HEWLETT-PACKARD

Equip Yourself with Problem Solvers that Have No Match:

HP-28S Advanced Scientific Calculator
HP-41 Advanced Programmable Calculator

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The HP-28S and the HP-41 Calculators – Choose Unparalleled Built-in Math Functions or Unsurpassed Expandability.

Whatever field you're in – engineering, science, mathematics, or technical management – you spend a good deal of your time solving math problems and analyzing data. And while you like finding the solutions, you don't like spending precious time arriving at them.

Hewlett-Packard has a solution for you with a choice of two unique calculators that make problem-solving easier than ever. The HP-28S Advanced Scientific Calculator features unparalleled built-in functions for working with numbers **and** symbols. The HP-41 Advanced Programmable Calculator offers unsurpassed expandability with its thousands of software options, enhancements, and peripherals.

These two battery-powered, handheld calculators give you a choice of unmatched computational functions, either built-in or expandable.

Choose the one that works best for you!

HP-28S/HP-41 Functions Comparison Chart

Use this chart to help determine which calculator suits your needs best. If you want symbolic math plus unique built-in functions, choose the HP-28S. If you prefer expandability through software, enhancements, and peripherals, the HP-41 is for you!

	HP-28S	HP-41CV/CX
Symbolic algebra and calculus	Built in	
HP Solve	Built in	
Memory	32K bytes	2.2K bytes; expandable to 6.4K bytes
Function and data plotting	Built in; viewable on the display or on optional printer/plotter	Via plug-in software; viewable on optional printer/plotter
Unit conversions	Any combination of 120 built-in units; user-definable units	Via plug-in software
Base conversions	Built in	Via plug-in software
Advanced statistics	Built in	Via plug-in software
Matrices and complex functions	Built in	Via plug-in software
Printer option	Via built-in infrared interface	Optional HP-IL or infrared interface
Advanced numeric computation	Yes	Yes
Programmable	Yes	Yes
LCD display	4-line, 23 characters; on-screen menus	1-line, 12 characters
Software	Solutions books	Plug-in modules; solutions books; thousands of user-contributed programs
Mass storage		Card reader; optical wand; digital cassette drive; 3½" disk drive
Alarms and date calculations		CX: Built in CV: Plug-in software available
HP-IL interface		Optional

Take Advantage of Unparalleled Math Capabilities through Built-in Functionality

The HP-28S is unparalleled in the field of scientific calculators: It has the broadest range of numeric and symbolic solutions, a hefty 32K memory, *and* the largest set of built-in functions. With the HP-28S, you'll have a competitive advantage in your field, because you can:

- Work with *symbols* in algebra and calculus as easily as you work with *numbers.*
- Tackle lengthy, complex calculations and store solutions, formulas, lists, and programs.
- Find solutions faster and more effortlessly than ever.

Symbolic and Numeric Calculation

Since the HP-28S allows you to perform algebra and calculus with symbols as well as numbers, you can key in an equation and solve it symbolically by using variables such as x and y in place of numbers.

Full 32K-Byte Memory

An impressive 32K bytes of RAM means the HP-28S gives you "elbow room" to tackle large, complex calculations. And once you've solved them, there's room to store them for future use. Store lists, formulas for HP Solve, graphics data, binary numbers... and access them easily whenever you need them.

Built-in Functions

With 128K bytes of built-in functionality, the

HP-28S makes short work of even the most complicated calculations. With just a few simple keystrokes, you can access functions through on-screen menus and associated softkeys or directly from the keyboard. With the HP-28S, you can reduce time and effort on problems involving:

- algebraic expressions
- chain rule of differentiation
- multiple roots of equations
- properties of matrices and vectors
- algebraic expansion
- simplification or substitution

HP Solve

Since the HP-28S features HP Solve, you may never need – or want – to do any programming. Simply enter an equation, and the HP-28S will create a menu with all your variables assigned to softkeys. Then it will solve for any variable in any order. HP Solve even lets you do "what if" analyses: Simply enter the new unknown, and the recalculation is done for you in an instant.

Advanced, Easy Programmability

Even though the HP-28S has more built-in functions than any other calculator, it is also easily programmable. Its advanced programmability allows you to create programs as subroutines, name them, then call them up by that name.

Advanced Graphics

With the advanced graphics package built into the HP-28S, you can store and recall graphs instantly. Data from the graphics section may be used as a seed for HP Solve.

Additional Features

The HP-28S also offers:

- Enhanced RPN (Reverse Polish Notation) logic as well as algebraic entry.
- An optional battery-operated strip printer that operates on infrared signals.

Because the HP-28S is battery-powered and compact, you can use this mathematical genius wherever you are. And once you've experienced how easily you can compute symbolically as well as numerically – and how fast you can find solutions using built-in functionality – you'll wonder how you ever got along without your HP-28S.

The HP-28S: $235.00
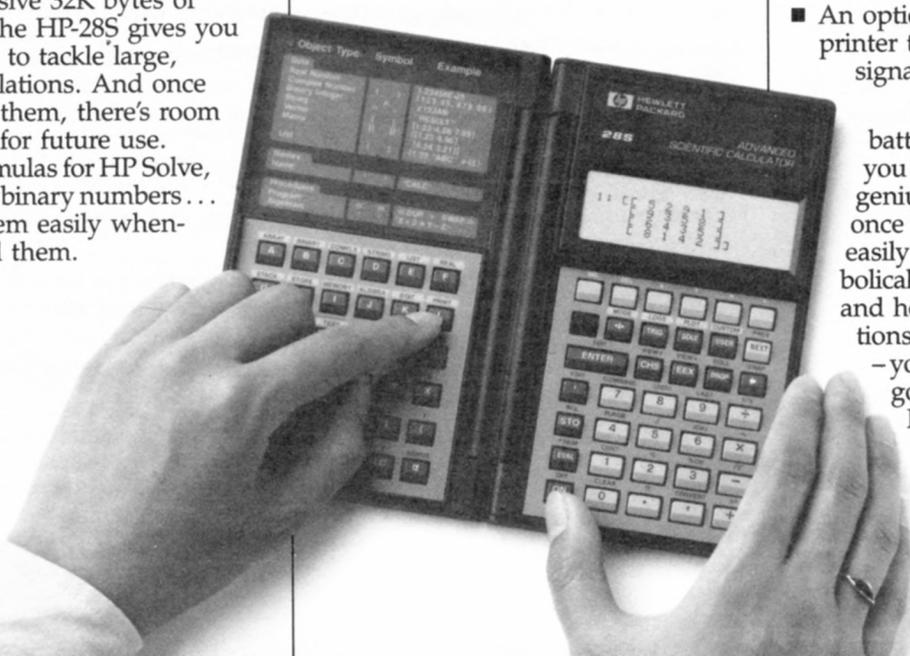
The HP-28S:
The Competitive Edge To Help You Stay Ahead

Key Features of the HP-28S	What They Do for You
● Built-in symbolic algebra and calculus capability.	Solves problems conceptually in terms of expressions and solves equations using variables such as x, y, and *zebra*. Can symbolically differentiate any expression that will fit in memory. Symbolically integrates polynomials. Numerically integrates any expression.
● 32K-byte RAM.	Provides ample space to tackle complex problems and a large capacity to store formulas, create and store programs, and store helpful utilities.
● User-defined menus and directories.	Lets you organize your formulas, programs, and data in neat, convenient menu "trees." Creates input menus that automatically enter data in an instant.
● Built-in matrix, vector, and complex number arithmetic capability.	Handles complicated calculations with ease. Applies ordinary math functions to each data type. Eliminates tedious mechanics.
● HP Solve.	Treats any formula as if it were built in. Allows you to create menus in your own words from your formulas. Solves for any variable in any order – and allows "what if" analyses. Finds solutions quickly without programming.
● Advanced graphics.	Stores and recalls graphs instantly. Plots expressions, equations, and statistical data on the 32 x 137-pixel display for visual analysis. Uses digitized points from the plot as initial values for HP Solve. Eliminates the guesswork in finding all the roots of equations with multiple roots.
● Advanced programmability.	High-level, object-oriented programming language. Creates programs as subroutines that can be named and then called by that name. Logical tests and program-branching capabilities make structured programming easier.
● Softkey selection.	Offers quick access to the large number of built-in functions and allows for user-generated menus. Features easy-to-use error recovery commands. User names for storing programs and data are automatically assigned to softkeys.
● 120 built-in units for automatic conversion, plus user-definable units.	Eliminates the need for conversion tables or specialized unit-conversion calculators.
● Enhanced RPN.	Allows entry of calculations in either Reverse Polish Notation or algebraic form. Expandable stack can handle an arbitrary number of multiple data types.
● Built-in infrared printer interface.	Provides optional printing capability via infrared light beam – no cords to clutter desks or work areas.
● Four-line by 23-character display.	Shows up to four levels of the stack, the results of past calculations, matrices, formulas, plots, and programs.
● Catalog function.	Lists the necessary stack elements for all built-in programmable functions.
● Separate alpha and numeric keyboards.	Presents numbers and letters in a straightforward, easy-to-use format.
● Continuous memory.	Stores all data, including the contents of the display, when you turn off the calculator. Automatically turns off after 10 minutes of inactivity, saving material you've been working on.
● Portability.	Fits in wherever you are with its compact size and sturdy self-contained case. Requires just three 1.5V N-cell alkaline batteries for power.
● Dot-matrix display.	Four-lines by 23-characters; 32 x 137 pixels. Each pixel can be switched on individually to create your own graphics programs and functions. Features adjustable display contrast for easy reading and reduction of glare from sunlight and other sources.

HP-28S Physical Specifications

DIMENSIONS . . 19.05 cm (7.50 in) x 15.88 cm (6.25 in) x 1.27 cm (.50 in) (when open) 9.22 cm (3.63 in) x 16.51 cm (6.50 in) x 1.60 cm (.63 in) (when closed)

WEIGHT . . . . . 226.8 g (8 oz) with batteries

POWER
Batteries . . . . . . Three replaceable 1.5V N-cell alkaline

BATTERY CURRENT
(worst case) . . . . 35 mA (operating, heavy graphics printing) 14 mA (operating, heavy text printing) 8 mA (operating, no printing) 1.0 mA (idle) 25 µA (off)

AVERAGE
BATTERY LIFE . . Up to nine months (battery life depends upon use; shorter when printer is used)

OPERATING REQUIREMENTS
Operating
temperature. . . 0° to 45°C (32° to 113°F)

Storage
temperature. . . −20° to 65°C (−4° to 149°F)
Humidity . . . . . 90% relative humidity at 40°C (104°F) maximum

DISPLAY (Liquid-crystal)
Size . . . . 32 x 137 pixels
Status
annunciators . . 7
Character font . . 5 x 7 dot matrix
Capacity . . . . . . 4 lines. Scrolling allows viewing of objects larger than the display.

Window size . . . 23 characters per line.

REDEFINABLE
KEYS 6

CHARACTER RANGE
A-Z, a-z, 0-9, plus other mathematical symbols and punctuation. 116 characters can be displayed; 219 can be printed.

DYNAMIC RANGE
Real precision . . 1.0×10^{-499} to $9.99999999999 \times 10^{499}$ Numbers are shown with a maximum of 12 mantissa digits and a 3-digit exponent. Dis-

played numbers are rounded to 12 significant digits or fewer as selected by the user. Internal calculations are carried out to 15 digits with a 5-digit exponent.

Integer precision .64 bits
Variable types . . Real floating point numbers, complex numbers, binary integers, strings, real vectors, complex vectors, real matrices, complex matrices, lists, names, programs, algebraic expressions.

ROM/RAM
Built-in operating system ROM . 128K bytes
Built-in RAM . . . 32K bytes (.4K used by operating system)
Built-in interface . . . . Infrared printer

HP-28S CALCULATORS COME WITH:
● Owner's Manual
● Reference Manual (over 300 pages each)
● Three N-cell alkaline batteries

HP-28S Commands and Operations

ALGEBRA FUNCTIONS
COLCT – Collects like terms.
e – Symbolic constant e.
EXGET – Gets a subexpression.
EXPAN – Expands an algebraic expression.
EXSUB – Substitutes a subexpression.
FORM – Changes the form of an algebraic expression.
i – Symbolic constant i.
ISOL – Solves an expression or equation.
MAXR – Symbolic constant maximum real.
MINR – Symbolic constant minimum real.
OBGET – Extracts an object from an algebraic expression.
OBSUB – Substitutes an object into an algebraic expression.
QUAD – Solves a quadratic polynomial.
SHOW – Resolves all references to a name implicit in an algebraic expression.
SIZE – Finds the dimensions of a list, array, string or algebraic expression.

TAYLR – Computes a Taylor series approximation.
π – Symbolic constant Pi.

ALGEBRAIC IDENTITY OPERATIONS
AF – Adds fractions.
A→ – Associates to the right.
DINV – Double inverts.
DNEG – Double negates.
D→ – Distributes to the right.
E^ – Replaces power-of-product with power-of-power.
E( ) – Replaces power-of-power with power-of-product.
LEVEL – Displays the level of the selected subexpression.
L( ) – Replaces product-of-log with log-of-power.
L* – Replaces log-of-power with product-of-log.
M→ – Merges right factors.
1/( ) – Double inverts and distributes.
-( ) – Double negates and distributes.
*1 – Multiplies by 1.
/1 – Divides by 1.
^1 – Raises to the power 1.
[←] – Moves FORM cursor left.

[→] – Moves FORM cursor right.
←A – Associates to the left.
←D – Distributes to the left.
←M – Merges left factors.
↔ – Commutes arguments.
→( ) – Distributes prefix operator.
+1−1 – Adds and subtracts 1.

ARITHMETIC (Real, complex, array)
INV – Inverse (reciprocal).
NEG – Negates an argument.
SQ – Squares.
x^2 – Executes function SQ.
1/x – Executes function INV.
+ – Adds two objects.
− – Subtracts two objects.
* – Multiplies two objects.
/ – Divides two objects.
^ – Raises a number to a power.
√ – Takes the square root.

CALCULUS
∫ – Definite or indefinite integral.
∂ – Derivative.

CATALOG
CATALOG – Lists commands and arguments.

HP-28S Commands and Operations (continued)

FETCH – Exits CATALOG or UNITS, writes the current command or unit in the command line.
NEXT – Displays next command in catalog.
PREV – Displays the previous command in catalog.
QUIT – Exits CATALOG. Exits USAGE display.
USE – Indicates stack contents required to use a function.

CHARACTER STRINGS

CHR – Converts a character number to a one-character string.
DISP – Displays an object.
LCD→ – Converts a string to a display picture.
→LCD – Converts a display picture to a string.
NUM – Returns character code of a string character.
POS – Finds a substring in a string.
STR→ – Parses and evaluates the commands defined by a string.
→STR – Converts an object to a string.
SIZE – Finds the dimensions of a string.
SUB – Extracts a portion of a string.

COMPLEX NUMBERS

ABS – Absolute value.
ARG – Argument.
CONJ – Complex conjugate.
C→R – Complex-to-real conversion.
IM – Returns the imaginary part of a number.
NEG – Negates an argument.
P→R – Polar-to-rectangular conversion.
R→C – Real-to-complex conversion.
RE – Returns the real part of a complex number.
R→P – Rectangular-to-polar conversion.
RND – Rounds a complex number.
SIGN – Sign of a real or complex number.

COMPUTER MATH OPERATIONS

AND – Logical or binary AND.
ASR – Arithmetic shift right.
BIN – Sets binary base.
B→R – Binary-to-real conversion.
DEC – Sets decimal base.
HEX – Sets hexadecimal base.
NOT – Logical or binary NOT.
OCT – Sets octal base.
OR – Logical or binary OR.
RCWS – Recalls the binary integer wordsize.
RL – Rotates left by one bit.

RLB – Rotates left by one byte.
RR – Rotates right by one bit.
RRB – Rotates right by one byte.
R→B – Real-to-binary conversion.
SL – Shifts left by one bit.
SLB – Shifts left by one byte.
SR – Shifts right by one bit.
SRB – Shifts right by one byte.
STWS – Sets the binary integer wordsize.
XOR – Logical or binary XOR.

LISTS

GET – Gets an element from a list.
GETI – Gets an element from a list and increments the index.
LIST→ – Moves list elements to the stack.
PUT – Puts an element into an array.
PUTI – Puts an element into an array and increments the index.
SIZE – Finds the dimensions of a list.
SUB – Extracts a portion of a list or string.
→LIST – Combines objects into a list.

LOGS

ACOSH – Arc hyperbolic cosine.
ALOG – Common (base 10) anti-logarithm.
ASINH – Arc hyperbolic sine.
ATANH – Arc hyperbolic tangent.
COSH – Hyperbolic cosine.
EXP – Exponential or natural anti-logarithm.
EXPM – Exponential of (argument-1).
LN – Natural logarithm.
LNP1 – Natural logarithm of (argument + 1).
LOG – Common (base 10) logarithm.
SINH – Hyperbolic sine.
TANH – Hyperbolic tangent.

MATRICES AND VECTORS (Arrays)

ABS – Absolute value.
ARRY→ – Replaces an array with its elements as separate stack numbers.
CNRM – Computes a column norm.
CON – Creates a constant matrix.
CONJ – Complex conjugate.
CROSS – Cross product of two two- or three-element vectors.
C→R – Complex-to-real conversion.
DET – Determinant of a matrix.
DOT – Dot product of two vectors or matrices.
GET – Gets an element from an array.
GETI – Gets an element from an array and increments the index.
IDN – Creates an identity matrix.
IM – Returns the imaginary part of an array.

NEG – Negates an argument.
PUT – Puts an element into an array.
PUTI – Puts an element into an array or list and increments the index.
RDM – Redimensions an array.
RE – Returns the real part of a complex array.
RND – Rounds the elements of an array.
RNRM – Computes the row norm of an array.
RSD – Computes a correction to the solution of a system of equations.
R→C – Real-to-complex conversion.
TRN – Transposes a matrix.
→ARRY – Combines numbers into an array.
SIZE – Finds the dimensions of an array.

MENU GROUPS

Redefine the six softkeys under the display.

ALGEBRA	PLOT
ARRAY	PRINT
BINARY	REAL
BRANCH	SOLV
CMPLX	STACK
CTRL	STAT
CUSTOM	STORE
LIST	STRING
LOGS	TEST
MEMORY	TRIG
MODE	USER

OPERATING MODE

DEG – Sets degrees mode.
ENG – Sets engineering display format.
FIX – Sets FIX display format.
PRMD – Prints and displays current modes.
RAD – Sets radians mode.
RDX. – Sets . as the radix mark.
RDX, – Sets , as the radix mark.
SCI – Sets scientific display format.
STD – Sets standard display format.
CMD – Enables COMMAND.
LAST – Enables LAST.
ML – Selects multi-line display mode.
UND – Enables UNDO.

PLOTTING

AXES – Sets intersection of axes.
CENTR – Sets center of plot display.
CLLCD – Clears the display.
CLMF – Clears the system message flag.
COLΣ – Selects statistics matrix columns.
DEL – Saves the display picture as a string.
DISP – Displays an object.
DGTIZ – Activates the digitizing cursor.

HP-28S Commands and Operations (continued)

DRAW – Creates a mathematical function plot.
DRAX – Draws axes.
DRWΣ – Creates a statistics scatter plot.
INDEP – Selects the plot independent variable.
INS – Digitizes point.
PIXEL – Turns on a display plot pixel.
PMAX – Sets the upper-right plot coordinates.
PMIN – Sets the lower-left plot coordinates.
PPAR – Recalls the plot parameters list.
PRLCD – Prints an image of the display.
RCEQ – Recalls the current equation.
RCLΣ – Recalls the current statistics matrix.
RES – Sets the plot resolution.
SCLΣ – Auto-scales the plot parameters according to the statistical data.
STEQ – Stores the current equation.
STOΣ – Stores the current statistics matrix.
*H – Adjusts the height of a plot.
*W – Adjusts the width of a plot.

PRINTING

CR – Prints a carriage-right.
PRLCD – Prints an image of the display.
PRMD – Prints and displays current modes.
PRST – Prints the stack.
PRSTC – Prints the stack in compact format.
PRUSR – Prints a list of variables.
PRVAR – Prints the contents of a variable.
PR1 – Prints the level 1 object.
TRAC – Enables printer trace mode.

PROGRAM BRANCHING

DO – Part of DO . . . UNTIL . . . END.
ELSE – Begins ELSE clause.
END – Ends program structures.
FOR – Begins definite loop.
IF – Begins IF clause.
IFERR – Begins IF ERROR clause.
IFT – If-then command.
IFTE – If-then-else function.
NEXT – Ends definite loop.
REPEAT – Part of WHILE . . . REPEAT . . . END.
START – Begins definite loop.
STEP – Ends definite loop.
THEN – Begins THEN clause.
UNTIL – Part of BEGIN . . . UNTIL . . . END.

WHILE – Begins WHILE . . . REPEAT . . . END.
→ – Creates local variables.

PROGRAM CONTROL

ABORT – Aborts program execution.
BEEP – Sounds a beep.
CLLCD – Clears the display.
CLMF – Clears the system message flag.
CONT – Continues a halted program.
DISP – Displays an object.
ERRM – Returns the last error message.
ERRN – Returns the last error number.
HALT – Suspends program execution.
KEY – Returns a key string.
KILL – Aborts all suspended programs.
SST – Single-steps a suspended program.
WAIT – Pauses program execution.

PROGRAM TEST

AND – Logical or binary AND.
CF – Clears a user flag.
FC? – Tests clear status of a user flag.
FC?C – Tests and clears a user flag.
FS? – Tests set status of a user flag.
FS?C – Tests and clears a user flag.
NOT – Logical or binary NOT.
OR – Logical or binary OR.
RCLF – Returns a binary integer representing the user flags.
SAME – Tests two objects for equality.
SF – Sets a user flag.
STOF – Sets all user flags according to the value of a binary integer.
TYPE – Returns the type of an object.
XOR – Logical or binary XOR.
<– Less-than comparison.
≤ – Less-than-or-equal comparison.
= = – Equality comparison.
≠ – Not-equal comparison.
≥ – Greater-than-or-equal comparison.
> – Greater-than comparison.

REAL NUMBERS

ABS – Absolute value.
CEIL – Next greater integer.
e – Symbolic constant e.
FACT – Factorial or gamma function.
FLOOR – Next smaller integer.
FP – Fractional part.
IP – Integer part.
MANT – Returns the mantissa of a number.
MAX – Returns the maximum of two numbers.
MAXR – Symbolic constant maximum real.
MIN – Returns the minimum of two numbers.

MINR – Symbolic constant minimum real.
MOD – Modulus.
NEG – Negates an argument.
RAND – Returns a random number.
RDZ – Sets the random number seed.
RND – Rounds according to real number display mode.
SIGN – Returns the sign of a number.
XPON – Returns the exponent of a number.
% – Percent.
%CH – Percent change.
%T – Percent of total.
π – Symbolic constant Pi.

STACK MANIPULATION

CLEAR – Clears the stack.
DEPTH – Counts the objects on the stack.
DROP – Drops one object from the stack.
DROPN – Drops n + 1 objects from the stack.
DROP2 – Drops two objects from the stack.
DUP – Duplicates one object on the stack.
DUPN – Duplicates n objects on the stack.
DUP2 – Duplicates two objects on the stack.
LIST→ – Moves list elements to the stack.
OVER – Duplicates the object in level 2.
PICK – Duplicates the nth object.
ROLL – Moves the level n object to level 1.
ROLLD – Moves the level 1 object to level n.
ROT – Moves the level 3 object to level 1.
SWAP – Swaps the objects in levels 1 and 2.

STATISTICS AND PROBABILITY

CLΣ – Purges the statistics matrix.
COLΣ – Selects the statistics matrix columns.
COMB – Combinations of n objects taken m at a time.
CORR – Correlation coefficient.
COV – Covariance.
LR – Computes a linear regression.
MAXΣ – Finds the maximum coordinate values in the statistics matrix.
MEAN – Computes statistical mean.
MINΣ – Finds the minimum coordinate values in the statistics matrix.
NΣ – Returns the number of data points in the statistics matrix.
PERM – Permutations of n objects taken m at a time.
PREDV – Predicted value.
RCLΣ – Recalls the current statistics matrix.

HP-28S Commands and Operations (continued)

SDEV – Computes standard deviation.
STOΣ – Stores the current statistics matrix.
TOT – Sums the coordinate values in the statistics matrix.
UTPC – Upper-tail Chi-square distribution.
UTPF – Upper-tail F-distribution.
UTPN – Upper-tail normal distribution.
UTPT – Upper-tail t-distribution.
VAR – Computes statistical variances.
Σ + – Adds a data point to the statistics matrix.
Σ– – Deletes the last data point from the statistics matrix.

STORAGE ARITHMETIC

SCONJ – Conjugates the contents of a variable.
SINV – Inverts the contents of a variable.
SNEG – Negates the contents of a variable.
STO* – Storage arithmetic multiply.
STO + – Storage arithmetic add.
STO– – Storage arithmetic subtract.
STO/ – Storage arithmetic divide.

SYMBOLIC SOLUTIONS

EXPR = – Evaluates the current equation.
ISOL – Isolates first occurrence of a variable in an expression.
LEFT = – Evaluates the left side of the current equation.
QUAD – Solves a quadratic polynomial.
RCEQ – Recalls the current equation.
ROOT – Finds a numerical root.
RT = – Evaluates the right side of the current equation.
SHOW – Resolves all references to a name implicit in an algebraic expression.
STEQ – Stores the current equation.

TRIG

ACOS – Arc cosine.
ARG – Argument.
ASIN – Arc sine.
ATAN – Arc tangent.
COS – Cosine.
C→R – Complex-to-real conversion.
D→R – Degrees-to-radians conversion.

HMS + – Adds in HMS format.
HMS– – Subtracts in HMS format.
HMS→ – Converts from HMS format.
P→R – Polar-to-rectangular conversion.
R→C – Real-to-complex conversion.
R→D – Radians-to-degrees conversion.
R→P – Rectangular-to-polar conversion.
SIN – Sine.
TAN – Tangent.
→HMS – Converts a number to HMS format.

MEMORY MANAGEMENT

CLUSR – Purges all user variables.
CRDIR – Creates a directory.
HOME – Activates the home directory.
MEM – Returns available memory.
MENU – Creates a custom menu.
ORDER – Rearranges the user menu.
PATH – Returns the path to the current directory.
VARS – Returns a list of variables in the current directory.

UNIT CONVERSIONS

CONVERT – Performs a unit conversion.
FETCH – Exits UNITS, writes the current unit in the command line.
NEXT – Advances to next unit in catalog.
PREV – Displays the previous unit in catalog.
QUIT – Exits UNITS. Exits USAGE display.
UNITS – Activates UNITS catalog.

OTHER KEYBOARD COMMANDS

ATTN (ON) – Aborts program execution; clears the command line; exits catalogs, FORM, plot displays.
CHS – Changes the sign of a number in the command line or executes NEG.
COMMAND – Moves an entry from the command stack to the command line.
DEL – Deletes character at cursor; digitizes point. Shifted DEL deletes character at cursor and all characters to the right.
EDIT – Copies the object in level 1 to the command line for editing.
EEX – Enters exponent in command line.
ENTER – Parses and evaluates the command line or executes DUP.
EVAL – Evaluates an object.

INS – Switches between insert and replace modes; digitizes point. Shifted INS deletes all characters to the left of the cursor.
LAST – Returns last arguments.
LC – Switches between upper-case and lower-case modes.
MENUS – Makes menu keys unshifted.
ON (ATTN) – Turns the calculator on; aborts program execution; clears the command line; exits catalogs, FORM, plot displays.
ON DEL – Cancels system halt or memory reset if pressed before ON is released.
ON INS ▶ – (Memory Reset) Stops program execution, clears local and user variables, clears the stack, resets user flags.
ON + – Increases the display contrast.
ON – – Decreases the display contrast.
ON-PRINT – Prints the current display.
ON ▲ – (System Halt) Stops program execution, clears local variables, clears the stack.
ON ▼ – Starts system test.
ON ◀ – Starts continuous system test.
OFF – Turns the calculator off.
RCL – Recalls the contents of a variable, unevaluated.
STO – Stores an object in a variable or an element in a list or array.
UNDO – Replaces the stack contents.
VIEW↑ – Moves the display window up one line.
VIEW↓ – Moves the display window down one line.
VISIT – Copies an object to the command line for editing.
▲ – Moves cursor up one space. Shifted ▲ moves cursor up all the way.
▼ – Moves cursor down one space. Shifted ▼ moves cursor down all the way.
◀ – Moves cursor left one space. Shifted ◀ moves cursor left all the way.
▶ – Moves cursor right one space. Shifted ▶ moves cursor right all the way.
◀ – Backspace.
α – Switches alpha mode on or off.
αLOCK – Locks alpha mode on.
→NUM – Evaluates an object in numerical mode.

These books offer a variety of examples and keystroke procedures to help set up your calculations the way you need them.

Practical routines show how you can reap the full benefits of built-in menus. Easy-to-follow instructions help you create personalized menus to solve problems in your words. Here is a sample of the concepts included in each book.

Electrical Engineering $9.95
00028-90103
- Use ready-to-go utilities for quick results or as part of your own custom application.
- Calculate mesh currents and nodal voltages of DC or AC circuits.
- Display and optionally print a Bode diagram of a transfer function.
- Calculate the impedance of a passive one-port network.
- Convert impedance values between delta and Y networks.
- Perform ladder network analysis, truth table generation, finite Fourier transforms and voltage/current division.

Vectors and Matrices $9.95
00028-90105
- Perform general matrix operations: summation, multiplication, determinant, inverse, transpose, conjugate, minor, rank computation and Hermitian determination.
- Solve a system of linear equations.
- Calculate important vector operations: basis, orthogonality, vector length and normalization.

- Learn methods for calculating eigenvalues and eigenvectors.
- Perform the method of least squares and Markov Chain calculations.

Algebra and College Math $9.95
00028-90101
- Solve algebraic problems: polynomial long division, function evaluation and plotting, simultaneous linear equations, quadratic equations, logarithms, polynomial equations, matrix determinants and infinite series.
- Perform trigonometric calculations: functions for one or two angles, graphs of functions, relations and identities, inverse functions, equations and complex numbers.
- Solve analytic geometry problems that involve rectangular and polar coordinates, the straight line, circle, parabola, ellipse, hyperbola and parametric equations.

Calculus $9.95
00028-90102
- Perform function operations: definition, composition, analysis, angles between lines, and angles between a line and a function.
- Solve problems of differential calculus: function minimization and maximization, computing tangent lines
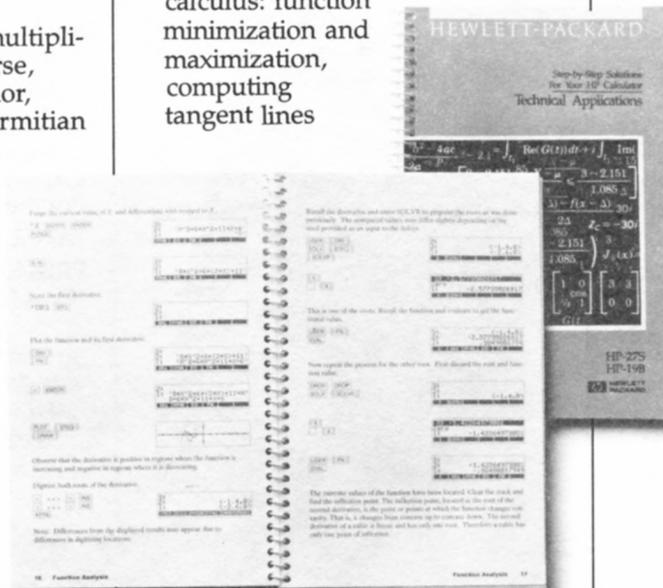
and implicit differentiation.
- Obtain symbolic and numerical solutions for integral calculus problems: polynomial integration, area between curves (double integration), arc length of a function, surface area, and volume of a solid of revolution.

Probability and Statistics $9.95
00028-90104
- Set up a statistics matrix.
- Calculate a variety of basic statistics: means, standard deviations, variances, covariances, correlation coefficient, sums of products, normalized data, delta percent on paired data, moments, skewness and kurtosis.
- Perform several regression techniques: curve fitting (straight line, exponential, logarithmic and power), multiple linear and polynomial regressions.
- Compute several test statistics.

Mathematical Applications $9.95
00028-90111
- Find the area and all sides and angles of any plane triangle.
- Perform synthetic division on polynomials of arbitrary order.
- Calculate all the roots of a 1st, 2nd, 3rd and 4th degree polynomial, with real or complex coefficients.
- Solve first- and second-order differential equations by the fourth-order Runge-Kutta method.
- Convert the coordinates of 2- or 3-dimensional vectors between two coordinate systems, where one system is translated and/or rotated with respect to the other.
- Collect statistical data points, and fit any or all of four common curves to the data. Plot the data and fit the curve(s).

HP 82240A
Infrared Printer for the HP-28S and the HP-41

HP's battery-powered infrared printer is a go-anywhere companion to the HP-28S . . . and now to the HP-41* as well. Since this unique printer operates by an invisible infrared beam, no cord is necessary to connect it to the calculator. Producing hard copies – in a car, in the field, in your office – couldn't be simpler.

Operation of the infrared printer is easy, too. Simply aim the calculator at the printer (from up to a foot-and-a-half away), push the appropriate keys, and receive a neat, clean copy of your calculations and graphs. You can print out a complete record of your work or select and print only what you need.

HP 82240A: $135.00

Key Printer Features

- Battery powered.
- Compact size.

- Graphics capability.

- Infrared light beam.

- Optional AC adapter.

- 24 characters per line.

What They Do for You

Goes anywhere, prints anywhere.

Fits neatly in hand for carrying, takes up little space on desk.

Gives you hard copies of your plots and graphs for extended analysis.

Provides an invisible connection to the HP-28S and HP-41 with no cords to clutter desk or work areas.

Saves batteries when working at your desk or near an outlet.

Provides easy-to-read copies of your work.

Physical Specifications

DIMENSIONS . . . 9.1 cm (3.6 in) x 18.5 cm (7.3 in) x 6.35 cm (2.5 in)

WEIGHT . . . . . 472 g (16 oz) with paper and batteries

INTERFACE . . . Infrared

POWER REQUIREMENTS
Batteries . . . . . Four replaceable 1.5V AA alkaline
AC adapter
  current . . . . . 9 to 12V AC or DC; 500 to 1500 mA (HP 82241A in U.S.)
Operating time . . Approximately 6,000 lines of continuous printing with one set of non-rechargeable batteries.

OPERATING REQUIREMENTS
Operating temperature . . 0° to 50°C (32° to 122°F)
Storage temperature . . –40° to 60°C (–40° to 140°F)
Relative humidity . . . 5% to 95% at 40°C (104°F)

PRINT FORMAT
Technique . . . . Thermal dot matrix
Speed . . . . 1.8 seconds/line at low battery. 0.8 seconds/line with fresh batteries or adapter.
Text mode character cell structure . . . 5 x 7 dot matrix
Graphics mode resolution . . . 166-dot columns at 90.7 dots/inch horizontal; 72.6 dots/inch vertical; 8-dot printhead. Paper advances 8-dot rows after each line, for continuous graphic printing.
Line length (characters) . . 24 per line
Character set . . ROMAN8
Printhead life . . 500,000 lines
PAPER FEED . . Friction
PRINT BUFFER 200 characters

*HP-41 requires HP 82242A Infrared Printer Interface Module.

Take Advantage of Unsurpassed Expandability and Customize To Suit Your Needs.

If you're in the market for a scientific handheld calculator, but you want one you can customize to your specific needs now *and* in the future, take a good look at the HP-41 Advanced Programmable Calculator. For combined expandability, versatility, and power, it's unsurpassed.

The HP-41 offers system capabilities you'd expect to find in large computers, since its software, peripherals, and enhancements expand it into one of the most versatile calculators available today.

Thousands of Programs

The HP-41 lets you focus on specific operations in engineering, science, navigation, surveying, machine design, or a variety of other fields with the thousands of programs available to HP-41 users (see partial list on p. 26).

Custom Programming

If a program you want isn't available, design it yourself with the HP-41's programming capability – just enter the keystrokes and create a masterpiece tailored specifically to your needs.

High-Powered Math Capabilities

With the largest software base available for any calculator, the HP-41 can quickly demolish intricate mathematical, scientific, engineering, and technical problems. Choose the HP-41 Advantage or Math/Stat pacs for pre-programmed convenience.

Additional Features

The HP-41 also offers:
■ A redefinable keyboard.
■ RPN (Reverse Polish Notation) logic system.
■ Optional printers, including the HP cordless infrared printer (see p. 10).
■ Ability to act as a controller for system management functions.

Two Expandable Models

You can choose between two HP-41 models – the HP-41CV and the HP-41CX. The two models differ in the amount of extended memory as well as in built-in functionality.
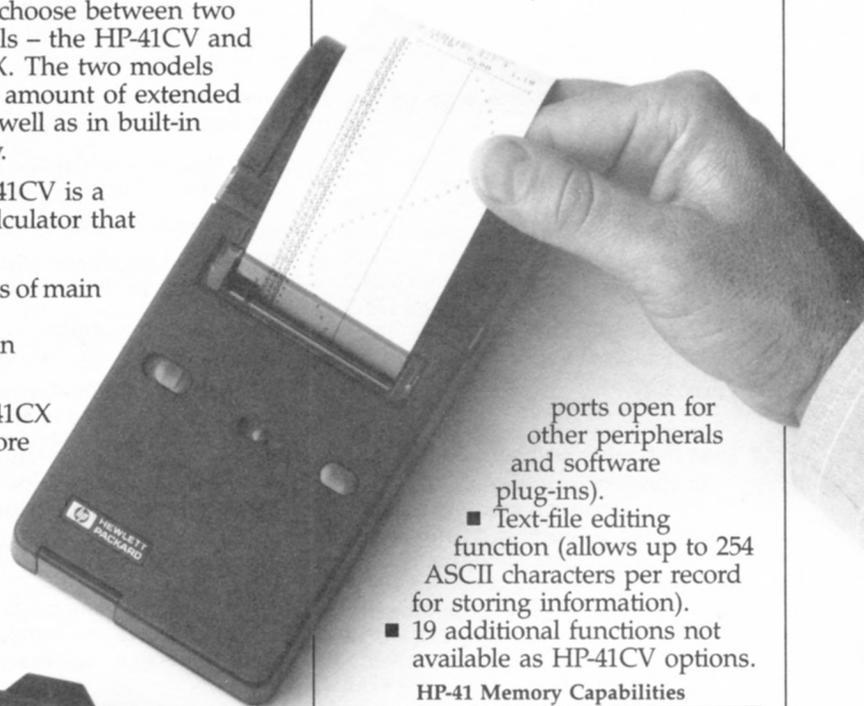
The HP-41CV is a powerful calculator that features:

■ 2,233 bytes of main memory.
■ 128 built-in functions.

The HP-41CX has even more power and also offers enhanced programming with its built-in and expandable functions. The HP-41CX features:

■ 3,101 bytes of main and extended memory.
■ More than 200 built-in functions.
■ Built-in Time and Extended Functions/Memory modules (leaves the four I/O ports open for other peripherals and software plug-ins).
■ Text-file editing function (allows up to 254 ASCII characters per record for storing information).
■ 19 additional functions not available as HP-41CV options.

HP-41 Memory Capabilities

	HP-41CV	HP-41CX
Main memory		
Bytes	2,233	2,233
Registers	319	319
Extended memory		
Bytes	868 (optional)	868
Registers	124 (optional)	124
Extended Memory Modules*		
Bytes	1,666	1,666
Data registers	238	238
Maximum memory		
Bytes	6,433	6,433
Data registers	919	919

*Add a maximum of two.

Versatile and expandable beyond any other calculator, the HP-41 is the calculator you buy to suit your needs today . . . and customize to suit your needs tomorrow.

HP-41CV: $175.00
HP-41CX: $249.00

The HP-41:
The Expandable Calculator That Continues To Meet Your Needs

Key Features of the HP-41	What They Do for You
• Four I/O ports.	Gives potential for plug-in ROM software, peripherals, interfacing, and more, to provide problem-solving versatility.
• Software.	Offers a well-established base of thousands of software solutions. Fast, accurate results in a multitude of applications are pre-tested and ready to go. Plug-in ROM modules, magnetic cards, cassettes, bar code available.
• Optional HP-IL (Interface Loop).	Gives increased expansion options for mass storage, larger computer connections, and instrument control to make the HP-41 a powerful custom tool.
• RPN.	Saves time in calculations by reducing the number of keystrokes necessary. Consistent, effective, friendly logic system.
• Expandable memory.	Uses extended memory modules to expand maximum memory to 6.4K bytes.
• Built-in operating system.	Allows for immediate solutions to complex problems with a 24K-byte operating system (12K in the HP-41CV).
• Continuous memory.	Preserves entire contents of memory, including key assignments, even when the HP-41 is turned off. No reloading of programs is necessary.
• Portability.	Requires four 1.5V N-cell alkaline batteries for go-everywhere portability. Optional battery pack may be recharged easily.
• User-definable keyboard.	Assigns any program or function to almost any key. Customizes the keyboard to the user's needs. Toggle selection of either User or Normal keyboards for customized key performance or original key functions.
• Alphanumeric keyboard.	Names and labels programs, functions, and results. Prompts in words for easy interpretation.
• Liquid-crystal display.	Helps eliminate glare problems from sunlight and other sources. Easy to read. Low power consumption minimizes battery drain. Display allows view of 10 digits or 12 alpha characters; automatic scrolling shows up to 24 alpha characters.

HP-41 Specifications

DIMENSIONS .. 14.2 cm (5.6 in) x 7.9 cm (3.1 in) x 3.3 cm (1.3 in)

WEIGHT ..... 205 g (7.2 oz) with batteries

POWER
Batteries ..... four 1.5V, size N batteries (replaceable by user)

Battery current
(worst case) . 20 mA (operating)
2 mA (idle)
50 μA (off)

Average alkaline
battery life .. up to 6 months (battery life depends upon use, less when a peripheral device without its own power source is in use)

OPERATING REQUIREMENTS
Operating
temperature .. 0° to 45°C (32° to 113°F)
Storage
temperature .. −20° to 65°C (−4° to 149° F)
Humidity .... 40°C at 95%

DISPLAY
Capacity ..... 10 digits; 12 alpha characters displayed (scroll to view 24); 12 annunciator words; each character position consists of 17 segments, including 3 punctuation segments.

CHARACTER RANGE
A-Z, a-z, 0-9, plus 37 special characters, some of which can be obtained only by using optional plug-in peripherals.

DYNAMIC RANGE
$\pm 1.000000000 \times 10^{-99}$ to $\pm 9.999999999 \times 10^{99}$, plus zero.
Numbers are shown with a maximum of ten digits, or an 8-digit mantissa and a 2-digit exponent.

Displayed numbers are rounded to the last displayed digit, calculations are performed internally with at least ten digits.

HP-41 CALCULATORS COME WITH:
- The appropriate owner's documentation:
  HP-41CX Owner's Manual (Vol. I and Vol. II)
  HP-41CX Pocket Operating Guide
  HP-41CV Owner's Manual: BASIC Operation
  HP-41CV Quick Reference Card
- And the following:
  Tough, pliable carrying case
  Four type N batteries
  Overlay packet

HP-41 Functions List

■ – Shift key.
+ – Addition operator.
− – Subtraction operator.
* – Multiplication operator.
/ – Division operator.
1/X – Reciprocal.
10↑X – Common antilogarithm.
ABS – Absolute value.
ACOS – Arc (inverse) cosine.
ADV – Advance paper.
AOFF – Alpha mode off.
AON – Alpha mode on.
APPEND – Append characters (�).
ARCL – Alpha recall.
ASHF – Alpha shift left.
ASIN – Arc (inverse) sine.
ASN – Assign.
ASTO – Store Alpha data in register.
ATAN – Arc (inverse) tangent.
AVIEW – Alpha view.
BEEP – Beeper.
CAT – Catalog.
CF – Clear flag.
CHS – Change sign.
CLA – Clear Alpha register.
CLD – Clear display.
CLP – Clear program.
CLRG – Clear register.
CLΣ – Clear statistics registers.
CLST – Clear stack registers.
CLX – Clear X-register.
COPY – Copy program from module or peripheral into program memory.
COS – Cosine.

D—R – Degrees to radians conversion.
DEC – Octal to decimal conversion.
DEG – Degrees mode.
DEL – Delete program memory lines.
DSE – Decrement, skip if equal.
EEX – Enter exponent.
END – End program.
ENG – Engineering notation.
ENTER↑ – Enter number in X-register into Y- register.
E↑X – Natural antilogarithm.
E↑X−1 – Natural antilogarithm for arguments close to zero.
FACT – Factorial.
FC? – "Flag clear" test.
FC?C – "Flag clear" test and clear.
FIX – Fixed point display.
FRC – Fractional portion of number.
FS? – "Flag set" test.
FS?C – "Flag set" test and clear.
GRAD – Grads mode.
GTO – Go to label.
HMS – Decimal hours to hours, minutes, seconds conversion.
HMS+ – Hours, minutes, seconds addition.
HMS− – Hours, minutes, seconds subtraction.
HR – Hours, minutes, seconds to decimal hours conversion.
INT – Integer portion of number.
ISG – Increment, skip if greater.
LASTX – Recalls LAST X register contents to X-register.
LBL – Program label.
LN – Natural logarithm.
LN1+X – Natural logarithm for arguments close to one.
LOG – Common logarithm.
MEAN – Mean.
MOD – Modulo (remainder).
OCT – Decimal to octal conversion.
OFF – Power off.
ON – Power on (continuous) function.
P→R – Polar to rectangular conversion.
PACK – Pack program memory.
% – Percent.
%CH – Percent of change.
PI – Pi (3.141592654).
PROMPT – Prompt.
PSE – Pause.

HP-41 Functions List (continued)

R↑ – Roll up stack.
R→D – Radians to degrees conversion.
R→P – Rectangular to polar conversion.
R/S – Run or stop a program.
RAD – Radians mode.
RCL – Recall data from register into X-register.
RDN – Roll down stack.
RND – Round.
RTN – Return.
SCI – Scientific notation.
SDEV – Standard deviation.
SF – Set flag.
Σ+ – Accumulations for statistics.
Σ– – Accumulation correction.
ΣREG – Statistical register block specification.
SIGN – Sign of x.
SIN – Sine.
SIZE – Size of data storage register allocation.
SQRT – Square root.
ST+ – Storage register addition.
ST– – Storage register subtraction.
ST* – Storage register multiplication.
ST/ – Storage register division.
STO – Store numeric data in register.
STOP – Stops program execution.
TAN – Tangent.
TONE – Tone.
VIEW – View register contents.
X=0? – X=0? conditional test.
X≠0? – X≠0? conditional test.
X<0? – X<0? conditional test.
X<=? – X≤0? conditional test.
X>0? – X>0? conditional test.
X=Y? – X=Y? conditional test.
X≠Y? – X≠Y? conditional test.
X<Y? – X<Y? conditional test.
X<=Y? – X≤Y? conditional test.
X>Y? – X>Y? conditional test.
X<> – Exchange X- and any register.
X<>Y – Exchange X- and Y- registers.
XEQ – Execute.
X↑2 – Square.
Y↑X – Exponential.

FUNCTIONS UNIQUE TO THE HP-41CX

ASROOM – Number of bytes left in working ASCII file.
CLALMA – Clear alarm by Alpha register.
CLALMX – Clear alarm by X-register.
CLRALMS – Clear all alarms.
CLRGX – Clear a specified block of registers.
ED – Text Editor.
EMDIRX – Access extended memory directory.
EMROOM – Number of unused registers in extended memory.
ΣREG? – Return number of first statistics register to X.
GETKEYX – Return ASCII code to X-register and keycode to Y-register.
RCLALM – Recall alarm.
RESZFL – Resize ASCII or data file.
SWPT – Activates stopwatch and sets pointers.
CAT6 – Lists all user key assignments in order of key code.
X=NN? – conditional test.
X≠NN? – conditional test.
X<NN? – conditional test.
X≤NN? – conditional test.
X>NN? – conditional test.
X≥NN? – conditional test.

EDITING

← – Correction key.
GTO. – Go to the line number of Alpha label.
GTO.. – Go to end of program memory.
BST – Back step.
SST – Single step.

KEYBOARD MODES

HP-41CV/CX:
Normal – Primary or shifted key functions available.
User – Activates functions or programs assigned by user to keys.
Alpha – Activates ALPHA entry capability.

HP-41CX:
Alarm Catalog – Allows user to examine all pending alarms.
Stopwatch – Activates stopwatch functions and allows user to access functions from keyboard.
Text Editor – Activates text editing functions and ALPHA keys for creation and editing of text files.

HP-IL

The Hewlett-Packard Interface Loop (HP-IL) is a bit-serial interface designed for low-cost, battery-operable systems. HP-IL lets you use your HP-41 as system controller, capable of transmitting and receiving data, and performing a wide variety of information management and instrument control functions. In this system, devices are connected by two-wire cables leading from the output port of one device to the input port of the next, until all devices form a closed loop. This loop structure provides a unique capability through auto address assignment, device capability identification, power ON/OFF control and error checking.

Several HP-IL peripherals support STANDBY mode, allowing you to power the peripherals on or off, under program control, to conserve battery life. The power ON/OFF feature lets you use an HP-IL system for remote applications.

Key Features

- Battery powered.

- Simple connector system.

- Auto addressing.
- Manual addressing.

- Device-powered loop.

- Automatic error checking.

- Bit-serial, loop structure.
- STANDBY mode.

- Common mode rejection.

What They Do for You

Completely field portable. Runs during power failure.

Keyed cables for easy, error-free connection.

Devices can be connected in any order.

Control of two similar devices can be determined programmatically.

Each device powers its section of loop, allowing 30 devices and up to 10 meters between devices (up to 100 meters with twisted, shielded pairs).

Assures that the message sent was received correctly.

Allows automatic error checking.

Conserves battery life as programs control power up/power down.

Eliminates unwanted voltage transients.

HP 82160A HP-IL Interface Module

The HP-IL Interface Module plugs into any one of the four ports in the HP-41 connecting your advanced calculator with the extensive family of HP-IL peripherals and instruments. The module gives your HP-41 simultaneous control of up to 30 devices on the loop. There are three function sets supplied by the HP-IL Module: printer, mass storage, and general input/output (I/O).

HP 82160A: $125.00

Physical Specifications

DIMENSIONS .. 2.8 cm (1.1 in) x 1.3 cm (0.5 in) x 7.4 cm (2.9 in)

WEIGHT ..... 42.5 g (1.5 oz)

CABLE LENGTH
(two attached cables) ..... 79 cm (31 in) each

OPERATING REQUIREMENTS
Operating temperature .. 0° to 45°C (32° to 113°F)
Storage temperature .. −40° to 75°C (−40° to 167°F)

DATA TRANSFER RATE
150 bytes per second

HP-41 Extended Functions and Memory Modules

Make your HP-41 even more versatile with extension modules. By adding one HP 82180A Extended Functions/Memory Module (built into the HP-41CX) and two HP 82181A Extended Memory modules, you can give your HP-41 a maximum of 4.2K bytes of mass storage memory.* The Extended Functions/Memory Module also increases the HP-41CV programming set.
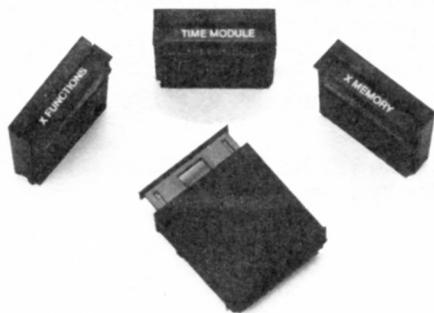
HP 82180A: $75.00
HP 82181A: $75.00

Physical Specifications

DIMENSIONS .. 3.2 cm (1.3 in) x 1.0 cm
(0.4 in) x 2.9 cm (1.2 in)

OPERATING REQUIREMENTS
Operating
temperature .. 0° to 45°C (32° to 113°F)
Storage
temperature .. −20° to 65°C (−4° to 149° F)

HP 82182A Time Module
(Built into the HP-41CX, optional for the HP-41CV.)

The time module expands your HP-41 system with time information and time-controlled operations. Using the quartz-crystal controlled time module, your HP-41 can become the heart of a time-based system controller, an alarm clock, an appointment reminder, a calendar, a timer, even an advanced stopwatch.

HP 82182A: $75.00

Physical Specifications

DIMENSIONS .. 3.2 cm (1.3 in) x 1.0 cm
(0.4 in) x 2.9 cm (1.2 in)

OPERATING REQUIREMENTS
Operating
temperature .. 0° to 45°C (32° to 113°F)
Storage
temperature .. −20° to 65°C (−4° to 149°F)

*No more than one HP 82180A Extended Functions/Memory Module or two HP 82181A Extended Memory Modules should be plugged into an HP-41CV. The HP 82180A is required when using the HP 82181A.

HP 82242A Infrared Printer Interface Module

The HP 82242A Infrared Printer Interface Module is a plug-in module that allows the HP-41 to use HP's battery-powered Infrared Printer (HP 82240A). Transmitting data to this low-cost printer via an invisible infrared beam, the module eliminates the need for cables and cords. That means you can print from the HP-41 more conveniently and inexpensively than ever before.

The HP 82242A Infrared Printer Interface Module plugs into any of the HP-41's four ports, leaving three ports free for other HP-designed peripherals and enhancements.

This module extends one-quarter inch from the calculator, creating a compact, portable printing solution for the HP-41.

HP 82242A: $65.00

Key Features

- Battery powered.
- Compact size.
- Infrared light beam.

- Compatible with most programs for HP 82143A and HP 82162A thermal printers.
- Variable print speeds.

- Graphics capability.

- Optional AC adapter (printer).

What They Do for You

Goes anywhere, prints anywhere.

Takes up little space on desk.

Provides an invisible connection to the HP-41 with no cords to tangle or clutter your work area.

Lets you operate most HP-41 programs with no modification.

Lets you control the rate at which data is transmitted to the printer for maximum print speed.

Gives you hard copies of your graphs and plots.

Saves batteries when you are working near an electrical outlet.

Physical Specifications

WEIGHT . . . . . 6 g (.2 oz)

LENGTH . . . . . 37 mm (1.45 in)

THICKNESS . . 9 mm (0.35 in)

DATA TRANSFER
RATE . . . . . . 1170 baud maximum (78 characters per second, maximum printing line rate: 0.9 seconds per line)

TRANSMISSION
DISTANCE . . maximum 18 in.

ANGLE OF
DEVIATION . . ± 30° left to right, 20° above, 20° below

OPERATING REQUIREMENTS
Operating
temperature . . 0° to 45°C (32° to 113°F)
Storage
temperature . . −20° to 60°C (−4° to 140°F)

TYPICAL POWER CON-
SUMPTION . . with calculator running: less than 10 mW, while printing: 150 mW

HP 82183A
Extended I/O Module

The HP 82183A provides easy-to-use I/O functions that enhance the HP-41's control of the HP-IL loop. This 4K-byte module provides 59 functions that extend the I/O capabilities beyond those provided by the HP 82160A HP-IL Module. These functions enhance mass storage, character manipulation, HP-IL control and advanced control of the HP-41 and devices on the loop.

HP 82183A: $75.00

Physical Specifications

DIMENSIONS .. 3.2 cm (1.3 in) x 1.0 cm (0.4 in) x 2.9 cm (1.2 in)

OPERATING REQUIREMENTS
Operating
temperature .. 0° to 45°C (32° to 113°F)
Storage
temperature .. −20° to 65°C (−4° to 149°F)

Automatic Start and Cassette Duplication Module (00041-15042)

The automatic start feature provides a means of writing "foolproof" HP-41 programs. With the automatic start module installed, the HP-41 goes through a special sequence when it is turned on. This sequence lets you write programs that automatically set status, configure memory, access peripherals, or prompt the user. The mass copy feature provides an easy-to-use means of duplicating programs and data. Use it to copy information from cassette to cassette, cassette to 3½" disc, and from disc to disc. The information on one HP 82161A Digital Cassette Drive can be copied onto as many as 29 other cassettes simultaneously.

00041-15042: $40.00

Key Features

- Alpha register functions.

- I/O buffer.

- Direct access to HP-IL integrated circuit.

What They Do for You

Add or remove characters from any position in the Alpha register.

Circumvent the loss of characters with byte values of zero.

Change the contents of any control register and poll certain status bits.

HP 82104A Card Reader

The HP-41 Card Reader is a valuable peripheral that lets you save programs and data on small magnetic cards. This "smart" card reader keeps track of cards as they are read and it even prompts you for the next card. A security feature permits a program to be run, but not reviewed or altered through normal operations. An added bonus is that it also accepts program cards from the HP-67 and HP-97 calculators, automatically making the necessary translations into HP-41 code.

HP 82104A: $195.00

Key Features

- Powered by HP-41's batteries.
- 224-byte magnetic cards.

- Uses one HP-41 port.

- Reads both HP-67/97 and HP-41 magnetic cards.
- Writes contents of HP-41 registers onto cards.

- Fits inside the HP-41 carrying case.

What They Do for You

Allows small size, total portability.

Programs and data easily modified. Cards easily stored. Easy to write contents on card's face. Inexpensive to duplicate.

Leaves other ports free for peripherals, modules, application ROMs and HP-IL interfacing.

Thousands of user-contributed programs available.

Can record programs and data on space-saving magnetic cards for inexpensive off-line mass storage.

Compact, convenient, protected.

Physical Specifications

DIMENSIONS . . 7.4 cm (3.0 in) x 7.9 cm (3.2 in) x 3.6 cm (1.4 in)
WEIGHT . . . . . 92 g (3.2 oz)

COMPATIBILITY
Plugs into the HP-41, also reads HP-67/97 magnetic cards.

OPERATING REQUIREMENTS
Voltages . . . . . regulated 6 Vdc supplied by HP-41. Unregulated 6 Vdc supplied by HP-41 batteries.
Current . . . . . . 2 mA maximum (no card inserted) 200 mA maximum (card inserted, motor off) 500 mA maximum (card inserted, motor on)
Operating temperature .. 10° to 45°C (50° to 113°F)
Storage temperature .. −40° to 75°C (−40° to 167°F)

HP-41 MAGNETIC CARDS

DIMENSIONS .. 7.11 cm (2.8 in) x 1.14 cm (0.45 in) x 0.003 cm (0.008 in)

WEIGHT . . . . . 0.258 g (0.001 oz) per card
00097-13141 − 40 Card Pac
00097-13143 − 120 Card Pac
00097-13206 − 1000 Card Pac without holder

STORAGE CAPACITY .. 16 registers (112 bytes) per track 2 tracks per card

HP 82153A Optical Wand

The HP 82153A Optical Wand makes using the HP-41 even faster and easier. Plug the wand into one of the HP-41 ports, and load programs and data into memory by passing the wand across a printed page of bar code. The wand translates the information into HP-41 programs and data, and then loads it into the HP-41. Bar code is an inexpensive distribution medium for programs and data. Store your bar code sheets in a three-ring binder if you choose. And share your programs quickly and easily – just photocopy and distribute.

HP 82153A: $125.00

Key Features

- Reads special HP-41 bar code.

- Plugs into and powered by the HP-41.

- Inexpensive bar code.

What They Do for You

Makes low cost and high reliability possible.

Economical data entry and processing. Portable.

Minimizes software distribution expense.

Physical Specifications

DIMENSIONS .. 13.0 cm (5.1 in) x 2.3 cm (0.9 in)

WEIGHT . . . . . 55 g (1.9 oz)

CABLE
LENGTH . . . 81.3 cm (32 in)

INTERFACE
Plugs into the HP-41 calculator, reads HP-41 bar code only.

OPERATING REQUIREMENTS
Voltages . . . . . regulated 6 Vdc supplied by the HP-41. Unregulated 6 Vdc supplied by HP-41 batteries.

Current . . . . . . 2 μA maximum (read switch off, calculator off) 65 mA maximum (read switch on, calculator on)

Operating
temperature .. 0° to 45°C (32° to 113°F)
Storage
temperature .. −20° to 65°C (−4° to 149°F)

OPERATING LIMITS
Scan angle . . . . within 25° of perpendicular (10° to 20° optimum)
Scan speed . . . 7.6 to 76 cm/sec (3 to 30 in/sec)
Subject to electro-magnetic interference.

HP 82161A
Digital Cassette Drive

The Digital Cassette Drive uses a digital-quality mini-cassette, capable of storing up to 128K bytes of information. Files can be located easily by name on the cassette drive. Rewind time is under 30 seconds and it can access over 250 bytes of information per second. All tape movement is under microprocessor control, unlike the more common audio cassette drives that must be operated manually. The HP 82161A can locate files when under program control. It also features STANDBY mode, enabling an HP-IL controller to turn the drive on or off remotely. This unique feature helps extend system battery life and allows for system operation in remote applications.

HP 82161A: $550.00

Key Features

- Battery powered.
- 128K bytes per cassette.
- Variable record length, file-by-name organization, tape directory.
- Internal buffer space.
- STANDBY mode.

What They Do for You

Take it anywhere.

Large storage capacity.

Access data quickly and easily; save file space.

Minimizes tape motion, access time.

HP-IL controller can turn drive on or off from a remote location; conserves battery power.

Physical Specifications

DIMENSIONS .. 17.8 cm (7.0 in) x 13.2 cm (5.2 in) x 6.1 cm (2.4 in)

WEIGHT . . . . . 798 g (1.8 lbs)

POWER REQUIREMENTS
Batteries . . . . . four-cell, 4.4 to 6 volt, quick-charge, nickel-cadmium battery pack
Pack recharging
time . . . . . . 14 to 16 hours (Drive turned on or off)
Usage . . . . ON – 2 watts maximum (motor off)
ON – 3.5 watts maximum (motor on)
STANDBY (on) – 2.3 watts maximum (motor off)
STANDBY (on) – 3.8 watts maximum (motor on)
STANDBY (off) – 0 watts maximum (motor off)

DATA FORMAT
Number of
tracks 2
Density . . . . . . 335 bits/centimeter (850 bits/in)
Format . . . . . . 256 bytes/record (8 bits/byte)
Formatted
capacity . . . . 512 records (131,072 bytes)
Encoding
method . . . . bi-phase/level-phase encoding

DRIVE MECHANISM
Type . . . . two-motor, hub drive
Read/Write
speed . . . . . 23 centimeters (9 in) per sec
Search/Rewind
speed . . . . . 76 centimeters (30 in) per sec

INTERFACE
Type . . . . HP-IL (Hewlett-Packard Interface Loop)
Default address on
power up . . . undefined
Default address after
auto address
unconfigured . . 2

OPERATING REQUIREMENTS
Operating
temperature .. 10° to 40°C (50° to 104°F)
Charging
temperature .. 15° to 40°C (59° to 104°F)
Storage temperature
without tape . . . −40° to 75°C (−40° to 167°F)

DIGITAL CASSETTE
Type . . . . Hewlett-Packard Mini-Data Cassette (HP 82176A)
Tape length . . . 24 m (80 ft)
Temperature
limits . . . . . . 10° to 45°C (50° to 113°F)
Humidity (tape storage)
limits . . . . . . 20% to 80% relative humidity

SPECIAL MODES
Standby

HP 9114B
Portable Disc Drive

Collect data with your HP-41 and store it with the HP 9114B Disc Drive. The drive is small enough to fit into a briefcase, yet each disc holds about as much information as you can pack into 175 pages of single-spaced, typed text.

This compact, portable drive provides 128K bytes* of information storage. It reads and writes double-sided, double-density format on 3½" flexible discs, and rotates at 600 RPM. The HP 9114B weighs about 6 pounds.

The HP 9114B can be used with the HP-41, HP-71, and other Hewlett-Packard computers too, making it an integral part of a powerful information collection and manipulation system.

HP 9114B: $795.00

Key Features

- Battery powered.
- Reads double-sided, double-density format on 3½" flexible discs.
- Hard discs.
- Discs have a hard center.
- Auto shutter contamination shield over read/write window.
- Media Monitor
- Weighs only 6 lbs.

What They Do for You

Take it anywhere.

Keeps more information in a smaller amount of space.

Prevent contamination from fingerprints, dust, and damage from handling.

Provides precise head placement.

Protects the disc from damage.

Tracks the amount of life left in flexible discs and tells you, with a flashing light, when to replace them.

Take it with you.

Physical Specifications

DIMENSIONS .. 7.8 cm (3.1 in) x 28.7 cm (11.5 in) x 20.0 cm (8.0 in)

WEIGHT . . . . . 2.68 kg (5.9 lbs)

POWER REQUIREMENTS
Batteries . . . . . 6 volt lead-acid dry cell (HP 88014A)
Recharging
time . . . . . . 5 hours (80% capacity) 16 hours (100% capacity)
Battery life . . . . 1.8 hours with recharger plugged in (100% duty cycle) 1 hour without recharger plugged in (100% duty cycle) No limit with recharger plugged in (5% duty cycle)
Source . . . . . 90-120 Vac
Line frequency
range . . . . . . 48-66 Hz
Power consumption
(max.) 6W

OPERATING REQUIREMENTS
Operating
temperature .. 10° to 40°C (50° to 104°F)
Storage
temperature .. −40° to 60°C (−40° to 140°F)

HUMIDITY
Operating . . . . 8% to 80% non-condensing (20°C maximum wet bulb temperature)
Storage . . . . . . 5% to 95% non-condensing
Operating
altitude . . . . 0 to 4572 m (0 to 15000 ft)
Storage
altitude . . . . −304 to 15240 m (−1000 to 50000 ft)

DATA FORMAT
Formatted
capacity . . . . 128K bytes per unit*
Sectors per
track 16
Tracks . . . . 80 (3 spared) per surface
Recording
surfaces . . . . 2 per disc
Tracks . . . . 135 per inch
Transfer rate . . 5.5K bytes per second (max. sustained)
Average access
time . . . . . . 225 msec (on) 825 msec (off)
Rotation speed...600 RPM
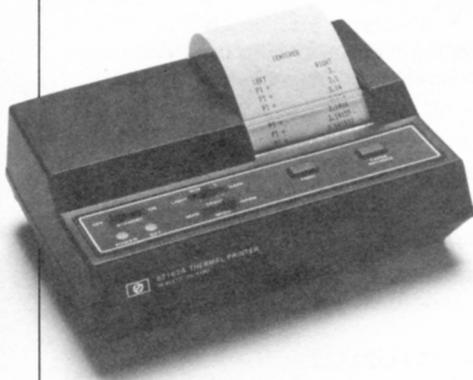Recording
format . . . . . Double density

INTERFACE
Type . . . . HP-IL (Hewlett-Packard Interface Loop)

*HP-41 use requires user-contributed program 09114-41 for full 630K byte capacity.

HP 82162A
Thermal Printer/Plotter

The HP 82162A provides fast printouts with 24-character lines. It's battery-powered, so you can produce hard copy in the field.

This HP-IL compatible printer/plotter automatically centers and justifies text to the left or right. It has numeric upper- and lowercase alpha, double-wide characters, and intensity control for optimum contrast and readability. Additionally, it supports STANDBY mode that lets any HP-IL controller on the loop manage its power consumption.

HP 82162A: $450.00

Key Features

- Battery powered.
- Automatic centering and left or right justification.
- 24 characters per line.
- Both single- and double-wide characters.
- 128-character set.
- STANDBY mode.

What They Do for You

Take it anywhere.

Provides formatting control; saves time.

Makes smaller print possible.

Allows highlighting of output.

Allows more precise communication.

HP-IL controller can turn printer on or off from remote location; conserves battery power.

Physical Specifications

DIMENSIONS .. 17.8 cm (7.0 in) x 13.2 cm (5.2 in) x 6.1 cm (2.4 in)

WEIGHT . . . . . 808 g (1.8 lbs) (includes paper and battery)

CABLE LENGTH . . . 86 cm (34 in)

POWER REQUIREMENTS
Battery . . . . . . four-cell, 4.4 to 6 volt, quick-charge, nickel-cadmium battery pack
Battery current, (worst case) .. 250 mA (idle), 5 A (printing)
Recharging time . . . . . . 14 to 16 hours (printer/plotter ON or OFF)
Operating time...3 to 6 hours

CHARACTER SETS
96 standard ASCII
127 modified-expanded ASCII

SPECIAL MODES
Standby, Parse, HP Bar code, Column, Double wide, Single wide, 8-bit escape

PRINT FORMAT
24 standard characters, 12 double-wide characters, 168 dot-columns per line
Upper- and lowercase letters
Special-character generation
Plotting capabilities
Graphics capabilities
101-character buffer

PRINTING SPEED . . . . . 24 characters/sec

OPERATING REQUIREMENTS
Operating temperature .. 0° to 45°C (32° to 113°F)
Charging temperature .. 15° to 40°C (59° to 104°F)
Storage temperature .. −40° to 55°C (−40° to 131°F)
Humidity . . . . 10% to 90% (non-condensing) at 40°C

THERMAL PAPER
Width . . . . 5.7 cm (2.2 in)
Roll length . . . . 25 m (80 ft)
Colors . . . . blue, black
6 rolls/box

INTERFACE
Type . . . . HP-IL (Hewlett-Packard Interface Loop)
Startup conditions .. normal (inactive or active-listener, selected at power-on)
Default address . . . . undefined (normal startup) or 1 (active-listener startup)

HP 2225B
ThinkJet Printer

The battery-powered ThinkJet prints bidirectionally at 150 characters per second to produce 80-column pages quickly in the office or in the field. With sound registering under 50 decibels, printer noise need never interrupt your train of thought again.

An inexpensive, disposable cartridge holds the print head and ink reservoir, and is capable of printing approximately 500 full pages before replacement. Ink is delivered to the paper on demand, and dries immediately.
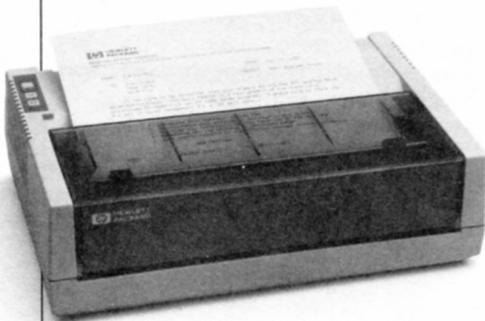
The 11 x 12 dot-matrix format text mode has a logic-seeking feature to find the fastest print route. Add a bold mode that won't slow printing speed to handle most of your letter-quality needs. A ROMAN8 character set provides 216 USASCII printable characters for use in many languages. Print on single sheets or fanfold paper.

HP 2225B: $495.00

Key Features

- Quiet 150 cps printing.

- Battery-powered, compact, and lightweight.

- High quality text and graphics.

- Comprehensive print features:
  — four print pitches
  — underline and bold
  — printable control codes

- Disposable print head.

- Pin or friction feed.

What They Do for You

Quickly, quietly generate memos, graphics, reports, and spreadsheets.

Hard copies on the spot, anywhere.

Easy-to-read text and impressive graphics.

Highlight and vary your output to meet text and graphics needs.

Fast, clean print head replacement.

Uses continuous fanfold paper or cut sheets.

Physical Specifications

DIMENSIONS .. 8.9 cm (3.5 in) x 29.2 cm (11.5 in) x 20.6 cm (8.1 in)

WEIGHT . . . . . 2.5 kg (5.5 lbs)

INTERFACE
Type . . . . HP-IL (Hewlett-Packard Interface Loop)

POWER REQUIREMENTS
Battery . . . . . . 6 cell, 4.4 to 6 volt, quick-charge, nickel-cadmium battery pack (HP 82199A)
Battery current, (worst case) . . . 20 mA (idle), 1.5 A (printing)
Recharging time . . . . . . 14 hours approximately (Battery either in printer or out)
Operating time . . over 200 typical pages

OPERATING REQUIREMENTS
Operating temperature .. 10° to 40°C (50° to 104°F)
Storage temperature .. −20° to 60°C (−4° to 140°F)
Relative humidity . . . 10% to 90%

PRINT FORMAT
Technique . . . . Ink-jet dot matrix
Speed . . . . 150 characters/sec; bidirectional; logic-seeking in text mode
Text mode character cell structure . . . 11 x 12 dot matrix
Graphics mode resolution . . . 96 x 96 or 192 x 96 dots/in

Print Pitch (CPI)		Line Length (characters)
12.0	Normal	80
6.0	Expanded	40
21.3	Compressed	142
	Expanded–	
10.7	Compressed	71
Character Set		ROMAN8

Printhead life . . . . 500 typical pages

PAPER FEED
Pin feed
Friction

PRINT BUFFER
One kilobyte

HP 82164A
HP-IL/RS-232C Interface

The HP 82164A RS-232C Interface translates HP-IL signals into RS-232C signals and vice versa. It is designed to allow the interconnection of HP-IL systems with RS-232C devices. The interface operates in an asynchronous mode providing 5-, 6-, 7-, or 8-bit data formats with one or two stop bits and odd, even, zero, one, and no parity modes. A configuration control block allows the user to change the signals at the connector from a terminal (DTE) configuration to a modem (DCE) configuration so a host computer can be emulated.

HP 82164A: $295.00

HP 82169A
HP-IL/HP-IB Interface

The HP 82169A expands HP-41 control and communication capabilities by linking low-cost HP-IL (Hewlett-Packard Interface Loop) systems with high-performance HP-IB (IEEE 488) computers and lab equipment. It puts a variety of peripherals, instruments, and computers at your disposal, including more than 120 HP-IB-compatible devices made by HP and many more offered by other manufacturers.

With the HP-IB interface, you can operate HP-IB versions of the HP 82906A Printer; operate and control power supplies and instruments such as the HP 1980 Oscilloscope; and talk directly with HP-IB computers such as HP Series 80, 100, 200, even the HP 1000 and 3000.

HP 82169A: $395.00

HP 82165A
HP-IL/GPIO Interface

Use your HP-IL system to control equipment operating with parallel bus structures. The GPIO interface contains the port buffering and a built-in power supply that operates from an HP standard AC adapter which is supplied with the interface. Interface to computers for data collection, to specialized devices in production or lab environments, and to other devices.

HP 82165A: $295.00

Software: Tackle New Areas of Work/Interest with Affordable Software.

A wide variety of user-contributed programs, application pacs and solutions books is available to increase the versatility of your HP-41.

User-Contributed Programs

User-contributed programs are a major source of software solutions for the HP-41. Thousands of programs are available in such diverse applications as real estate, navigation, medicine and mechanical engineering.

Programs come with complete documentation, to give you ready-to-go solutions. You can expect detailed program descriptions, warnings, or limits; sample problems and examples as appropriate; instructions on running the program; and step-by-step listings of program keystrokes. You can purchase programs on pre-recorded magnetic cards, mini data cassettes, 3½" discs or with HP bar code.

More information about user-contributed programs is available from Solve and Integrate Corp., an independent organization dedicated to providing top-quality solutions and customer service.

Solve and Integrate Corp.
460 SW Madison, Suite 5
P.O. Box 118
Corvallis, OR 97339
(503) 754-1207

Application Pacs and Solutions Books

Application pacs come with comprehensive manuals, plug-in modules and, when applicable, keyboard overlays and quick reference card.

Solutions books come with complete documentation, keystroke listings, and printed bar code.

For Science And Engineering:

Application Pacs

HP-41 Advantage $49.00
(00041-15055)
- Comprehensive Advanced Matrix Math
- Real and Complex Matrix Operations
- Simultaneous Equations on Real and Complex Numbers
- Solve (roots of f(x)–0) and Integrate
- Three-dimensional Vector Operations
- Complex Number Operations
- Number Base Conversions and Boolean Logic
- Curve Fitting
- Roots and Evaluation of Polynomial Equations
- Differential Equations
- Coordinate Transformations
- Time Value of Money
- User-accessible Subroutines

Circuit Analysis $40.00
(00041-15006)
- General Network Analysis
- Ladder Network Analysis

Clinical Lab and Nuclear Medicine
(00041-15024) $40.00
- Beer's Law
- Body Surface Area
- Creatinine Clearance
- Blood Acid-Base Status
- Oxygen Saturation and Content
- Red Cell Indices
- Total Blood Volume
- Thyroid Uptake
- Radioactive Decay Correction
- Radioimmunoassay
- Basic Statistics
- Chi-Square Evaluation and Distribution
- t Statistics
- t Distribution

Machine Design $40.00
(00041-15020)
- Circular Cams
- Generation of a Four Bar Linkage
- Progression of Four Bar System
- Progression of Slider Crank
- Gear Forces
- Standard External Involute Spur Gears
- Helical Spring Design
- Force Oscillator with Arbitrary Function
- Coordinate Transformation
- Points on a Circle
- Circle by Three Points
- Unit Conversions

Math/Stat $45.00
(00041-15049)
- Matrix Operations
- Solution to f(x) = 0 on an Interval
- Polynomial Solutions/Evaluation
- Numerical Integration
- Differential Equations
- Fourier Series
- Complex Operations
- Hyperbolics
- Triangle Solutions
- Coordinate Transformations
- Basic Statistics for Two Variables
- Moments, Skewness and Kurtosis
- Analysis of Variance (One Way)
- Analysis of Variance (Two Way)
- Analysis of Covariance (One Way)
- Curve Fitting (Linear, Exponential, Logarithmic and Power Curve)
- Multiple Linear Regression
- Polynomial Regression
- t Statistics
- Chi-Square Evaluation
- Contingency Table
- Spearman's Rank Correlation Coefficient
- Normal and Inverse Normal Distribution
- Chi-Square Distribution

Petroleum Fluids Pac   **$75.00**
(00041-15039)
- Z Factor
- Gas Isothermal Compressibility
- Gas Formation Volume Factor
- Gas Viscosity
- Pseudocritical Temperature and Pressure From Gas Gravity
- Gas Properties From Composition
- Oil Isothermal Compressibility
- Oil Formation Volume Factor
- Oil Viscosity
- Gas-Oil Ratio
- Bubble Point Pressure
- Two-Phase Formation Volume Factor
- Water Isothermal Compressibility
- Water Formation Volume Factor
- Water Viscosity
- Gas-Water Ratio
- Rock Compressibility
- Total Isothermal Compressibility

Includes unit management systems subroutines.

Standard Applications Module   **$40.00**
(00041-15001)
- RPN Primer
- Calendar Functions
- Word Guessing Game
- Arithmetic Teacher
- Hexidecimal-Decimal Converter
- Financial Calculations
- Root Finder
- Curve Fitting
- Vector Operations
- Blackjack

Stress Analysis for Mechanical Engineers   **$40.00**
(00041-15027)
- Section Properties
- Beams
- Simply Supported Continuous Beams
- Columns
- Mohr Circle Analysis
- Strain Gage Data Reduction
- Soderberg's Equation for Fatigue
- RPN Vector Calculator

Structural Analysis for Civil Engineers   **$45.00**
(00041-15021)
- Section Properties
- Beams
- Simply Supported Continuous Beams
- Settling of Continuous Beams
- Continuous Frame Analysis
- Steel Column Formula
- RPN Vector Calculator
- Reinforced Concrete Beams
- Reinforced Concrete Columns
- Effective Moment of Inertia for Concrete Sections

Surveying   **$40.00**
(00041-15005)
- Traverse, Inverse and Sideshots
- Compass Rule Adjustment
- Transit Rule Adjustment
- Intersections
- Curve Solutions
- Horizontal Curve Layout
- Vertical Curves and Grades
- Resection
- Predetermined Area
- Volume by Average End Area
- Volume of a Borrow Pit
- Coordinate Transformation

Thermal and Transport Science   **$40.00**
(00041-15019)
- Equations of State
- Polytropic Processes for Ideal Gas
- Isentropic Flow for Ideal Gases
- Conduit Flow
- Energy Equation for Steady Flow
- Heat Exchangers
- Black Body Thermal Radiation

Includes unit management system subroutines.

Solutions Books   **$15.00**
- Antennas (00041-90093)
- Chemical Engineering (00041-90100)
- Chemistry (00041-90102)
- Civil Engineering (00041-90089)
- Control Systems (00041-90092)
- Electrical Engineering (00041-90088)
- Fluid Dynamics & Hydraulics (00041-90139)
- Geometry (00041-90084)
- Heating, Ventilating & Air Conditioning (00041-90140)
- High-Level Math (00041-90083)
- Mechanical Engineering 00041-90090)
- Optometry I (General) (00041-90143)
- Optometry II (Contact Lens) (00041-90144)
- Physics (00041-90136)
- Solar Engineering (00041-90138)
- Structural Design (cassette based) (00041-90441) $35.00
- Surveying (00041-90141)
- Test Statistics (00041-90082)
- Time Module Solutions I (00041-90395)

Application Pacs and Solutions Books (continued)

For Business:

Application Pacs

Financial Decisions $40.00
(00041-15004)
- Compound Interest Solutions
- Internal Rate of Return
- Modified Internal Rate of Return (FMRR)
- Net Present Value
- Loan Amortization Schedules
- Depreciation Schedules
- Bond Price and Yield
- Days Between Dates

Home Management $40.00
(00041-15023)
- Home Budgeting
- Travel Expense Record
- Stock Portfolio Evaluation
- Checking Account Reconciliation
- Your Financial Calculator
- Accumulated Interest and Remaining Balance
- Home Owner's Equity Analysis
- The Rent or Buy Decision
- Tax Free Individual Retirement Account (IRA) or Keogh Planning
- The True Cost of an Insurance Policy

Real Estate $45.00
(00041-15016)
- Compund Interest and Loan Amortization
- Internal Rate of Return
- Modified Internal Rate of Return
- Net Present Value
- Depreciation Schedules
- Income Property Analysis
- Graduated Payment Mortgage
- Wrap-Around Mortgage
- Home Owner's Equity Analysis

- The Rent or Buy Decision
- Price and Yield of a Mortgage Traded at a Discount/Premium
- APR of a Loan With Fees
- Present Value of an Increasing/ Decreasing Annuity

Securities $40.00
(00041-15026)
- Bond/Note Price and Yield
- Routines for Option Writers Using the Black-Scholes Evaluation Method
- Warranty and Option Hedging
- Yield on Call Option Sales
- Butterfly Options
- Bull Spread Option Strategy
- Convertible Bond Investment Analysis
- Stock Portfolio Valuation
- Bond Speculation Using Margin
- Convertible Security Analysis

Standard Applications Module (00041-15001)
(See Scientific and Engineering Applications)

Solutions Books $15.00

- Business Statistics/Marketing Sales (00041-90094)
- Calendars (00041-90145)
- Home Construction Estimating (00041-90096)
- Lending, Savings & Leasing (00041-90086)
- Real Estate (00041-90136)
- Small Business (00041-90137)

For Entertainment:

Application Pacs

Games $40.00
(00041-15022)
- Submarine Hunt
- Space War
- Super Bagels
- Hangman
- Pinball
- Craps
- Biorhythms
- Random Number Generator

Solutions Books $15.00

- Games I (00041-90099)
- Games II (00041-90443)

Key
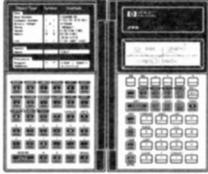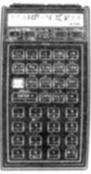
(1) Card reader HP 82104A
    Infrared Printer HP 82240A with adapter module HP 82442A
    HP-IL peripherals with HP-IL adapter module HP 82160A
Mem Unlimited within available memory.
*   Thousands of user-contributed programs.
M   Plug-in application module.
†   Includes scientific, business, operational, customizing.

	HP-28S	HP-41CX	HP-41CV
PHYSICAL FEATURES			
Display type	Dot-matrix LCD	Segment LCD	Segment LCD
Display size	4 lines x 23 chrs	1 line x 12 chrs	1 line x 12 chrs
Keyboard	Numbers & letters	Numbers & letters	Numbers & letters
OPERATING FEATURES			
Built-in functions†	Over 1500	200 + M	128 + M
Operating logic	RPN & algebraic	RPN	RPN
CONFIGURATION			
Peripherals	Infrared printer	(1)	(1)
Plug-in modules		ROMs, RAMs, I/O	ROMs, RAMs, I/O
Built-in user memory (bytes/regs)	32K bytes	3133/443	2237/319
Max. user memory (incl. add-on RAM)	32K bytes	6433/919	6433/919
Clock, alarms, appointments	Clock software	X	M
Text file editor	X	X	
Software support	6 HP Solutions books	27 books/20 ROMs*	27 books/20 ROMs*
Redefinable keys	6 Mem	34 user keys	34 user keys
MATH FEATURES			
+ − */ √ 1/x chs 1nx eˣ			
yˣ log x 10ˣ x² % π n!	X	X	X
Graphics	Display, printer	Printer	Printer
Symbolic algebra	X		
Calculus:			
numeric integration	X	M	M
symbolic polynomial integration	X		
symbolic derivatives	X		
SCIENTIFIC FEATURES			
Base conversions, arithmetic	X	M	M
Bit manipulations, Boolean operators	X	M	M
Complex-number functions	X	M	M
Solve function (root finder)	HP Solve	M	M
Hyperbolics/inverses	X	M	M
Matrix/vector operations	X	M	M
Trigonometric functions	X	X	X
Unit conversions	X	M	M
FINANCIAL FEATURES			
Time value of money (PV FV n %i PMT)		M	M
STATISTICAL FEATURES	Multivariate statistics	Cumulative	Cumulative
Statistical plots (scatter-grams)	X		
Σx, Σx², Σy, Σy², Σxy		X	X
Create, edit, save, name, sort, list	X		
Standard deviation, mean value	X	X	X
Linear regression/correlation coefficient	X	M	M
Curve fit (LIN LOG EXP POW)		M	M
Weighted mean, grouped standard deviation		M	M
Probability analysis	X	M	M
Combinations/permutations	X	M	M
CUSTOMIZING METHOD	HP Solve/keystroke	Keystroke/M	Keystroke/M
Number of steps/formulas	Mem	Mem	Mem
Create, name, edit custom applications	X	X	X
Solve for any variable without programming	X		
Alpha string manipulation	X	X	X
Conditional tests/flags	22/64	20/56	14/56
Indexed looping	X	X	X
Program labels/levels of subroutines	Mem/Mem	Mem/6	Mem/6

hp HEWLETT
PACKARD

For additional information or a
demonstration of Hewlett-Packard
professional calculators, visit your
nearest HP dealer. For the location and
number of the dealer in the U.S.A.
nearest you, call toll-free 800-752-0900.
In Canada, call toll-free 800-387-3867.

To order items your dealer does not
carry, call toll-free 800-538-8787.

Canada:
Hewlett-Packard (Canada) Ltd.
6877 Goreway Drive
Mississauga, Ontario
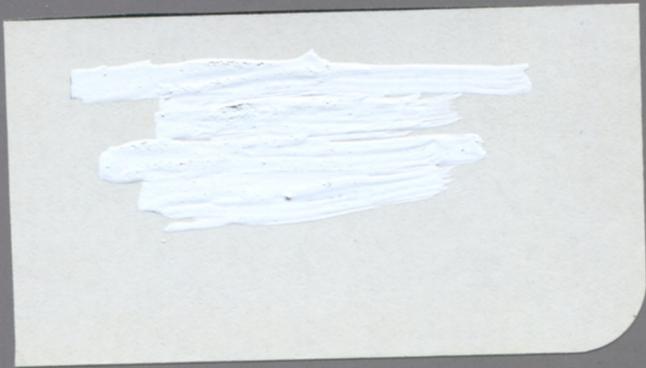L4V 1M8

Europe, North Africa, Middle East:
Hewlett-Packard S.A.
150, Route du Nant-d' Avril
P.O. Box CH-1217
Meyrin 2, Geneva,
Switzerland

Other countries:
Hewlett-Packard Intercontinental
3495 Deer Creek Road
Palo Alto, California 94304
U.S.A.

Hewlett-Packard Corporate Offices:
3000 Hanover Street
Palo Alto, California 94304
U.S.A