t STATISTIC FOR TWO MEANS
- CHI-SQUARE EVALUATION
- BARTLETT'S CHI-SQUARE STATISTIC
- SPEARMAN'S RANK CORRELATION COEFFICIENT
- MANN-WHITNEY STATISTIC
- KENDALL'S COEFFICIENT OF CONCORDANCE
- BISERIAL CORRELATION COEFFICIENT

00065-67005 . . . . **$45.00**
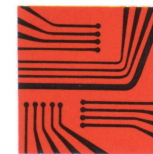
EE PAC 1

Thirty-five programs (40 pre-recorded cards) provide functions for use in electronic and electrical engineering projects. Topics addressed include impedance matching filter design; transmission line calculation; perameter conversion; power supply design; transistor biasing; control system; and waveform analyses. The programs are:

- REACTANCE CHART
- IMPEDANCE OF LADDER NETWORK
- TRANSMISSION LINE IMPEDANCE TRANSFORMATION
- S $\rightleftarrows$ Y PARAMETER CONVERSION
- FOURIER SERIES

Other programs are:

- SERIES RESONANT CIRCUIT
- PARALLEL RESONANT CIRCUIT
- T ATTENUATOR

- PI ATTENUATOR
- WYE-DELTA OR DELTA-WYE TRANSFORMATION
- MINIMUM-LOSS PAD MATCHING
- PI NETWORK IMPEDANCE MATCHING
- BAND PASS FILTER DESIGN
- ACTIVE FILTER—LOW PASS
- ACTIVE FILTER—HIGH PASS
- BUTTERWORTH FILTER
- CHEBYSHEV FILTER
- CAPACITANCE OF PARALLEL PLATES
- SELF-INDUCTANCE OF STRAIGHT ROUND WIRE
- INDUCTANCE OF A SINGLE-LAYER CLOSE-WOUND COIL
- SKIN EFFECT AND COIL Q
- TRANSFORMER DESIGN
- REED RELAY DESIGN
- IMPEDANCE OF TRANSMISSION LINE
- MICROSTRIP TRANSMISSION LINE
- POWER SUPPLY RECTIFIER CIRCUITS
- CONTROLLED RECTIFIER CIRCUITS
- INTEGRATED CIRCUIT CURRENT SOURCE
- TRANSISTOR BIAS
- JFET BIAS AND TRANSCONDUCTANCE
- PHASE-LOCKED LOOP
- DECIBEL CONVERSION
- VOLTAGE TO dBm
- WIRE TABLES Al & ANNEALED Cu
- HEAT SINKS

00065-67007 . . . . $45.00
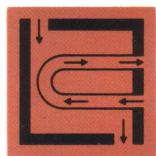
CHEMICAL ENGINEERING PAC 1

18 programs (on 40 pre-recorded cards) designed to aid the engineer in thermodynamic and transport process calculations. Topics addressed include P-V-T gas relations, gas dynamics, incompressible flow, heat exchangers, heat conduction, black body radiation, and curve fitting.

- IDEAL GAS EQUATION OF STATE
- REDLICH—KWONG EQUATION OF STATE
- REVERSIBLE POLYTROPIC PROCESS FOR AN IDEAL GAS
- ISENTROPIC FLOW FOR IDEAL GASES
- ONE DIMENSIONAL NORMAL SHOCKS FOR IDEAL GASES

Other programs are:

- FLUID TRANSPORT NUMBERS (NUSSELT—HEAT & MASS, REYNOLDS, STANTON, LEWIS, SCHMIDT, BIOT, AND PRANDTL)
- FANNING FRICTION FACTOR AND CONDUIT FLOW
- CONSERVATION OF ENERGY
- VON KÁRMÁN ANALOGY FOR HEAT AND MASS TRANSFER
- HEAT EXCHANGER ANALYSIS (HEAT TRANSFER AND EFFECTIVENESS FOR CROSS-FLOW, COUNTER-FLOW, PARALLEL-FLOW AND PARALLEL-COUNTER-FLOW HEAT EXCHANGERS)
- HEAT TRANSFER THROUGH COMPOSITE CYLINDERS AND WALLS
- STRAIGHT FIN EFFICIENCY
- NATURAL CONVECTION (ESTIMATE COEFFICIENTS FOR VERTICAL CYLINDERS AND WALLS, AND HORIZONTAL CYLINDERS AND PLATES)
- BLACK BODY THERMAL RADIATION
- TEMPERATURE OR CONCENTRATION PROFILE FOR A SEMI-INFINITE SOLID
- HYDROCARBON COMBUSTION
- CURVE FITTING (LINEAR, EXPONENTIAL, AND POWER)
- UNIT CONVERSIONS

00065-67050 . . . . $45.00

STRESS ANALYSIS PAC 1

25 programs (on 39 pre-recorded cards) designed to aid the engineer in the calculation of the properties of structural elements. Topics addressed include vector statics, section properties, interference fits, stress analysis, flat plates, beams and columns. Programs included in this Pac are:

- TWO DIMENSIONAL VECTOR OPERATIONS
- STATIC EQUILIBRIUM OF A POINT
- STATIC EQUILIBRIUM OF A RIGID BODY

Other programs are:

- PROPERTIES OF RECTANGULAR SECTIONS
- PROPERTIES OF CIRCULAR SECTIONS
- PROPERTIES OF ANNULAR SECTIONS
- COMPOSITE SECTION PROPERTIES
- BENDING STRESS IN BEAMS OR TORSIONAL SHEAR STRESS IN CIRCULAR SHAFTS
- LINEAR OR ANGULAR DEFORMATION OF A SHAFT
- THIN-WALLED PRESSURE VESSELS
- STRESS IN THICK-WALLED CYLINDERS
- INTERFERENCE FITS
- MOHR CIRCLE FOR STRESS
- SODERBERG'S EQUATION FOR FATIGUE
- CIRCULAR PLATES WITH SIMPLY SUPPORTED EDGES
- CIRCULAR PLATES WITH FIXED EDGES
- RECTANGULAR PLATES (SIMPLY SUPPORTED AND WITH FIXED EDGES)
- COMPRESSIVE BUCKLING
- ECCENTRICALLY LOADED COLUMNS
- RECTANGULAR, REINFORCED CONCRETE SECTIONS
- BOLT TORQUE

The next four programs calculate deflection, slope, moment, and shear for various beam geometries.
- CANTILEVER BEAMS
- SIMPLY SUPPORTED BEAMS
- BEAMS FIXED AT BOTH ENDS
- BEAMS FIXED AT ONE END AND SIMPLY SUPPORTED AT THE OTHER

00065-67051 . . . . $45.00

SURVEYING PAC 1

Because surveying practices differ from country to country, different versions are offered. Contact your local Hewlett-Packard sales office for the exact contents of Surveying Pac 1 in your country. The U.S. version consists of 34 programs (on 34 pre-recorded cards) dealing with traversing; curves; triangles and intersections; predetermined area; and earthwork. The Pac contains:

- FIELD ANGLE TRAVERSE
- HORIZONTAL CURVE LAYOUT
- BEARING-DISTANCE INTERSECT
- STADIA REDUCTIONS
- VOLUME BY AVERAGE END AREA

Other programs are:

- BEARING TRAVERSE
- CLOSURE FOR FIELD ANGLE AND BEARING TRAVERSES
- INVERSE FROM COORDINATES
- SIDESHOTS
- COORDINATE TRANSFORMATION
- COMPASS RULE ADJUSTMENT
- TRANSIT RULE ADJUSTMENT
- TWO INSTRUMENT RADIAL SURVEY
- CURVE SOLUTION—Given △ & R or △ & T
- CURVE SOLUTION—Given R & T or R & L
- CURVE SOLUTION—Given △ & C or R & C
- ELEVATIONS ALONG A VERTICAL CURVE
- TRIANGLE SOLUTION—Given SSS or SAS
- TRIANGLE SOLUTION—Given SSA

- TRIANGLE SOLUTION—Given ASA or AAS
- BEARING-BEARING INTERSECT
- DISTANCE-DISTANCE INTERSECT
- DISTANCE FROM A POINT TO A LINE
- TAPING CORRECTIONS
- EDM SLOPE REDUCTION—Given Zenith Angle
- EDM SLOPE REDUCTION—Given △ Elevation
- FIELD ANGLE CHECK
- THREE WIRE LEVELING
- SLOPE STAKING—Given Centerline Terrain Elevation
- SLOPE STAKING—Given Centerline Cut/Fill
- AZIMUTH OF THE SUN
- PREDETERMINED AREA—Line Through a Point
- PREDETERMINED AREA—Two Sides Parallel
- VOLUME OF BORROW PIT

00065-67003 . . . . $45.00

MEDICAL PAC 1

This Pac of 27 programs (38 pre-recorded cards) allows for the following types of medical calculations: unit conversions; ventilator set-up and calibration; analysis of cardio-pulmonary function; acid-base balance, blood gases; and respiratory status. The Pac contains:

- WEIGHT CONVERSIONS
- LENGTH CONVERSIONS
- VOLUME CONVERSIONS
- ENGLISH-METRIC CONVERSIONS
- PATIENT IDENTIFICATION

Other programs are:

- MALE VITAL CAPACITY
- FEMALE VITAL CAPACITY
- LUNG DIFFUSION
- RESPIRATORY GAS CONVERSIONS
- VENTILATOR SETUP
- P_ACO_2 NORMALIZATION
- BLOOD ACID-BASE STATUS
- VIRTUAL PO_2
- OXYGEN SATURATION AND CONTENT
- ANAEROBIC PCO_2 AND pH CHANGE
- ANAEROBIC PO_2 CHANGE
- DEAD SPACE FRACTION
- A-a O_2 DIFFERENCE
- PHYSIOLOGIC SHUNT AND FICK
- DUBOIS BODY SURFACE AREA
- BOYD BODY SURFACE AREA
- DYE CARDIAC OUTPUT
- FICK CARDIAC OUTPUT
- VALVE AREA
- ANATOMIC SHUNTS
- CONTRACTILITY
- STROKE WORK

00065-67004 . . . . $45.00

AVIATION PAC 1

Here are 29 programs (31 cards) for flight and preflight calculations—primarily for the private and business pilot, but also being used by many airline pilots. Included are:

- AIRCRAFT FLIGHT PLAN WITH WIND
- FLIGHT MANAGEMENT
- PREDICTING FREEZING LEVELS
- GENERAL AIRCRAFT WEIGHT AND BALANCE
- CUSTOMIZED WEIGHT AND BALANCE
- TURN PERFORMANCE

Other programs are:

- RATE OF CLIMB AND DESCENT
- HEAD WINDS AND CROSSWINDS
- FLIGHT PLANNING AND FLIGHT VERIFICATION
- DETERMINING IN-FLIGHT WINDS

- STANDARD ATMOSPHERE (For altitudes 0-36089 and 36089-82000)
- MACH NUMBER AND TRUE AIRSPEED
- TRUE AIR TEMPERATURE AND DENSITY ALTITUDE
- LOWEST USABLE FLIGHT LEVEL
- GREAT CIRCLE PLOTTING
- RHUMBLINE NAVIGATION
- GREAT CIRCLE NAVIGATION
- POSITION, GIVEN HEADING, SPEED AND TIME
- LINE OF SIGHT DISTANCE
- POSITION BY TWO VORS
- NAVIGATION BY TWO VORS
- POSITION BY ONE VOR
- DME SPEED CORRECTION
- AVERAGE WIND VECTOR
- COURSE CORRECTION
- TIME OF SUNRISE AND SUNSET
- AZIMUTH OF SUNRISE AND SUNSET
- PILOT UNIT CONVERSIONS
- CUSTOMIZED UNIT CONVERSIONS

00065-67042 . . . . $45.00

NAVIGATION PAC 1

Written for marine navigators but also useful to the land or air navigator, these 26 programs (40 cards) assist the navigator in piloting, dead reckoning, celestial navigation, and relative motion problems. The pac includes:

- GREAT CIRCLE COMPUTATION
- LONG-TERM ARIES ALMANAC
- 1974-1975 SUN ALMANAC
- LONG-TERM STAR ALMANAC
- ALMANAC POSITIONS
- SIGHT REDUCTION TABLE
- MANEUVERING RELATIVE TO ANOTHER VESSEL

Other programs are:

- LENGTH CONVERSIONS
- SPEED, TIME, AND DISTANCE
- TIME-ARC CONVERSION
- PROPELLER SLIP
- FUEL CONSUMPTION
- DISTANCE TO OR BEYOND HORIZON
- DISTANCE BY HORIZON ANGLE AND DISTANCE SHORT OF HORIZON
- DEAD RECKONING
- RHUMBLINE NAVIGATION
- GREAT CIRCLE NAVIGATION
- COMPOSITE SAILING
- SEXTANT ALTITUDE CORRECTIONS
- SUNRISE, SUNSET, AND TWILIGHT
- MOST PROBABLE POSITION
- FIX BY TWO OBSERVATIONS
- FIX BY THREE OBSERVATIONS
- DISTANCE OFF AN OBJECT BY TWO BEARINGS
- VECTOR ADDITION
- VELOCITY TO CHANGE RELATIVE POSITION

00065-67045 . . . . $45.00

BLANK PROGRAM CARDS

So that you may customize the HP-65's capabilities even more, these blank magnetic cards can be used to store programs of up to 100 steps, then used again and again for problem-solving. Each card may be "erased" to record different programs, or a corner clipped for permanency.

00065-67010 (40 cards) $25.00
00065-67054 (120 cards) $50.00

All Hewlett-Packard pocket calculators feature RPN "computer logic"—the most sensible logic system a pocket calculator can have!

In 1967, Hewlett-Packard began designing a family of computer calculators—powerful enough to solve complex engineering, scientific and business problems, yet simple enough to be used by anyone who works with numbers.

As part of this effort, HP thoroughly evaluated the strengths and weaknesses of the various logic systems which a person might use to communicate with an electronic calculator.

Computer logic, for example, had many advantages, but was not commonly used except by computer programmers.

Algebraic logic was in more common use and worked well with simple calculations, but when working complex problems it was often necessary to restructure the equation.

So, after much testing and evaluation, Hewlett-Packard selected a parenthesis-free but unambiguous logic system derived from the one developed by a mathematician named Jan Lukasiewicz. It's known as "RPN computer logic," and all HP pocket calculators use it.

RPN is the most efficient, most consistent way to solve mathematical problems, because it reduces even the most complex problems to a relatively few, easily-handled steps. It gives you confidence in your computations.

The RPN "computer logic" system is only possible because HP pocket calculators incorporate a four-register stack. This is symbolized in the photo at left and completely explained in every HP Owner's Handbook.

Numbers that are keyed in, as well as intermediate answers, are automatically stored here, for review or to use again in subsequent calculations.

A fifth register—the "Last x" register—is also incorporated into HP's advanced scientific calculators. It stores the last input argument (the number keyed in just before the function is pressed), for review or other operation.

T

Z

Y

X

LAST X

No "=" key is needed

If you will look at the keyboard of any HP calculator shown in this catalog, you will see that none has an "=" key. Nor are there any keys for parentheses. None are needed.

Instead, all HP calculators have a key like this:

| ENTER↑ |

Thanks to this key, and RPN logic, you get four major advantages you don't get with most other calculators:

1. You work with only two numbers at a time, just as if you were solving the problem with paper and pencil. (Only incredibly faster.)

Even the most complex problems are broken down into a series of easily-handled two-number problems, which you can solve in any order that's convenient—left to right, right to left, or from the middle of the equation outwards.

No matter what kind of problem it is, there's no restructuring to do . . . no rearranging of the equation as is so often necessary with other calculators, to conform to algebraic logic.

So there's less confusion and less chance for error.

2. The function is immediately calculated.

With an HP calculator, pressing the function key initiates the desired action, so you get your answer immediately.

For example, to find the square root of 16, simply press three keys . . .

| 1 | 6 | √x |

. . . and your answer immediately appears on the display . . .

| 4.00 |

And it's just as fast and easy to calculate squares, cosines, factorials or other functions.

3. The intermediate answer is displayed.

This enables you to check your calculation every step of the way . . . so you can do something about it if it doesn't look "right."

4. The intermediate answer is automatically stored.

So there's no need to store it manually, by keying in each digit,

if the number is needed in the next calculation.

Obviously, this saves keystrokes and helps prevent errors. And you can easily recall the intermediate answer if need be.

Four major advantages — to give you *confidence in your computations.*

Just four simple steps

To use any Hewlett-Packard pocket calculator, just follow these four simple steps . . .

1. Key in the first number.

2. Enter it into the stack (press the "ENTER↑" key).

3. Key in the second number.

4. Press the function key.

And if your numbers are already stored in the calculator as intermediate answers, all you have to do is hit the function key.

Could anything be easier . . . or faster?

Here's an example

Let's take a simple problem—2.5 x 4—and solve it with an HP calculator, using the four steps shown above . . .

1. Key in the first number:

| 2 | · | 5 |

2. Enter it into the stack:

| ENTER↑ |

3. Key in the second number:

| 4 |

4. Press the function key:

| x |

Your answer appears on the display:

| 10.00 |

Now let's try a slightly more difficult problem:
(2 + 6) x (9 — 3.5).

If you were working this out with paper and pencil, you'd probably work from left to right and first solve for (2 + 6). Then you'd solve for (9 — 3.5). Finally, you'd multiply the two answers—8 x 5.5—and get 44.

Well, with an HP pocket calculator, you work the problem the same way.

(Or, if you prefer, you could work it right to left, or even—with more complex problems—from the middle outwards).

Working from left to right, press . . .

| 2 | ENTER↑ | 6 | + |

The display shows the intermediate answer:

| 8.00 |

To solve for (9 — 3.5), press . . .

| 9 | ENTER↑ |
| 3 | · | 5 | — |

The display shows:

| 5.50 |

To multiply the two intermediate answers (which have been automatically stored), press . . .

| x |

And the displays shows:

| 44.00 |

Even if your problem were as complex as converting indicated air speed to the true mach number . . .

$$\sqrt{5\left(\left[\left[\left(\frac{400}{661.5}\right)^2 \cdot 2 + 1\right]^{\frac{1.4}{.4}} - 1\right]\frac{29.96}{15} + 1\right]^{.286} - 1\right)}$$

. . . you would still be able to solve it quickly, easily and without confusion if you used an HP calculator, thanks to RPN—the most sensible logic system a pocket calculator can have!

Optional accessories that protect and increase the versatility of your Hewlett-Packard pocket calculator

B

C

A

Reserve power pack assures you of portable power whenever you need it.
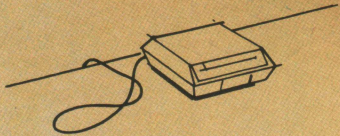
A You'll always have a fully-charged spare battery pack on hand when you use this reserve power pack, especially designed for Hewlett-Packard pocket calculators. It comes complete with a spare battery pack.

Simply slip the battery pack into the holder, then plug the holder into the AC adapter/recharger that comes with your calculator. A built-in light-emitting diode tells you that the battery pack is recharging. In six to eight hours, you'll have a fully-charged battery pack to exchange for the one in your calculator.

Temperature range: 32°F to 104°F (0°C to 40°C)
Dimensions: 3x3x1" (8x8x3 cm)
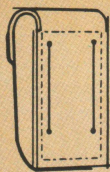Weight: 4 oz. (110 g) with battery pack

Battery pack and holder. (For all models except HP-21.)
82004A **$20⁰⁰**

Battery pack only. (For all models except HP-21.)
82001A **$10⁰⁰**

Battery pack and holder for HP-21
82028A **$15⁰⁰**

Battery pack only for HP-21
82019A **$7⁰⁰**

Hard leather case helps protect your calculator outdoors

B Using your HP calculator outdoors? Help protect it by carrying it in this hard leather field case. It slips onto your belt and 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.

Field case for HP-35, HP-45, HP-55, HP-70, HP-80
82006A **$20⁰⁰**

Field case for HP-65
82016A **$25⁰⁰**

Security cradle helps reduce pilferage

C When leaving your HP calculator unattended in the office or lab, you can help guard it against "mysterious disappearance" by means of this ruggedly-constructed security cradle.

A key is used to lock and unlock the cradle holding your calculator. And while your calculator is in place you have complete access to the keyboard and display, with battery pack or AC operation.

The security cradle may be attached to your desk via: (1) four corner screws, (2) center screw attachment, allowing 360° rotation, (3) removable six-foot steel cable, or (4) extremely-hard-to-remove adhesive tape. (All are supplied.)

Security cradle for HP-35, HP-45, HP-55, HP-70, HP-80
82007A **$25⁰⁰**

Security cradle for HP-65
82015A **$25⁰⁰**

Security cradle for HP-21
Similar to (c) above, but because of HP-21's design, has built-in prism to provide better viewing angle when on flat surface.
82029A **$30⁰⁰**

Accessories to replace or replenish those received with your pocket calculator

Owner's Handbook

HP-21	#00021-90001	$ 2.00
HP-35	#00035-90008	1.50
HP-45	#00045-90300	2.00
HP-55	#00055-90001	2.50
HP-65	#00065-90200	2.50
HP-70	#00070-90001	2.00
HP-80	#00080-90001	2.00

Quick Reference Guide

HP-45	#00045-90303	$ 1.00
HP-55	#00055-90002	1.00
HP-65	#00065-90203	1.00
HP-80	#00080-90003	1.00

Soft Case

HP-21	#82027A	$ 6.00
HP-65	#82017A	10.00
All Other Models	#82021A	6.00

Battery Pack

HP-21	#82019A	$ 7.00
All Other Models	#82001	10.00

Battery Charger (115/230 V AC)

HP-21	#82026A	$15.00
All Other Models	#82002	18.00

Programming Worksheets (Pad of 50)

HP-55	#9320-2940	$ 1.65
HP-65	#9320-0616	1.65

Blank Program Cards for HP-65

40-Card Pac	#00065-67010	$25.00
120-Card Pac	#00065-67054	50.00

Pocket Card Holders for HP-65

Pack of 20	#9320-0613	$ 7.50

Safety Travel Case
(For all models except HP-21)
#82018A . . . . $ 8.00

Hewlett-Packard Business Pocket Calculators...

Designed to help you make profitable business and financial decisions

If you're in business, you know that most of the decisions you're called upon to make involve time and/or money. And the decisions you make affect that important goal: profitability.

With a Hewlett-Packard business pocket calculator, you can have—right at your fingertips—the power you need to make profitable decisions anywhere . . . anytime.

These calculators are pre-programmed with all the necessary equations and interest tables (one even has a 200-year calendar) for solving virtually any problem involving the relationship between time and money.

Calculations that would take you considerable time and effort with paper and pencil, or with a four-function calculator, are easily handled with just a few keystrokes when you use an HP business calculator—even if you have had no formal training in business or finance.

Simply follow the step-by-step directions in the Owner's Handbook and feed in the known data. Almost immediately, the answer is revealed to you on the calculator's display—with accuracy to the last penny in a million dollar calculation.

The *HP-70 Business Pocket Calculator* gives you the portable power needed to solve most types of general business and financial math problems—everything from markups and percent to depreciation and rate of return.

For solving even more complex time-and-money problems—including those involving bond yields and prices, trend lines, interest rebates, and the number of days between dates—Hewlett-Packard offers the well-known *HP-80 Financial Pocket Calculator* and its desktop version, the *HP-81*.

The ultimate in problem-solving power is yours with the amazing *HP-65 Fully Programmable Pocket Calculator* (page 13) and the Financial Application Pac (page 18). It's like having your own personal, pocket-sized computer and is especially useful for solving lengthy, complex or repetitive problems.

In today's fast-moving economy, it's imperative that you make decisions quickly and accurately. HP's business calculators help you do this by increasing your capability to get the information you *need*—when you need it.

In these pages you'll discover the extensive range of functions and features offered by the HP-70, HP-80, HP-65 and HP-81, and on page 31 you'll find a chart to help you compare models. Whichever one you finally select, consider it an investment with an excellent rate of return.
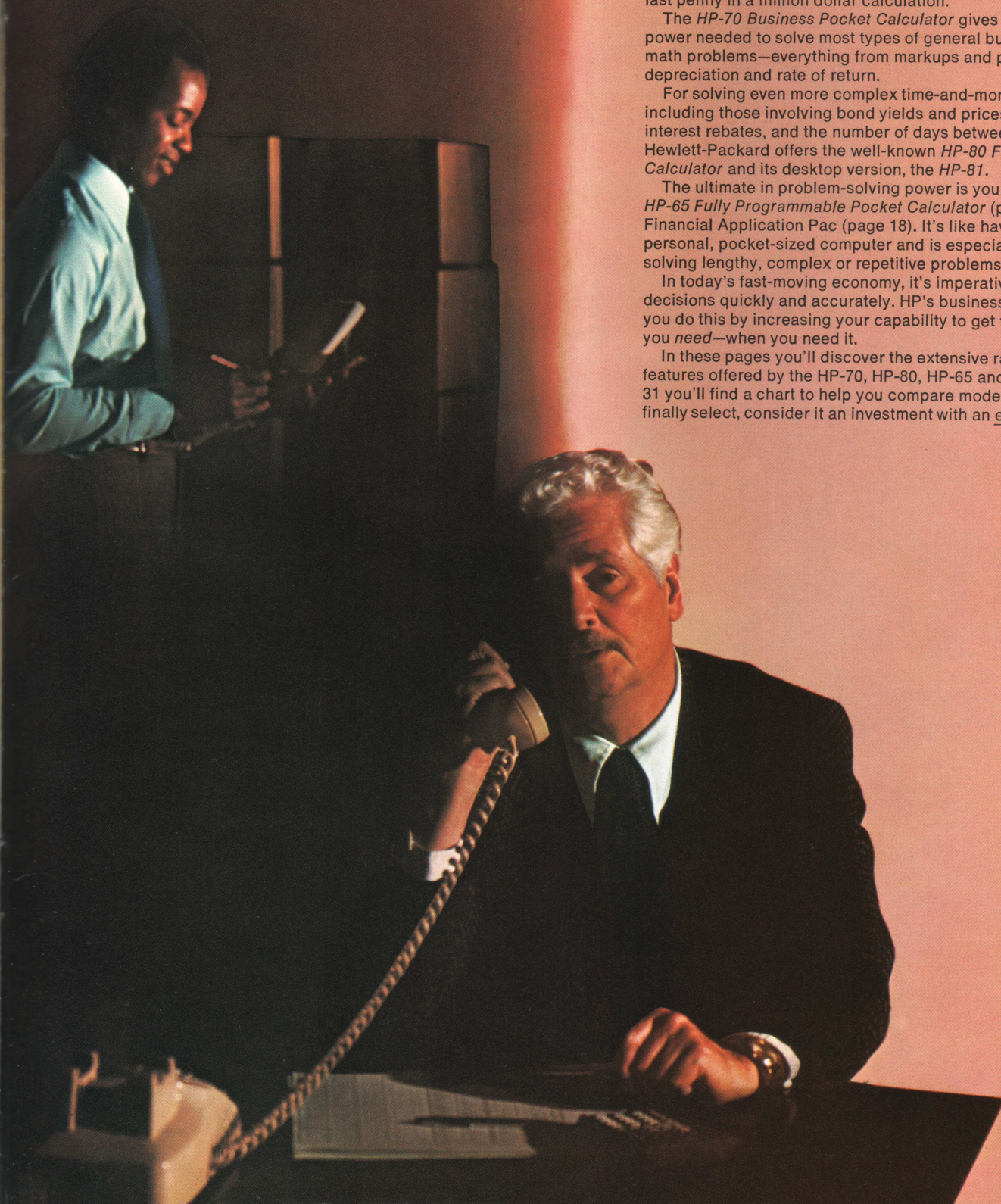
HP-70 Business

For everyday business problem solving... plus reserve power to help make financial decisions

Pre-programmed functions and interest tables, and superior memory power, let you solve business math problems in seconds . . . anywhere

Designed for the "generalist" in business, the HP-70 gives you the ability to solve everyday business math problems—such as markups, discounts and extensions—quickly and easily.

The HP-70 also has *reserve* power to rapidly solve financial management problems that previously required much time or expensive equipment.

And you can use it *anywhere . . . anytime.*

The HP-70 can quickly solve problems dealing with everyday business math
### Percentages

%	△%

The "%" and "△%" keys allow you to easily handle problems concerned with: percentages; net amounts (markups, discounts, chained discounts, etc.), and percent difference.

Random-entry financial keys . . . the reserve memory power that speeds and simplifies the solving of time-and-money problems

The five keys in the top row of the HP-70 are financial keys—preprogrammed with problem-solving equations and interest tables. Simply enter the known data and press these keys to get your answers.

This random-entry system also lets you change any number at any time, so you can solve the same problem with different data quickly and easily, by keying in only the new data. These five powerful, financial keys are:
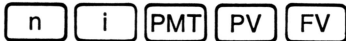
n	i	PMT	PV	FV

Number of periods—To enter or find the number of time periods, payment periods, compounding periods, etc.

Interest rate per period—To enter or find the compound interest rate.

Payment per period—To enter or find the payment or deposit amount.

Present value—To enter or find the loan amount, principal amount, current price, beginning value or investment—the "now money."

Future value—To enter or find the final balance—what you get after all the interest and deposits or payments have been added.

These financial keys save you valuable time when calculating:

Compounded amounts (compound interest)

You can readily solve problems involving future and present value amounts; rate of interest; number of periods; interest earned; effective annual interest rates, and nominal (stated) annual interest rates.

Amortized (direct reduction) loans (ordinary annuity)

The HP-70's financial keys also aid in solving problems dealing with: the number of payments; the number of payments to reach a specified balance; payment amounts; annual percentage rates, with or without

fees; principal amounts; amortization schedules; remaining balance (remaining principal, last payments and balloon payments) and accumulated interest; payment amount for loan with balloon payment; annual percentage rate with balloon payment coincident with, or one period after, the last payment; price and yield of discounted mortgages (prepaid or fully amortized), and the factor for Canadian mortgages.

Loans with a constant amount paid toward the principal

Using the HP-70, you can prepare a schedule showing the interest portion per payment and the remaining balance when a constant amount is paid toward the principal.

Sinking funds (ordinary annuity)

Just press the keys, and the HP-70 can solve for: the debt retirement amount; rate of interest; payment amount, and number of payments.

Consumer loans

With the HP-70, it's easy to calculate the monthly payment amount or, using the Rule of 78's, rebates. You can also convert the add-on interest rate to the annual percentage rate, or vice versa.

Savings functions (annuity due)

In seconds, you can calculate: number of deposits; rate of interest; deposit amount, or future value.

Lease and rent functions (annuity due)

Calculations include: number of payments; rate of interest; payment amount; the payment amount with a balloon payment or a residual value, and present value. The HP-70 will also convert add-on interest rate to annual percentage rate of interest, or vice versa.

Discounted cash flow analysis

You can use the "M" addressable memory as an accumulator, to calculate the net present value of even, uneven or deferred payment streams. You can also calculate the discounted or internal rate of return (IRR)—an iteration of the above.

Equity investment analysis for income property

You can calculate equity investment value and present value, and future value and overall appreciation/depreciation rate.

Commercial loans (short term notes)

INT

The "INTerest" key expedites problems dealing with accrued interest amounts or discount amounts and annual yields for discounted notes (360- or 365-day years).

Depreciation functions

You can use the HP-70 to calculate the depreciation amount and remaining balance, using the straight-line method, the sum-of-the-year's-digits method (full year only), or declining-balance methods (full or partial year).

Superior memory power—for solving complex or repetitive problems in just seconds

Memory power gives the HP-70 the ability to store entries, answers or constants for use later on in a calculation. And the HP-70 has memory power *superior* to other business pocket calculators.

Four memories are in the four-register stack (see pages 20, 21). Each time you key in a number, it's stored in this automatic memory and automatically positioned to make calculating easier. For example, when doing chain calculations, you don't have to write down any numbers and key them in again later on which helps reduce your error ratio.

K	M	M+

Two addressable memories are also available for saving numbers you want to use later on, or for storing constants. One of these registers may also be used as an accumulator. Together with the stack, it permits you to keep two different running totals at the same time.

n	i	PMT	PV	FV
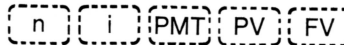
A financial memory bank is inside the HP-70, too. Each of the five financial keys has its own memory. This permits random entry and lets you change any number at any time—to make financial problem solving faster and easier. Or you can use any three of these memories as addressable memories.

Plus other quality HP features . . .

The HP-70—like other Hewlett-Packard pocket calculators—features the famous RPN "computer logic" system (see pages 20, 21) that facilitates the handling of lengthy, complex or repetitive problems.

Light-emitting diode display—Displays up to 10 significant digits, plus two-digit exponent and appropriate signs. Two selectable display modes: fixed point, with automatic overflow for large numbers into scientific, and scientific with a dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Selective round-off; range: 0-9 decimal places in fixed point. Flashing display indicates improper operation; flashing decimal points indicate low battery.

Functions and features
Keyboard commands:

Financial functions: Number of periods (n) • Interest rate (i) • Payment per period (PMT) • Present value (PV) • Future value (FV) • Simple interest (INT)

Mathematical functions: Percentage • Percent difference • y^x • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations • Accumulation

Data storage and positioning operations: Data entry • Stack roll down • x, y interchange • Data storage • Data recall • Change sign

Memory:

4-register stack • 2 addressable memories (including an automatic accumulating memory) • Financial memory bank

Specifications

Power: AC: 115 or 230 V, ± 10%, 50 to 60 Hz • Battery: 500 mw nickel-cadmium rechargeable battery pack
Weight: HP-70: 9 ounces (255 g) • Adapter/recharger: 5 ounces (142 g) Shipping: Approx. 2 lbs. (900 g)
Dimensions: Length: 5.8 in. (14.7 cm) • Width: 3.2 in. (8.1 cm) • Height: 0.7 to 1.3 in. (1.8 to 3.3 cm)
Operating temperature range: 32° F to 122° F (0° C to 50° C)

The HP-70 outfit includes:

HP-70 Business Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/recharger • Soft carrying case • Illustrated Owner's Handbook • "Your Key To Better Real Estate Decisions" Book

HP-70 Outfit $275.00

HP-80 Financial

The finest pocket calculator ever designed for time– and–money management

For calculating most financial problems—even a bond price or yield—in seconds, without referring to tables

The HP-80 Financial lets you solve business math or time-and-money problems quickly and easily.

All the interest equations and tables have been pre-programmed. So has a 200-year calendar, used in solving for bond price and yield, or short-term interest.

It's pre-programmed to handle general business math problems

Percentages

| % | △ % |

The "%" and "△%" keys allow you to easily handle problems concerned with: percentages; net amounts (markups, discounts, chained discounts, dealer discount ratios, anticipation discounts, etc.), and percent difference.

Just press the keys to solve time-and-money problems in seconds

At the top of the HP-80's keyboard are five keys for solving all types of business problems involving compound interest or compound growth. They replace the compound interest, discount, bond and annuity tables commonly in use. Merely enter the known amounts (the data) and press the appropriate keys.

| n | i | PMT | PV | FV |

Number of periods—To enter or find the number of time periods, payment periods, compounding periods, etc.

Interest rate per period—To enter or find the compound interest rate.

Payment per period—To enter or find the payment or deposit amount.

Present value—To enter or find the loan amount, principal amount, current price, beginning value or investment—the "now money."

Future value—To enter or find the final balance—after all the interest and deposits, or payments have been added.

The HP-80's financial keys save you time and effort when calculating:

Compounded Amounts (compound interest)

It takes but a few seconds to solve for: present value and future value amounts; rate of interest; number of periods; interest earned; effective annual interest rate, and nominal (stated) annual interest rate.

Amortized (direct reduction) loans (ordinary annuity)

You can solve for: the number of payments; the number of payments to reach a specified balance; payment amount; annual percentage rate, with or without fees; principal amount; amortization schedules; remaining balance (remaining principal, last payment, balloon payment) and accumulated interest; payment amount for loan with a balloon payment; annual percentage rate with balloon payment coincident with, or one period after, the last payment; price and yield of discounted mortgages (prepaid or fully amortized), and the mortgage factor for Canadian mortgages.

Loans with a constant amount paid toward the principal

With the HP-80 you can prepare a payment schedule showing the interest portion per payment and the remaining balance, when a constant amount is paid toward the principal.

Sinking funds (ordinary annuity)

The HP-80 can calculate: payment amount, interest rate, number of payments and debt retirement amount.

Consumer loans

Just press the keys to calculate the monthly payment amount, or to convert the add-on interest rate to the annual percentage rate of interest. And, using the Rule of 78's, you can use the HP-80 to calculate rebates.

Also, you can convert the annual percentage rate to the add-on rate.

Savings functions (annuity due)

You can calculate the number of deposits, the rate of interest, the deposit amount and the future value.

Lease and rent functions (annuity due)

The HP-80 can be used to convert the add-on interest rate to the annual percentage rate, or vice versa.

You can calculate: the number of payments; rate of interest; payment amount; payment amount with balloon payment or residual value, and present value.

Discounted cash flow analysis

| Σ+ | Σ— |

You can quickly and easily perform a discounted cash flow analysis, and calculate the net present value of even, uneven or deferred payment streams.

The HP-80 can also be used to calculate the discounted or internal rate of return (iteration of above).

Equity investment analysis for income property

You can use the calculator to solve for: equity yield rate; equity investment value and present value; and future value and overall appreciation/depreciation rate.

Bond functions

| YTM | INTR | BOND |

The HP-80 has pre-programmed function keys for bond calculations: "Yield-To-Maturity," "INTeRest" and "BOND". You can calculate bond price, yield and after-tax yield, accrued interest (between coupons) and bond amortization. You can also calculate a callable bond price and yield-to-call.

Commercial loans (short term notes)

| INTR |

The HP-80's "INTeRest" key lets you calculate the accrued interest amount or the discount amount and annual yield for a discounted note (for either a 360- or 365-day year).

Calendar functions

DATE

| DAY |

This key puts a 200-year calendar (1900 to 2099) at your fingertips. You can find: the number of calendar days between two dates; the day of the week a date falls on; a future date, or a past date, given the number of days from a known date.

Depreciation functions

COMPUTE

| SOD |

The HP-80 incorporates a unique key labeled "SOD" for calculating sum-of-the-years'-digits depreciation—amount and remaining balance—on a full-year or partial year basis.

You can also calculate the depreciation amount and remaining balance via the straight-line method, or via the declining-balance method (full year or partial year).

Statistical functions

| | Σ— | →Σ |
| TL | Σ+ | x̄ |

By using the "Trend Line" key, you can easily calculate: a trend line (time series linear regression) giving you the y-intercept (value at point 0); the number of time periods; the slope, and automatic projections. You can also calculate two variable linear regression.

The HP-80 can also calculate: the mean and the standard deviation, with the ability to change data points after a calculation and recalculate. The "Σ+" key provides running totals and computes the sum of the squares and the number of entries.

Memory power

In addition to the four-register stack, the HP-80 has an addressable memory for storing constants or other numbers to be used later on in a calculation.

Plus other quality HP features . . .

The HP-80 features the famous RPN "computer logic" system (see pages 20, 21).

Light-emitting diode display— Displays up to 10 significant digits, plus two-digit exponent and appropriate signs. Two selectable display modes: fixed point, with automatic overflow for large numbers into scientific, and scientific with a dynamic range of 10^{99} to 10^{-99}. Automatic decimal point positioning. Selective round-off; range: 0-6 decimal places in fixed point. Flashing display indicates improper operation; flashing decimal points indicate low battery.

Functions and features

Keyboard commands:

Financial functions: Number of periods (n) • Interest rate (i) • Payment per period (PMT) • Present value (PV) • Future value (FV) • Simple interest (INTR) • Sum-of-the-years'-digits depreciation (SOD)

Bond functions: Bond prices • Bond yields • 200-year calendar

Statistical functions: Mean, standard deviation (sum-of-the-squares) • Trend line

Mathematical functions: Percentage • Percent difference • $\sqrt{x}$ • y^x • Addition, subtraction, multiplication or division in serial, mixed serial, chain or mixed chain calculations

Data storage and positioning operations: Data entry • Stack roll down • x, y interchange • Data storage • Data recall • Change sign

Memory:

4-register stack • Addressable memory

Specifications

Power: AC: 115 or 230 V ±10%, 50 to 60 Hz • Battery: 500 mw nickel-cadmium rechargeable battery pack

Weight: HP-80: 9 ounces (255 g) • Adapter/recharger: 5 ounces (142 g) • Shipping: Approx. 2 lbs (900 g)

Dimensions: Length: 5.8 in (14.7 cm) • Width: 3.2 in (8.1 cm) • Height: 0.7 to 1.3 in (1.8 to 3.3 cm)

Operating temperature range: 32° F to 122° F (0° C to 50° C)

The HP-80 outfit includes:

HP-80 Financial Pocket Calculator • Rechargeable battery pack • 115/230 V AC adapter/recharger • Soft carrying case • Safety travel case • Illustrated Owner's Handbook • Quick Reference Guide • "A Guide to Profitable Real Estate Decisions" Book

HP-80 Outfit $395⁰⁰

Scientific and Business Desktop Calculators
With an alpha-numeric printer

HP-46 Advanced Scientific

If you prefer a desktop scientific calculator with a printer, select the HP-46. It includes all of the pre-programmed functions of the HP-45 (pages 8, 9)—*plus* a paper tape printout to provide a permanent record of your calculations.

Alpha-numeric symbols identify each calculation
More than just a running tape of your figures, the printout provides you with easy-to-read alphanumeric symbols for each function . . . so your *method* of calculation is also recorded.

Superior memory power is also provided
At the press of a key, the HP-46 lets you recall any number in the four-register stack. Or it lists the contents of all 9 addressable memories.

Tape and/or display
The light-emitting diode display may be used with the tape printout, to help in editing during long calculations . . . or without the printout, to conserve paper.

Plus other quality HP features . . .
The HP-46 also includes a four-register stack—which makes possible the famous RPN "computer logic" system—and a "Last x" register (see pages 20, 21). Inside its modern, low-profile case are large-scale integrated circuits (LSI).

For the complete list of the HP-46's pre-programmed functions and other features—and information on the LED display—please refer to those shown for the HP-45 on page 9.

Specifications
Power: AC: 115 or 230 V, ±10%, 48-66 Hz
Weight: 13 lbs. 8 oz. (6.12 kg)
Dimensions: Length: 15.5 inches (39.3 cm) • Width: 10.9 inches (27.7 cm) • Height: 5.5 inches (14.0 cm)
Operating temperature range: 32°F to 113°F (0°C to 45°C)

The HP-46 outfit includes:
HP-46 Advanced Scientific Desktop Calculator • Portable carrying case • Dust cover • Spare fuses • Power cord • Printer paper and ribbon • Illustrated Operator's Guide

HP-46 Outfit $675⁰⁰*

HP-81 Financial

Designed for solving *any* type of business or financial problem—even those involving bonds or the exact number of days—the HP-81 offers all of the capabilities of the HP-80 (see preceding page) plus more. And, it features an alpha-numeric print-out, providing symbols as well as numbers for each function, for reference at any time.

With extra power for extended calculations
The HP-81 also prints complete, labeled schedules for 10 extended calculations: Interest per period • Discounted rate of return • Declining balance depreciation • Diminishing balance depreciation • Sum-of-the-years'-digits depreciation • Rule-of-78's prepayment • Amortized loan schedule • Odd days' interest • Coupon equivalent yield • Percent of total.

And, the HP-81 performs calculations in any of 10 modes: pre-tax or after-tax, annual or semi-annual coupon, 30-day or actual-day/month, 360- or 365-day, and bond or note.

More addressable memories
In addition to the four-register stack found in all HP calculators, the HP-81 has 20 addressable memories to store constants or other data. Full register arithmetic—adding to, subtracting from, multiplying by, or dividing into data stored in addressable memories—is fast and easy.

Tape and/or display
The light-emitting diode display may be used with the tape printout, to help in editing during long calculations . . . or without the printout, to conserve paper.

Plus other quality HP features . . .
Like the other HP calculators, the HP-81 uses RPN "computer logic" (see pages 20, 21), and is made with large-scale integrated circuits (LSI). It's about the size of an adding machine.

For the complete list of the HP-81's pre-programmed functions (in addition to those mentioned above), and details on the LED display, please refer to the HP-80 on the preceding page.

Specifications
Power: AC: 115 or 230 V, ±10%, 48-66 Hz
Weight: 13 lbs. 8 oz. (6.12 kg)
Dimensions: Length: 15.5 inches (39.3 cm) • Width: 10.9 inches (27.7 cm) • Height: 5.5 inches (14.0 cm)
Operating temperature range: 32° to 113°F (0°C to 45°C)

The HP-81 outfit includes:
HP-81 Financial Desktop Calculator • Portable carrying case • Dust cover • Spare fuses • Power cord • Printer paper and ribbon • Illustrated Operator's Guide

HP-81 Outfit $1,025⁰⁰*

Expedited Entry Option. Acts as special memory device (buffer) for keys. Permits ultra-fast operation without keys jamming, so HP-81 can be solving one problem as another is being keyed in. Optional (at time HP-81 is ordered) **$225.00***

Calculator Buying Guide

How to select the calculator that's best for your type of problem-solving—today and tomorrow

Selecting the *right* pocket calculator can be a joy forever. Selecting the *wrong* one can waste your time and money . . . resulting in errors . . . and cause you aggravation and frustration.

That's why, before you select *any* pocket calculator, you should make sure it can solve *all* of your problems—the ones you face today and the ones you're likely to face tomorrow.

The calculator you select should have *all* of the capabilities you need—all the pre-programmed functions, memories and other features required to solve *your* specific problems quickly, easily, accurately and without confusion.

If the problems you face involve only addition, subtraction, multiplication and division, almost any well-made four-function calculator will suffice—providing it can handle the required number of digits. You may also want it to include "%" and constant keys.

But when your problems extend beyond basic arithmetic, then you need a *professional* pocket calculator—designed and manufactured for day-in, day-out professional use.

Professional calculators are designed with the specific capabilities required to quickly and easily solve problems intrinsic to a specific discipline or application. The nomenclature on the keys gives you a quick insight into the types of problems the calculator can help you solve. Broadly speaking, there are two main types of professional pocket calculators: *scientific* for the scientific and engineering disciplines and *business* for the broad business and more exacting financial disciplines.

Scientific Pocket Calculators

A professional scientific calculator should be pre-programmed with all of the standard log and trig functions, so you don't have to refer to tables or interpolate from those tables. Just press the keys to get your answer—an answer far more accurate than any slide rule can give you. These "full scientific" calculators are also pre-programmed with exponential, square root and reciprocal functions.

For handling more advanced types of scientific, engineering, mathematical or statistical problems, you need an "advanced scientific" calculator. These have all the pre-programmed functions found in the full scientific machines, *plus* a variety of others, depending upon which model you select. These may include: mean, standard deviation, linear regression (trend line), and U.S./metric conversions.

Advanced models also offer more memory power . . . more sophisticated trig functions, such as rectangular coordinate/polar coordinate conversion . . . selectable modes (degrees, radians and, possibly grads) . . . conversion between decimal angle and angle in degrees/minutes/seconds . . . and others.

This added capability facilitates the handling of complex problems and can drastically reduce the time and effort necessary to solve them. For example, polar/rectangular coordinate conversions let you add or subtract vector components in seconds, simply by pressing a few keys.

The most proficient type of professional scientific pocket calculators is the programmable. When solving complex, repetitive or iterative problems, programming can be invaluable. You enter your problem-solving sequence of keystrokes just once . . . then, with just one keystroke initiate the entire sequence—as often as you wish.

But whatever scientific calculator you choose, the *more* functions and features it has, the more capability it has to solve more types of problems—even the most complex—faster and easier, reducing the work *you* have to do. And the less chance for error. So compare functions and features carefully before you make your final selection.

Business Pocket Calculators

Although a scientific calculator may be used for solving the more basic types of business problems, calculators especially designed for business and/or financial problems can soon pay for themselves in terms of time and effort saved—because they are pre-programmed to solve *your* business problems—giving you the exact answers you need *when and where you need them.*

Compared to the keyboard on an advanced scientific calculator, the one on a business pocket calculator may look positively barren. But appearances can be deceiving. With business calculators, it's not so much how *many* pre-programmed keys there are, but what you can *do* with the keys – the number of different types of problems *you can solve* with the calculator.

The relatively few keys on a business calculator can be used to solve *dozens* of different types of problems—everything from discounts and markups to figuring out interest rates, the remaining principal on a mortgage, the future value of an annuity, or depreciation.

In addition to business pocket calculators, there are also "advanced business" or "financial" calculators. These usually have all of the pre-programmed functions found in business calculators, but will also have more specialized capabilities to solve problems involving depreciation, statistics, bond prices and yields. And because the latter require a calendar, these types of calculators will have one "built-in."

For specialized business or financial problems, involving extended calculations or unique and complex formulas, a programmable calculator can be a tremendous time-saver. Since you enter your problem-solving sequence of keystrokes just once—and then with one keystroke start an entire sequence—you reduce your error ratio and as a result, have confidence in your answers.

Another point to consider when selecting a business calculator, is the basic financial concepts you work with daily as a decision maker handling business transactions. The calculator you select should help you in making your decisions, because you could very well make or save far more than the calculator costs, the very first time you use it. And this, according to a basic business concept, would be a very nice return on investment.

Four features that can help make your problem-solving easier

Before you make your final selection of a pocket calculator, take a closer look at four features that can make your problem-solving easier and more reliable. These are programming, memory power, the logic system, and construction.

Programmable Calculators

As stated previously, when solving very complex or repetitive or iterative problems with a pocket calculator, you have to press a lot of keys—sometimes the same keys over and over. To reduce the number of keystrokes, and keystroke errors, certain pocket calculators can be programmed—directed to initiate the desired keystrokes automatically. And that's just what a program is: a sequence of keystrokes, used to solve a problem or series of problems. Once a calculator is programmed, all *you* have to do is key in the data—the numbers for the specific problems you're solving—and press one key to run the entire program.

A pocket calculator may be either "programmable" or *"fully programmable."* A programmable machine can usually be programmed only by pressing the keys. (Then the program is temporarily stored in the program memory, where it remains until removed or changed by the calculator operator or until the calculator is turned off.)

With a fully programmable pocket calculator, that same program can also be permanently stored on an external device (such as magnetic cards) and re-entered in the program memory when needed.

Programming can be an extremely useful feature, saving time and energy and helping to avoid keystroke errors. Depending on the model, a programmable calculator may have provision for editing a program (adding, deleting or changing steps) and such computer-like operations as branching—choosing between two alternate steps depending upon the outcome of a relational test. A programmable calculator can actually make logical decisions *for* you.

So if you find yourself pressing dozens of keys to solve certain types of problems, give serious consideration to a calculator you can program.

For occasional programming, a "programmable" machine (*i.e.,* one with temporary storage capability) should suffice. But if you *frequently* handle problems that can be programmed, consider a "fully programmable" caculator, and record your programs on program cards. You might even find your general applications already programmed for you.

Memory Power

Every pocket calculator should have at least one addressable memory—to store constants or other numbers used more than once in a calculation. The more memories a calculator has, the less writing down of numbers that *you* have to do.

With certain calculators having addressable memories, you can do register arithmetic—you can directly add to, subtract from, divide into or multiply the contents of a register. This makes data manipulation exceptionally easy, even when working problems involving three simultaneous linear equations (or other 3 x 3 matrix inversions).

Besides addressable memories, certain pocket calculators have an automatic memory (also called an operational stack, a four-register stack, etc.). Entries and intermediate answers are stored automatically, then re-entered into the calculation at the appropriate time. Obviously, this eliminates the need for you to write down and re-enter numbers, which could lead to errors, and it speeds the work.

Logic Systems

A logic system is the "language" you use to communicate with a calculator—the way in which you key in problems and the way the calculator is designed to handle the problems. One logic system may require you to restructure an equation to conform to the system; another may not.

The two most common types of logic systems used in professional pocket calculators are algebraic and "RPN computer logic." You may wish to check out both systems, and determine for yourself: which is the easiest to use (especially important when solving complex problems) . . . which is the least confusing (so you can have confidence in your answers) . . . and which is the best to use for solving the kinds of problems you face regularly.

Construction Is Important

In addition to everything mentioned so far, you should also—before selecting a professional calculator—consider the quality . . . the physical construction of the calculator (is it rugged enough for daily use?) . . . the availability of accessories and applications books . . . and, of course, remember, a good value is a calculator that's capable of solving *your* problems today . . . and tomorrow.

With all this in mind, study the descriptions of each calculator, compare the models, and select the *one* machine that comes *closest* to filling your needs.

HP Calculator Comparison Chart

Check the features and functions you need before you select your calculator.

	SCIENTIFIC AND ENGINEERING					ALL PURPOSE	BUSINESS AND FINANCE		
	HP-35	HP-21	HP-45	HP-46	HP-55	HP-65	HP-70	HP-80	HP-81
FEATURES									
☐ RPN Logic System	●	●	●	●	●	●	●	●	●
Data Storage, Positioning Operations									
☐ Number entry	●	●	●	●	●	●	●	●	●
☐ Exponent entry	●	●	●	●	●	●	●	●	●
☐ Stack roll-down	●	●	●	●	●	●	●	●	●
☐ Stack roll-up						●			
☐ x,y memory interchange	●	●	●	●	●	●	●	●	●
☐ Data storage	●	●	●	●	●	●	●	●	●
☐ Data recall	●	●	●	●	●	●	●	●	●
☐ Change sign	●	●	●	●	●	●	●	●	●
Memory									
☐ Stack (number of registers)	4	4	4	4	4	4	4	4	4
☐ Addressable memories	1	1	9	9	20	9	2(a)	1	20
☐ Full register arithmetic		●	●	●	●(b)	●	●		●(b)
☐ Financial memories							5(c)		
☐ "Last x" register			●		●	●			
☐ Program memory (number of steps)					49	100			
Display									
☐ Significant digits	10	10(d)	10	10	10	10	10	10	10
☐ Exponential digits	2	2	2	2	2	2	2	2	2
☐ Dynamic range (decades)	200	200	200	200	200	200	200	200	200
☐ Automatic decimal point positioning	●	●	●	●	●	●	●	●	●
☐ Selectable formatting, rounding—fixed point (number of digits)	To10(e)	0-10	0-10	0-10	0-10	0-10	0-10	0-7	0-7
☐ Selectable formatting, rounding—scientific (number of digits)	To10(e)	0-8(d)	0-10	0-10	0-10	0-10	0-10	0-10(e)	0-10(e)
☐ Automatic overflow into scientific	●	●	●	●	●	●	●	●	●
☐ Automatic underflow into scientific	●	●			●				
☐ Improper operating, low battery indicators	●	●	●	●	●	●	●	●	●
Other Features									
☐ Digital timer						●			
☐ Alpha-numeric print out on paper tape					●				●
Programming									
☐ Writing capability					●	●			
☐ Single-step running, inspection					●	●			
☐ Program editing					●	●			
☐ Run/Stop					●	●			
☐ Conditional branching—relational tests					2	4			
☐ Conditional branching—flag tests						2			
☐ Direct branching					●	●			
☐ Decrement and skip on zero						●			
☐ User definable keys						5			
☐ Permanent program storage (magnetic cards)						●			
PRE-PROGRAMMED FUNCTIONS, MATHEMATICS									
☐ y^x	x^y	●	●	●	●	●	●	●	●
☐ $\sqrt{x}$	●	●	●	●	●	●		●	●
☐ $1/x$	●	●	●	●	●	●			
☐ x^2			●	●	●	●			
☐ π	●	●	●	●	●	●			
☐ %			●	●	●	●	●	●	●
☐ Δ%			●	●	●		●	●	●
☐ Addition, subtraction, multiplication and division in serial, mixed serial, chain or mixed chain calculations	●	●	●	●	●	●	●	●	●
☐ Integer/fraction truncation						●			

For persons in the fields of science, engineering, business and finance.

	SCIENTIFIC AND ENGINEERING					ALL PURPOSE	BUSINESS AND FINANCE		
	HP-35	HP-21	HP-45	HP-46	HP-55	HP-65	HP-70	HP-80	HP-81
PRE-PROGRAMMED FUNCTIONS, STATISTICAL									
☐ Mean, standard deviation (number of variables)			1	1	1 or 2	1 or 2*	1	1	1
☐ Tread line (a time-series linear regression)								●	●
☐ Trend line projection								●	●
☐ Linear regression					●	●*			●
☐ Linear estimate					●	●*			●
☐ Factorial			●	●	●	●			
☐ Positive, negative summation (with n, Σx, Σx², Σy)			●	●	●(f)	●(f)*		●(g)	●(g)
PRE-PROGRAMMED FUNCTIONS, SCIENTIFIC/ENGINEERING									
Trigonometric									
☐ Decimal degrees mode	●	●	●	●	●	●			
☐ Radians mode		●	●	●	●	●			
☐ Grads mode			●	●	●	●			
☐ Sin x, Arc sin x, Cos x, Arc cos x, Tan x, Arc tan x	●	●	●	●	●	●			
☐ Rectangular coordinates ↔ Polar coordinates		●	●	●	●	●			
☐ Vector arithmetic			●	●	●	●*			
☐ Decimal angle (time) ↔ Angle (time) in deg (hr)/min/sec			●	●	●	●			
☐ Angle in degrees ↔ Angle in radians					●	●*			
☐ Angle arithmetic					●	●			
Logarithmic									
☐ Log x	●	●	●	●	●	●			●
☐ Ln x	●	●	●	●	●	●			
☐ e^x	●	●	●	●	●	●			
☐ 10^x			●	●	●	●			
Metric Conversion									
☐ Inch ↔ Millimeter			●(h)	●(h)	●				
☐ Foot ↔ Meter					●				
☐ Gallon ↔ Liter			●(h)	●(h)	●				
☐ Pound ↔ Kilogram			●(h)	●(h)	●				
☐ Force in pounds ↔ Newton					●				
☐ Fahrenheit ↔ Celsius					●				
☐ BTU ↔ Joule					●				
PRE-PROGRAMMED FUNCTIONS, BUSINESS/FINANCIAL									
☐ Number of periods					●(i)	●*	●	●	●
☐ Interest rate/period					●(i)	●*	●	●	●
☐ Payment/period					●(i)	●*	●	●	●
☐ Present value					●(i)	●*	●	●	●
☐ Future value					●(i)	●*	●	●	●
☐ Simple interest						●*	●	●	●
☐ Bond prices, yields						●*		●	●
☐ Calendar					●(i)	●*		●	●
☐ Rule of 78's interest rebate						●*		●	●
☐ Sum-of-years-digits depreciation schedule					●(i)	●*		●	●
☐ Declining balance depreciation schedule					●(i)	●*		●	●
☐ Diminishing balance depreciation schedule					●(i)	●*		●	●
☐ Amortized loan schedule					●(i)	●*		●	●
☐ Percent of total extension						●*		●	●
☐ Effective annual interest rate converted to nominal rate						●*		●	●
☐ Add-on interest rate with odd-days interest converted to annual rate						●*			●
☐ Internal date of return (IRR)						●*			●
☐ Coupon-equivalent yield									●
☐ Note price and yield (before maturity)									●

See pages 25 and 27 for the multitude of financial and business problems you can solve when utilizing these keys in conjunction with each other and the other keys on the calculator.

* Not a pre-programmed function, but available on pre-recorded, magnetic program cards. For a full listing, see current list of Software Pacs, Pages 18, 19.

(a) One memory doubles as an accumulator.
(b) Registers 1-10.
(c) Three can be used as separate addressable memories when not using financial keys.
(d) Eight displayed when in scientific notation, 10 retained internally.
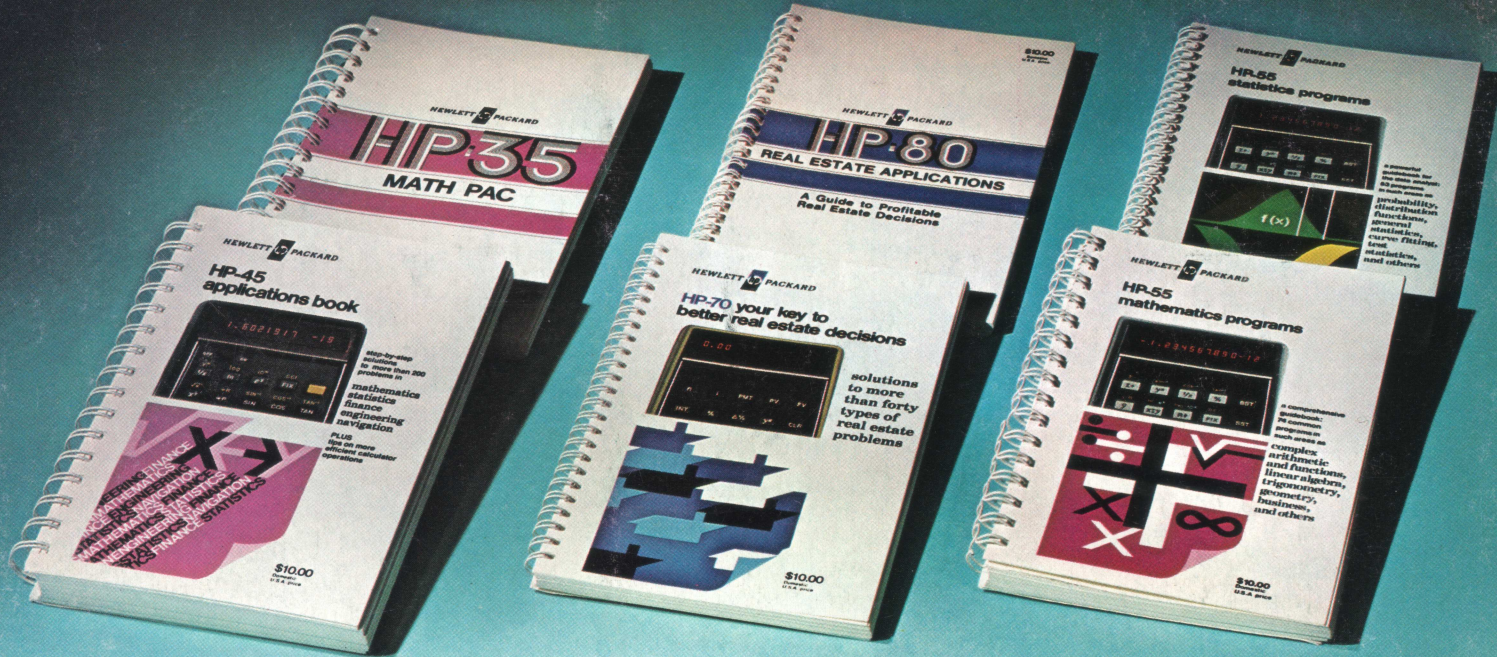(e) Automatic—not selectable

(f) Also Σy², Σxy
(g) Does not include Σy
(h) Slightly diffeerent: centimeter/inch; liter/gallon; kilogram/pound constants
(i) Not a pre-programmed function. Can be programmed into calculator using HP-55 Mathematics Program Book listed on Page 32.

These books give you ready-to-follow solutions for complicated problems...

The HP-35 Math Pac
To help solve complex or lengthy problems on the HP-35, over 150 keystroke sequence routines in this 169, page manual cover: number theory and algebra, geometry, trigonometry, statistics, numerical methods, finance, exponentiations, conversions, weekday from date computations, and other calculations. It also shows how to use HP's RPN logic and memory system in more efficient ways. (These routines can also be used for the HP-21.)
00035-66001 ....$10.00

HP-45 Applications
More than 200 keystroke sequence routines help you solve problems in mathematics, statistics, finance, engineering and navigation. This 218-page manual includes routines for: number theory, algebra, geometry, trigonometry, statistics, numerical methods, finance (e.g., bonds, interest, depreciation, loan repayments) and more. The manual also shows how to use HP's RNP logic and memory system in more efficient ways.
00045-66001 ....$10.00

HP-80 Real Estate Applications
This 101-page book offers dozens of keystroke sequence routines that benefit brokers, investors, appraisers, assessors, mortgage bankers, analysts and other decision makers in the real estate field.

The main applications are: appreciation and depreciation calculations; simple mortgages; mortgages with balloon payments, loans with a constant amount paid towards the principal; the price and yield of a mortgage; annuity due calculations; discounted cash flow analysis; linear regression calculations; Canadian mortgages, and equity investment analysis.
00080-66006 ....$10.00

HP-70 Real Estate Decisions
This 91-page HP-70 book has over 40 keystroke sequence solutions to real estate problems. You'll find problem-solving routines for: appreciation and depreciation calculations; simple mortgages; mortgages with balloon payments; the price and yield of a mortgage; annuity due calculations; loans with a constant amount paid toward the principal; Canadian mortgage calculations; discounted cash flow analysis, and equity investment analysis. The appendix covers: financing alternatives, rent or buy analysis, and worksheet ideas.
00070-66001 ....$10.00

HP-55 Statistics Programs
This 130-page manual has nearly 60 keystroke sequence routines to help you program the HP-55 to solve classifications such as: probability, special functions, general statistics, distribution functions, curve fitting and test statistics. Routines include: probability of a repetition in a sample, gamma function, random number generator, moving average, standard errors for linear regression, normal distribution, multinomial distribution, exponential curve fit, analysis of variance and mean, standard deviation and standard error for grouped data.
00055-66002 ....$10.00

HP-55 Mathematics Programs
This 178-page, HP-55 manual shows you how to write programs for solving problems in: complex variables, linear algebra, integration and interpolation, number theory and algebra, trigonometry and analytical geometry.

Also included are programs for solving business math problems such as: compounded amount, direct reduction loan, sinking fund, depreciation schedules, discounted cash flow analysis, day of the week, and number of days between dates.
00055-66001 ....$10.00

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Take a look at the **New** *HP-21 on pages 10 and 11*