

The new Hewlett-Packard HP-25C Scientific Programmable Calculator with Continuous Memory.



Retains your programs
and saves your data

-even when you
turn it off.

The HP-25C saves a program for instant reuse—without lost time for reprogramming.



The continuous memory capability of the new HP-25C can provide tremendous values in time-saving and convenience to any scientist, engineer or student who uses a few long programs repeatedly—for example, if twenty percent of your programs will solve most of your problems.

The HP-25C retains a program—no matter how often you switch it on and off—by means of sophisticated complementary metal oxide silicon circuitry (C-MOS). The last program you store is saved, ready for use, until you clear it or enter a new program.

As a result, you can program a frequently-needed calculation once, and then perform it as often as necessary—hour after hour, day after day—without the bother or lost time caused by re-entering your program.

Lets you add special functions not on the keyboard.

Continuous memory makes it possible to add specialized functions to those already pre-programmed into the HP-25C.

For example, if you anticipate extensive work with hyperbolics, you can program them into the HP-25C where they will be retained by the continuous memory for repeated calculations at the touch of a key.

Many specialized functions can be programmed into the HP-25C for fast keystroke calculations, including conversions such as decimal degree/radian, octal/decimal; statistical functions; pricing analysis functions; real estate functions; business functions and many others.

Remembers data collected for later use.

The HP-25C with continuous memory not only retains all information in its 49-step program memory, it also retains all data in the 8 addressable registers and the LAST-X register.

This capability lets you use the HP-25C as a notebook to save data from previous problems for later use or to keep the sum of statistical data entries while taking samples in the field. For example, surveyors doing traverses in the field can keep intermediate results even while the calculator is turned off between readings.

Engineers will find the HP-25C convenient in storing conversion constants until needed later.

Power economy greatly extends battery operating time.

Since the HP-25C may be switched off between calculations without losing programs or data, battery operating time can be significantly extended.

Even when changing batteries, the HP-25C will retain your programs and data. When batteries are removed a capacitor temporarily furnishes power to the continuous memory circuits. Depending on the charge of the battery being replaced, time available for the exchange is between 5 seconds and 2 minutes.

The extended battery operating time made possible by C-MOS circuitry makes the HP-25C ideal for many uses in the field where time between data collections is prolonged; for example, navigation, surveying, and many other applications.

All the capabilities of the HP-25—plus continuous memory.

The HP-25C is identical in every respect to the HP-25 Scientific Programmable Pocket Calculator—with the added advantage of continuous memory.

The new HP-25C. \$200* complete with:

Owner's Handbook. A 120-page, spiral bound guide that takes you step-by-step through the operation of your HP-25C. The automatic memory stack, the function keys and programming all are explained in clear detail. Provides all information you need to make efficient use of the HP-25C in your work.

Applications Programs Book. Contains 54 applications programs related to algebra and number theory, trigonometry and analytical geometry, numerical methods, statistics, finance, surveying, navigation, and various games. Each application includes a full description of the problem, pertinent equations, the keystrokes required for the program memory, instructions for running the program, examples and solutions. To use these programs, no proficiency in programming is required. The first program in each section of the book contains, in addition to the basic explanations, a list of program keystrokes with comments, a step-by-step tracing of the stack register contents and a list of keystrokes used to solve the example problem. When a particularly interesting programming technique is used, it is described in a Programming Remarks section. This valuable book will help you get the most from your HP-25C, whether your interest lies in solving a particular problem or in learning more about the programming power of your calculator.

Quick Reference Guide. An easy-to-carry card that summarizes important basic instructions for the HP-25C.

Fast-charge Battery Pack that under normal use provides up to 3 hours of continuous operation.

Adapter/Recharger. Lets you operate the HP-25C while the Battery Pack is recharging.

Soft Carrying Case with zipper and belt loop.

Optional accessories are available at extra cost, including: reserve power pack; security cradle. Details included with the HP-25C.

The HP-25 Scientific Programmable Calculator without continuous memory. \$145.*

One of Hewlett-Packard's most popular scientific pocket calculators, the HP-25 is ideal for those to whom repetitive use of programs is not so important. The HP-25 is identical to the HP-25C in every detail, except for the continuous memory feature. Comes complete with: soft carrying case, AC adapter/recharger, Owner's Handbook, Quick Reference Guide and Applications Programs Book.

The HP-25 and HP-25C are now available at authorized Hewlett-Packard dealers.

*Suggested retail prices, excluding applicable state and local taxes—continental U.S.A., Alaska, Hawaii.

Hewlett-Packard Quality.

HP pocket calculators are designed and built for you—the business or professional person—who needs a calculator rugged enough for day-in, day-out use and as up-to-date as tomorrow.

HP pocket calculators meet these requirements—and more—because they're the most advanced pocket calculators in the world.

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

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.

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

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.)

Uncompromising quality, innovative design, high quality components and precision assembly combine to produce calculators that are second to none.



The HP-25C lets you program up to 49 steps to solve repetitive problems quickly and easily.

The HP-25C gives you all the programming power available in the popular HP-25 Scientific Programmable Pocket Calculator.

PRGM RUN

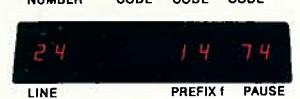
Simply set the HP-25C to PROGRAM mode by flipping a switch. Then press the keys you'd normally press to solve the problem. (But don't enter the data.) Your program is retained in the HP-25C's program memory.

To solve the problem, switch to RUN mode and enter the data. Then press the "Run/Stop" key to run your program. Seconds later, your answer appears on the HP-25C display. To solve other problems using the same program, just enter the new data and press the "Run/Stop" key again.

Because your program does the calculation automatically—just sit back and watch it—there's less chance for error than if you had to repeat the keystroke sequence yourself step by step. Also, it takes but a fraction of the time.

Programming is easy with the HP-25C. You don't have to learn "computer language." The keyboard controls are in plain English (abbreviations). Every step and function is clearly explained—with illustrated, step-by-step directions—in the HP-25C Owner's Handbook. To see just how easy it is to program the HP-25C, review the example of a typical problem from the HP-25C Applications Programs Book in the box at right.

And it's easy to review, change or test your program.



The HP-25C's program memory consists of 49 steps, numbered 01 through 49. Your program

remains stored until you erase or change it.

The program memory uses a simple numeric code, based on the position of each key on the keyboard. For example, "31" means "3 rows down, 1st key"—the "ENTER" key. Some key codes will appear as two or three pairs of numbers. To conserve steps, each prefixed function (e.g., "f", "x") takes only one program memory step. When you single-step through a program, the code numbers are visible on the HP-25C display. This system lets you know where you are in the program memory and what your program looks like step-by-step. Testing and editing your programs—to make sure complex solutions are correct—is thus greatly simplified.

BST **SST** **GTO**

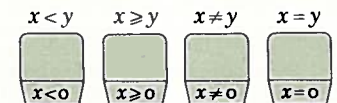
The "Back Step" and "Single Step" keys let you review the entire memory one step at a time, in either direction. Or you can press the "Go To" key, along with the number of the step you want.

If you want to change your program, simply stop it at the appropriate step and key in a new entry, which will overwrite the previous one. To test your program a step at a time, switch to RUN and press "SST" repeatedly. You will see the numeric code when you press the key and the intermediate solution when you release the key.

You can even program the HP-25C to do decision branching.

Like a computer, the HP-25C can be programmed to make decisions, because it can do conditional branching.

You can program it to test the relationship between two values, by means of these tests:



Depending on the outcome of the tests, the HP-25C will automatically skip a step of the program... or it will continue through the program in sequence.

Or, by means of the "Go To" key, you can program the HP-25C to branch directly to a specified step, and then continue executing the program.

Both types of branching—conditional and direct—are useful in solving a variety of programming problems... and make your work easier.

You can also program the HP-25C to PAUSE during the running of your program.

Another feature on the HP-25C is the "PAUSE" key. You can use it to momentarily interrupt (about one second per Pause command) the program execution and display the contents of the X register. This gives you the opportunity to

review or write down intermediate results, data, the value of a counter or other output. The example below shows one use.

The Absolute and Truncation functions make some programming even easier.

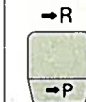
The ABSolute value function allows you to get the absolute value, or magnitude, of a number within a programmed calculation.

The INTeger/FRACTION truncation function allows you to keep only the integer or fractional portion of a number. This is especially useful in base conversion, random number generation and other specialized routines. In addition, you can integer-fractionalize your data and double the number of data points you can save in the registers.

The HP-25C gives you dozens of preprogrammed keyboard functions for speed and convenience.

In addition to its programming power, the HP-25C provides preprogrammed functions most used by scientists and engineers.

Extra trigonometric capability



Rectangular/polar coordinate conversions:

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

→H.M.S

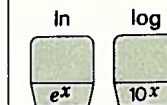


Angle (time) conversions:

You can convert angles (times) in decimal degrees (hours) to angles (times) in degrees (hours)/minutes/seconds... or vice versa.

Of course the HP-25C is also preprogrammed with the six basic trig functions—sin x, arc sin x, cos x, arc cos x, tan x, arc tan x.

Logarithmic functions



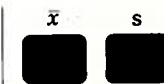
The HP-25C computes both natural and common logarithms as well as their inverse functions (antilogarithms).

Extra statistical capability



Summations:

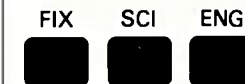
The "Σ+" key automatically calculates n, Σ x, Σ x², Σ y, Σ xy for statistical and vector calculations. Data may be deleted via the "Σ-" key.



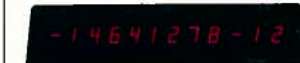
Mean and standard deviation:

The HP-25C calculates the mean and standard deviation.

Your choice of display formats



When you first turn on the HP-25C, the display "wakes up" in fixed point notation, with the display rounded to two decimal places. By pressing "f", "FIX" and a number key (0 to 9), you can specify the number of decimal places. Or you can select scientific notation, by pressing "f", "SCI" and a number key to specify the number of decimal places (up to seven digits after the decimal point).



Engineering notation on HP pocket calculators allows all numbers to be shown in a modified scientific notation with exponents of 10 that are multiples of three (e.g., 10³, 10⁶, 10⁹). This is particularly useful in scientific and engineering calculations, where units of measure are often specified in multiples of 10³. When the HP-25C is in engineering notation, the first three digits are always present but you can display up to 8 total digits.

Whichever notation is selected, the HP-25C always maintains the complete 10-digit number internally. Also, the HP-25C switches the display automatically from fixed point notation to full scientific notation whenever a number is too large or too small to be seen in fixed point notation.

Superior HP memory power.

In addition to the 49-step program memory the HP-25C has...

8 addressable registers

Instead of writing down and re-entering numbers manually, you can simply store them in any or all of the eight addressable memory registers, and recall them when needed. The registers may also be used for register arithmetic—directly adding to, subtracting from, dividing into or multiplying the register contents. Eight addressable registers and register arithmetic make data manipulation easy, especially with programmed problem-solving.

RPN—the professional logic system—gives added flexibility, speed and confidence.

Compared to algebraic logic, the RPN logic system is faster, more efficient and more versatile in solving the complex problems faced by today's professionals in science and finance. For most calculations, it requires fewer keystrokes. You don't need parenthesis keys and you don't need to keep track of complicated hierarchies. Intermediate answers are displayed and stored automatically in an operational stack of four memories—so you never need to write them down and risk errors. And because only intermediate results are stored, the size and complexity of problems that can be handled with RPN logic are virtually unlimited.

Here's an example of keystroke programming

Suppose you were asked to plot the trajectory of a stone which is hurled into the air with an initial velocity V at an angle to the horizontal of θ.

Neglecting drag due to friction with the atmosphere, the following equations describe the stone's x- and y- coordinates as functions of the time t;

$$x = vt \cos \theta$$

$$y = vt \sin \theta - \frac{1}{2} gt^2$$

Where x = the horizontal distance the stone has traveled

y = height of the stone

g = acceleration due to gravity (9.8 m/s² or 32 ft/s²)

Using a page from the HP-25C Applications Programs Book as a guide, here's how you would program the solution on the HP-25C:

KEY ENTRY	DISPLAY		COMMENTS
	LINE	CODE	
	00		
f→R	01	14 09	Use polar-to-rectangular for
STO 2	02	23 02	v _x = v cos θ = horiz. vel.
x↔y	03	21	
STO 3	04	23 03	v _y = v sin θ = vert. vel.
0	05	00	
STO 4	06	23 04	Initialize: t = 0
RCL 0	07	24 00	Start of loop
STO +4	08	23 51 04	Next time interval:
RCL 4	09	24 04	t ← t + Δt
g x ²	10	15 02	
RCL 1	11	24 01	
x	12	61	
2	13	02	
+	14	71	
CHS	15	32	
RCL 4	16	24 04	
RCL 3	17	24 03	
x	18	61	
+	19	51	y = v _y t - 1/2 gt ²
RCL 4	20	24 04	
RCL 2	21	24 02	
x	22	61	x = v _x t
RCL 4	23	24 04	
f PAUSE	24	14 74	Pause to display t
R↓	25	22	
R/S	26	74	Halt and display x
x↔y	27	21	
R/S	28	74	Halt and display y
GTO 07	29	13 07	Branch back for next t
	30		

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Key in program			
2	Store time interval	Δt	STO 0	
3	Store gravitational constant	g	STO 1	
4	Input angle and initial speed	θ, v	ENTER, f, PRGM	
5	Perform steps 5 and 6 any number of times: Display time and horizontal distance		R/S	(t), x
6	Display height		R/S	y
7	To change θ or v, go to step 4. To change Δt or g, go to appropriate step, store new value, then go to step 4.			

Problem:

Plot the trajectory of a stone cast upwards with a velocity of 20 m/s at an angle of 30° to the horizontal. Use intervals of 1/4 second between points plotted. Let g = 9.8 m/s².

Solution:

0.25	STO 0	9.8	STO 1	30	20	f	PRGM	R/S	0.25 (t)
	R/S								4.33 (x)
	R/S								2.19 (y)
	R/S								0.50 (t)
	R/S								8.66 (x)
	R/S								3.78 (y)
	R/S								0.75 (t)
	R/S								12.99 (x)
	R/S								4.74 (y)

Continue until y becomes negative.

The table of these results is shown below:

t	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25
x	4.33	8.66	12.99	17.32	21.65	25.98	30.31	34.64	38.97
y	2.19	3.78	4.74	5.10	4.84	3.98	2.49	0.40	-2.31

The HP-25C

functions and features:

Programming Features:

- Continuous Memory** —Retains your programs and data when calculator is switched OFF or ON.
- R/S** —In RUN mode, begins execution of a stored program; stops execution if program is running. In PRGM mode, stops program execution.
- GTO** —In RUN mode, positions calculator at a specified step number. In PRGM mode, causes calculator to execute the instruction at the specified step number next, and continue program execution sequentially from there.
- x=y, x≠y, x<y, x≥y, x=0, x≠0, x<0, x≥0** —Conditionals. Each tests value in X-register against that in Y-register or 0 as indicated. If true, calculator executes instruction in next memory step. If false, calculator skips next step.
- PAUSE** —In PRGM mode, stops program execution for about 1 second and displays contents of X-register, then resumes program execution.
- SST** —In RUN mode, displays step number and key code of current program memory step when pressed; executes instruction, displays result, and moves to next step when released. In PRGM mode, displays step number and contents of next program memory step.
- BST** —In RUN mode, displays step number and key code of previous program memory step when pressed; displays original contents of X-register when released. No instructions are executed. In PRGM mode, displays step number and contents of previous program memory step.
- NOP** —No operation.

Mathematical Functions:

- sin, cos, tan** —Trigonometric functions and their inverses.
- sin⁻¹, cos⁻¹, tan⁻¹**
- DEG, RAD, GRD** —Selects degrees, radians, or grads mode.

- In, e^x** —Natural log and antilog.
- log, 10^x** —Common log and antilog.
- y^x** —Exponential function.
- R, →P** —Rectangular/polar coordinate conversion.
- H.MS, →H** —Time (angle) conversion between hours, minutes, and seconds and hours.
- 1/x, √x, x², π, %** —Convenient math functions.
- INT** —Truncates decimal portion of number.
- FRAC** —Truncates integer portion of number.
- ABS** —Takes the absolute value of number.

Statistical Functions:

- Σ+** —Accumulates n, x, x², y, xy
- Σ-** —Deletes unwanted data.
- \bar{x}** —Mean
- s** —Standard deviation

Data Manipulation and Storage Functions:

- ENTER ↑** —Separates numerical entries.
- x↔y** —Exchanges contents of x and y stack registers.
- R↓** —Rolls down contents of stack registers.
- CHS** —Changes the sign of a number.
- EEX** —Enters exponent for numbers in scientific notation.
- LAST x** —After an operation, recalls previous x-value.
- f** —Gold shift key; selects functions printed in gold on keyboard.
- g** —Blue shift key; selects functions printed in blue on front face of keys.
- STO** —Stores displayed value into addressable register. Also used with arithmetic functions in storage register arithmetic.
- RCL** —Recalls a number to the display from an addressable register.

Display Control and Clearing Options:

- FIX** —Sets fixed decimal notation display.
- SCI** —Sets scientific notation display.
- ENG** —Sets engineering notation display.
- CLX** —Clears display.
- CLEAR REG** —Clears addressable registers.
- CLEAR STK** —Clears stack registers.
- CLEAR PREFIX** —Clears prefix key.

- CLEAR PRGM** —Clears program memory in PRGM mode. Resets calculator to top of program memory in RUN mode.

Physical Specifications:

- Calculator length: 130.2 mm (5-1/8")
- Calculator width: 68.3 mm (2-11/16")
- Calculator height: 30.2 mm (1-3/16")
- Calculator weight: 170.1 g (6 oz.)
- Recharger weight: 141.8 g (5 oz.)
- Shipping weight: 680 g (1-1/2 lb.)
- Operating temperature range: 0°C to 45°C (32°F to 113°F)
- Charging temperature range: 15°C to 40°C (59°F to 104°F)
- Storage temperature range: -40°C to 55°C (-40°F to 131°F)
- Power requirements: AC: 115 (or 230V) ±10%, 50 to 60 Hz.
- Battery: 2.75 Vdc nickel-cadmium rechargeable battery pack.

Full One Year Warranty.

The HP-25/25C is warranted against defects in materials and workmanship for one year from the date of delivery. During the warranty period, Hewlett-Packard will repair, or at its option, replace at no charge components which prove to be defective, provided the calculator is returned shipping prepaid, to Hewlett-Packard's Customer Service facility.

This warranty does not apply if the calculator has been damaged by accident or misuse, or as a result of service or modification by other than an authorized Hewlett-Packard Customer Service facility. No other express warranty is given by Hewlett-Packard. **HEWLETT-PACKARD SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES.**

Hewlett-Packard reserves the right to make changes in materials, specifications or accessories without notice.

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