New—a faster, easier way to solve complex, repetitive or iterative problems

Hewlett-Packard's
HP-55
Programmable
Scientific
Pocket Calculator

with
built-in
Digital Timer!

The new

HP·55

Programmable Scientific
Pocket Calculator

The most powerful
scientific
pocket calculator
ever . . .
because it offers
keystroke programming,
more keyboard commands
and more data memory

ACTUAL SIZE

Programmable—to solve repetitive or iterative problems with just a few keystrokes

More Powerful—to solve all types of problems faster, easier and more accurately

Keystroke programming

So you can key in a problem-solving sequence of keystrokes just once . . . then, with just one keystroke, initiate the entire sequence—as often as you wish.

More keyboard commands—86—than any other scientific pocket calculator

So you can solve more types of problems—even the most complex—faster and easier . . . to save you time and effort.

More data storage registers—20—than any other scientific pocket calculator

So you can store and retrieve more data than ever before—push-button fast—without writing down and re-entering numbers.

And it's the only scientific pocket calculator in the world with a timer

So you can time lab experiments, tests, production or other events . . . up to 10 at a time.

Plus—Hewlett-Packard's patented 4-register operational stack and "computer logic" system . . . and a "Last x" register

So you can solve problems with speed, simplicity *and* confidence—along with the opportunity to double-check intermediate answers for greater accuracy. There's never been a pocket calculator like the HP-55. Yet it's easy to use! Turn the page and see for yourself .

For use in engineering, chemistry, programming, business, architecture, research, mathematics, statistics, education, surveying, navigation, aviation and other disciplines.

Keystroke programming

so you can create the exact programs you need—on the spot!

Simply press the keys!

In addition to being the most powerful scientific pocket calculator ever made—for all types of problem-solving—the HP-55 has been specifically designed for fast, easy and accurate solving of repetitive or iterative problems.

To solve these types of problems with an *ordinary* calculator, you press the appropriate keys in a certain sequence, performing dozens of keystrokes. Then, if you want to solve the equation again with different data, or if you want to alter the keystroke sequence, you have to press all the keys all over again.

This extra effort is now unnecessary—if you have an HP-55. Because . . .

The HP-55 is keystroke programmable

It's programmable—so you can solve repetitive problems without having to re-enter equations and constants every time you repeat a calculation with new data.

It's programmable—with automatic, computer-like branching, so you can solve decision-making and iterative problems with greater speed and fewer errors.

It's programmable—so you can, in effect, create your own pre-programmed functions . . . to transform the HP-55 into a *personalized* calculator!

And you can take advantage of the HP-55's programmability without buying accessories or software, and without learning "computer language."

Best of all, it's *portable* programmability. So you can use it anywhere, anytime, to solve problems *on the spot.*

How keystroke programming works

Simply think through the problem and enter the keystrokes needed to solve it. (But don't enter the data.) When the HP-55 is in PROGRAM mode, all of your keystrokes—up to 49 of them—are recorded, in sequence, in the HP-55's keystroke memory.

To solve the problem, switch to RUN mode and enter the data. Then press the "Run/Stop" key to run the program. In just seconds, the HP-55 gives you the answer!

To solve other problems using the same program, all you need do is enter new data . . . then press "Run/Stop" again.

Because the stored keystrokes are entered into a calculation automatically, there's far less chance for error than if you had to enter them manually. And it takes but a fraction of the time.

Want to change your program . . . or part of it? Just switch to PROGRAM mode, and press a new sequence of keys to overwrite the previous program or any section of it. Keystrokes remain stored for as long as you leave the HP-55 switched on.

Programming the HP-55 is fully explained—with illustrated, step-by-step directions—in the Owner's Handbook. And, in addition, we have our optional *Mathematics Programs Book* and *Statistics Programs Book,* which contain the keystroke sequences for the most commonly used math and statistics functions.

Keyboard controls in "plain English" abbreviations help make programming easy!

PRGM   **RUN**

Set the mode switch to "PRoGraM" to enter keystrokes (functions and constants) in the 49-step keystroke memory. Set it to "RUN" for all other operations.

R/S   Key in the data for your first problem, then press the "Run/Stop" key to run your program. At the end of the program, the HP-55 returns automatically to the top of the keystroke memory and stops . . . ready for another problem.

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

BST   The keystroke memory consists of 49 storage lines, numbered 01 through 49.

SST   The "Back STep" and "Single STep" keys let you review the entire memory one line at a time, in either direction. Or you can press the "Go TO" key, along with the number of the line in the memory you want. Any of these keys may be used to position the memory exactly where you want it.

GTO   If you want to change your program, simply key in the new entry. It will overwrite the previous entry. If you want to test your program, use the "Single STep" key repeatedly (with the HP-55 in RUN mode).

□ 4. 4 1

Line number   Keystroke code
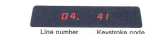
The keystroke memory system uses a simple numeric code, based on the position of each key on the HP-55 keyboard. For example, the code number of means "4 rows down, 1st key from the left" (*i.e.,* the "ENTER" key).

When you step through a program—one line of keystroke memory at a time—the code numbers are visible on the HP-55 display, to identify the position of the keystroke memory and to facilitate any changes.
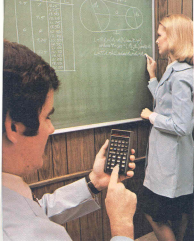
And you can program the HP-55 to do computer-like branching!

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

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

$$x < y \qquad x = y$$

Then, depending upon the outcome of the test, the HP-55 will *automatically* branch to the specified line of the program, or continue through the program in sequence.

Computer programmers call this powerful feature *conditional branching.*

Or, using the "Go To" key in a program, you can direct the HP-55 to go directly to a specified line in the keystroke memory, and then continue executing the program. This is known as *direct branching.*

Conditional branching and direct branching are extremely useful in solving iterative problems.

Keystroke programming brings new ease and speed to *any* type of problem-solving—simple, complex, repetitive or iterative.

Simply write a program (e.g., an equation) to solve a specific type of problem, and store it in the HP-55's keystroke memory. (It remains stored for as long as you leave the HP-55 turned on.)

Whenever you need to use the equation in a calculation, run the program. Instead of pressing a dozen or more keys, you need press just one!

Since the HP-55 has a 49-step keystroke memory, you can store two or more short programs simultaneously, calling upon the exact one you need at the time.

And thanks to the HP-55's on-the-spot programming, you can change your program whenever and wherever you wish.

Here's an example of how keystroke programming can be used to solve an iterative problem.

Suppose a culture of a certain bacteria doubles each day. Given any initial population size, you want to find out:
How long will it take to grow to 1 million?

Writing the program

Turn the HP-55 on, switch it to PROGRAM mode, and key in the keystroke sequence as follows:

Directions	Program Key Sequence	Program Line No.	Key Code
Store the initial bacteria count in Register 1. ("STO" means "STORE".)	STO	00.	00
	1	01.	33
		02.	01
Set the counter in Register 2 to zero, to start counting the days.	0	03.	00
	STO	04.	33
	2	05.	02
Add "1" to the number of days. The HP-55 can add directly to data in registers.	1	06.	01
	STO	07.	33
	+	08.	61
	2	09.	02
Calculate the population on that day by recalling the previous population count and doubling it.	RCL	10.	34
	1	11.	01
	2	12.	02
	×	13.	71
	STO	14.	33
	1	15.	01
Compare the population to 1 million. If true (x is less than or equal to the value of y), go to program line 21. If false, go to line 06.	EEX	16.	43
	6	17.	06
	f x≤y	18.	31
	GTO 2 1	19.	-21
	GTO 0 6	20.	-06
Display the number of days, and stop	RCL	21.	34
	2	22.	02
	GTO 0 0	23.	-00

Your program is written.

Running the program

Given various initial counts
200   1,000   50,000
let's calculate the number of days required to reach a population of 1 million.

To run your program, switch the HP-55 to RUN mode, key in the data (initial population value) and start the program . . .

Key Sequence	Answer in Display	Comments
2 0 0 R/S	13	Number of days to reach a population of 1 million, given the initial value
1 0 0 0 R/S	10	
5 0 0 0 0 R/S	8	

This is a relatively simple example of the iterative problem-solving power of the HP-55's keystroke programming. You can easily solve problems that are much more complex, too!

More powerful

More data storage registers than any other pocket calculator

More keyboard than any other

20 addressable data storage registers

R_{10}	R_{16}
R_9	R_{17}
R_8	R_{18}
R_7	R_{19}
R_6	R_{20}
R_5	
R_4	
R_3	
R_2	
R_1	

Other pocket calculators—even many of the scientific models—have only a few data storage registers. (Some have only one . . . none has more than nine.)

But the more data storage 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 data registers than any other pocket calculator on the market—20!

And they're all fully addressable. This means you can enter and retrieve data (e.g., an intermediate solution) from any register . . . push-button fast. Or, 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 such problems as four simultaneous linear equations with four unknowns, or other 4 x 4 matrix inversions, or linear regression.

Addressable registers—to use from the keyboard or as part of a program.

Twenty addressable registers—to make your work easier!

49 Keystroke memories

```
00
01
02
03
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48
49
```

The HP-55 incorporates 49 keystroke memories to store the keystroke sequence(s) required for one or more programs.

Forty-nine keystroke memories—to help make programming possible!

"Computer logic" and five more registers

T
Z
Y
X

Operational Stack

X	LAST X

"Last X" Register
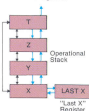
Like all other Hewlett-Packard pocket calculators, the HP-55 uses RPN—"computer logic"—the most sensible logic system a calculator can have!

It allows you to solve any problem without restructuring, in natural left-to-right sequence.

RPN is possible only because the HP-55 has a four-register operational stack. The stack retains as many as four intermediate solutions in sequence. At the proper time, these solutions are automatically entered into the calculation being performed, so you don't have to enter them manually.

As the HP-55 does its work, every intermediate answer is visible on the display. And it's easy to recall previously-entered data, for review or other operation.

RPN and the four-register stack—so unique Hewlett-Packard patented it—to give you "confidence in computation"!

And the HP-55 also features a "Last x" register. It automatically stores the last input argument of a calculation, for instant recall—to correct an error (in case you pressed the wrong key) or to enter the number into another calculation.

86 keyboard functions and operations—and all but a few operations can be

Extra trigonometric capability

$$R \rightarrow P$$

Coordinate conversions—You can convert polar coordinates to rectangular coordinates, or vice versa, enabling you to do vector arithmetic quickly, easily and accurately.

DEG   RAD   GRD

3 angular modes—You can calculate in degrees, radians or grads. The degrees mode is automatic when the HP-55 is turned on. The others are set from the keyboard.

$$D \rightarrow R$$

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

H.MS $\rightarrow$

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

$$H \rightarrow H.MS$$

Angle (time) conversion—You can convert angles (times) in decimal degrees (hours) to angles (times) in degrees (hours)/minutes/seconds, or vice versa.

commands
pocket calculator

including extra trigonometric, statistical and metric conversion capability
incorporated into your programs

$\sin^{-1}$	$\cos^{-1}$	$\tan^{-1}$

6 trigonometric functions—You
can calculate sin, cos, tan,
$\sin^{-1}$, $\cos^{-1}$ and $\tan^{-1}$ in any mode.

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:
Σn, Σx, Σx^2, Σy, Σy^2, and Σxy. Data
may be deleted via the "$\Sigma -$" key.

$\bar{x}$

Mean—The HP-55 simultaneously
calculates the means of both the
x and y values.

s

Standard deviation—Two
keystrokes are all it takes to
calculate the standard deviation
of x and y.

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.

Metric Conversion capability

in $\rightleftarrows$ mm
$\text{lb} \rightleftarrows$ mm

$\text{gal} \rightleftarrows l$

lbm $\rightleftarrows$ kg

lbf $\rightleftarrows$ N

$\degree F \rightleftarrows \degree C$

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
—with the HP-55.

Plus dozens more!

For the complete list of pre-
programmed functions, see the
back cover of this brochure.
Better yet, see the HP-55!

And a built-in
digital timer!

HRS • MIN • SEC • HUNDREDTHS

Use it for lab experiments, tests, time-and-
motion studies . . . or athletic events!
Inside every Hewlett-Packard calculator is a
sophisticated control and timing circuit, for
internal calculations. Now, to give you even
greater value for your money, HP has added a
quartz crystal to this circuit . . . to provide
you with a 100-hour digital electronic timer,
accurate to ±.01%.

This timer—unique in an advanced scientific
pocket calculator—measures time in hours,
minutes, seconds and hundredths. Intermediate
time measurements—"splits"—may be stored in
any of the HP-55's first 10 addressable registers,
so you can easily time up to 10 events in the
same experiment simultaneously!

And—push-button fast—you can convert
measured time to decimal hours . . . or vice versa.

HP-55 Programmable Scientific Pocket Calculator
for complex, repetitive or iterative problems

Conversion functions:

Rectangular coordinates ⟷ Polar coordinates • Decimal angle ⟷ Angle in degrees/minutes/seconds • Decimal time ⟷ Time in hours/minutes/seconds • Angle in degrees ⟷ Angle in radians • Btu ⟷ J • lbm ⟷ kg • Gal ⟷ ltr • in ⟷ cm • ft ⟷ m • gal ⟷ ltr • °F ⟷ °C • lb ⟷ kg • °C ⟷ °K • °F ⟷ °R

Degrees ⟷ Radians

Statistical functions:

Mean & standard deviation (one or two variable) • Linear regression (two variable) • Linear estimate • Factorial • Positive & negative summation giving Σn, Σx, Σx², Σy, Σy², Σxy

Other functions: yˣ • √x • 1/x • eˣ • x² • % • Register arithmetic • Vector arithmetic • Angle 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.

Memory:
4-register operational stack. "Last x" register. 20 addressable data storage registers. Keystroke memory for storage of up to 49 keystrokes (a program).

Timing:
Digital timer, 0-100 hour range   ±.01% accuracy. Displays hours/minutes/seconds/hundredths. Up to 10 "splits" may be stored in addressable registers.

General operations:
Dynamic range is 10⁻⁹⁹ to 10⁹⁹. Light-emitting diode (LED) display. Displays up to 10 significant digits plus 2-digit exponent and appropriate signs. Two display modes: fixed point and scientific. Automatic decimal point positioning to two decimal places. Selective round-off range: 0-9 decimal places. Primary function activated by single keystrokes; alternate functions utilize prefix keys. Indicators for improper operations and low battery condition. Operates on rechargeable battery pack or AC. Tactile feedback keyboard. Vinyl liquid-tooled wood grain plastic keyboard. Compact, ultrasonically welded contour case. Sealed battery compartment. Recessed recharger plug receptacle. Solid state electronics.

Operating specifications:

Power:
AC: 115 or 230 V, ±10%, 50 to 60 Hz, 5 watts. Battery: 500 mw derived from 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: 3.1 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, that under normal use provides up to 5 hours of continuous operation
* 115/230 V AC adapter/recharger, that lets you operate the HP-55 on house current while the battery pack is recharging
* Soft carrying case with zipper and belt loop
* Safety travel case that holds the complete HP-55 outfit
* Illustrated Owner's Handbook with step-by-step instructions and sample problems
* Quick Reference Guide that summarizes instructions
* Pad of programming worksheets

Optional accessories:

Mathematics Programs Book; Statistics Programs Book; reserve power pack; security cradle; field case; additional pads of programming worksheets. (Details sent with HP-55.)

The most powerful pocket calculator ever . . .

Programming:
Program-writing capability • Single step running or inspection of a program • Program overwriting capability • x ≷ y, x = y relational tests • Conditional and infinite branching

Keyboard commands:
Trigonometric functions: 3 angular modes • Sin x • Arc sin x • Cos x • Arc cos x • Tan x • Arc tan x

Logarithmic functions: Log x • Ln x • eˣ • 10ˣ

The HP-55 continues the Hewlett-Packard tradition of highest quality and innovative features, backed up by prompt world-wide service.

35 years of experience—Ever since 1939, Hewlett-Packard has been a leading designer and manufacturer of special-purpose electronic equipment for measurement and computation.

Today, there are more than 3,000 different HP products, ranging in size from near-microscopic components to complete computer systems.

HP pocket calculators have become the standard of excellence in the industry, and more than 500,000 are in daily use throughout the world.

Advanced Technology—Hewlett-Packard has always been an innovator, with a policy of introducing products with unique features and benefits. To make this advanced technology possible, HP maintains an unusually high dedication to research and development. Last year, more than $85,000,000 was spent on R&D. The HP-55 is one result of these expenditures.

Thorough Testing—The HP-55 is manufactured to exceedingly close tolerances, with final assembly in Hewlett-Packard's own facilities. Then every single HP-55 is thoroughly tested not only for mechanical operation, but for accuracy in computation.

Service—Prompt service is available at any Hewlett-Packard Customer Service Facility. These are conveniently located throughout the world.

Warranty—The HP-55 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 HP-55 has been damaged by accident or misuse or as a result of service or modification by any person other than an authorized Hewlett-Packard Customer Service Facility.

No other warranty is expressed or implied. Hewlett-Packard is not liable for consequential damages.

Hewlett-Packard reserves the right to make changes in materials and specifications without notice.

HEWLETT **hp** PACKARD

Hewlett-Packard makes the most advanced pocket-sized calculators in the world!