

HP-85A Desktop Computer Specifications

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Hewlett-Packard's personal computer for industry, the HP-85A, is a low priced addition to HP's family of BASIC-language desktop computers. It is designed to be used as a computation device or as a system controller in industrial and scientific applications. The total integration into a small package of a keyboard, CRT display, printer and tape cartridge, makes complex problem solving easy.

The easy-to-use BASIC language is fully compatible with and is a superset of ANSI BASIC, with many useful extra features. In addition to a typewriter-like keyset, the keyboard has a numeric keypad, system control and editing keys and eight "soft" keys. Interaction during execution of the program is simplified by the eight "soft" keys, which may be defined by the user to select optional courses for program execution. The prompts for the user-definable keys may be displayed in a special area of the CRT.

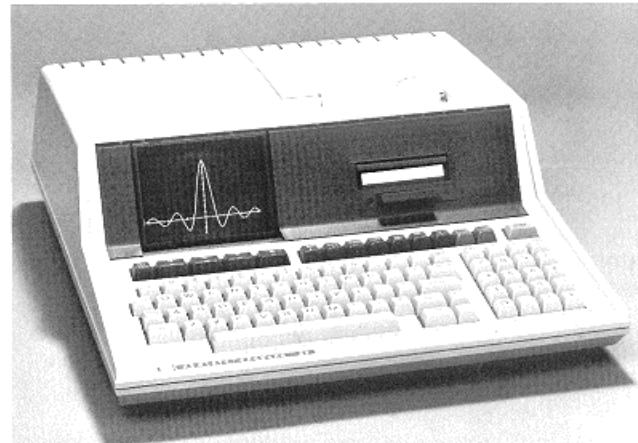
When not running programs, the HP-85 can be used in its calculator mode by simply keying in the statements desired and executing them. Because a line is checked for syntax when it is stored, typing errors are caught easily. Editing keys allow quick and easy editing of program lines to speed up program development. A built-in debugging facility simplifies the process of locating errors during program execution.

Graphics has become a major aid in the analysis and presentation of problems and solutions. Full graphics capability is implemented on the HP-85's 127 mm (5 in.) CRT, including user-defined characters, patterns and logos. It is possible to copy the CRT image onto the built-in printer in both the graphic and alphanumeric modes either from the program or the keyboard.

A standard system clock maintains both the date and time of day, and three timers can be set to interrupt program execution and alter the course of program flow.

Four slots on the back of the HP-85 accept a variety of plug-in modules. These include a 16K read/write memory addition and various interface cards. One module has slots for up to six Read-Only Memories (ROMs). ROMs that will soon be available include an I/O and a Printer/Plotter ROM.

A variety of applications software is available on pre-recorded tape cartridges for statistical, engineering and management problem solving.



Features

- Totally integrated system
- Small size
- Superset of ANSI BASIC
- Memory expandable to 32K bytes *RAM*
- Full graphics capability
- Typewriter-like, alphanumeric keyboard plus numeric keypad
- Editing keys and built-in debugging facilities
- 127 mm (5 in.) CRT for graphic or alphanumeric displays
- 32-character, bidirectional, scanning-head, thermal printer
- 210K-byte, high-performance tape drive with secure capability
- System clock and three timers
- Four slots for memory expansion and interfacing
- Eight soft keys for enhanced user control of program execution
- Variety of software pacs
- Peripherals for output and storage
- Full self-test capability

*Data subject to change.

General Information

Read/Write Memory

Standard	16K bytes
Expansion memory module	16K bytes

Dynamic Range

Real Precision: -9.9999999999E499 to -1E-499, 0 and 1E-499 to 9.9999999999E499
Short Precision: -9.9999E99 to -1E-99, 0, 1E-99 to 9.9999E99
Integer Precision: -99999 to 99999

Built-in Functions

ROM

Mathematical and trigonometric functions are included in the following table with average execution times in milliseconds.

Absolute (ABS)	0.83
Fractional part (FP)	1.01
Integer part (IP)	2.56
Maximum (MAX)	6.42
Minimum (MIN)	6.19
Modulus (MOD)	2.21
ln (LOG)	32.11
log (LGT)	26.63
e ^x (EXP)	24.54
Raise to power (Y [↑] X)	43.92
Random number (RND)	3.54
Sign (SGN)	0.90
Square root (SQR)	8.74
Sine (SIN)	45.62
Cosine (COS)	45.69
Tangent (TAN)	27.27
Arcsine (ASN)	43.23
Arccosine (ACS)	43.98
Arctangent (ATN)	22.76
Cosecant (CSC)	51.68
Secant (SEC)	51.72
Cotangent (COT)	27.29
+	1.08
-	1.12
÷	5.92
*	2.85
Ceiling (CEIL)	2.91
Floor (FLOOR)	3.33

Built-in Operators

Logic: AND, OR, NOT, EXOR
Relational: =, <, >, <=, >=, < > (or #)

Printer

Imprinting method	moving head, thermal
Paper width	108 mm (4.3 in.)
Speed	120 lines per minute
Character font	5x7 dot matrix; 32 char./line
Graphics resolution	2.63 dots/mm (67 dots/inch)
Intensity	adjustable

Tape Cartridge

Capacity: data	210K bytes
programs	195K bytes
File management	by name, up to 42 files
Read/write speed	254 mm/s (10 in./s)
Search speed	7800 bytes/s (1524 mm/s or 60 in./s)
Transfer rate	650 bytes/s
Average access time	9.3 seconds
Rewind time	29 seconds (end to end)
Tape length	43 m (140 ft.)
Cartridge size	61.2 x 80.9 x 11.9 mm (2.41 x 3.18 x 0.47 in.)
Security	programmable and mechanical

NOTE: Tape cartridges are intended for nominal program or data storage; the typical life cycle is 50-100 hours of use, depending on the application. Environmental conditions of 25°C (77°F) and 20 to 50% relative humidity are most favorable for a long tape life. Tape life is decreased by a high duty cycle (percent of time the tape is accessed during the total time the HP-85 is in use) and continuous use for long periods of time (longer than one-half hour). It is suggested that tape transports be regularly cleaned and cartridges removed from drives after use.

CRT Display

Size	127 mm (5 in.) diagonal
Capacity: Alphanumeric	16 lines x 32 characters
Graphics	192 x 256 dots
Scrolling capacity	64 lines
Character set	256 characters; set of 128 + same set underscored
Character font	5 x 7 dot matrix
Intensity	adjustable to 32 ft-lamberts
Cursor	underline

Environmental Range

Operating temperature	5° to 40° C (40° to 105° F)
Storage temperatures	-40° to 65°C (-40° to 149°F)
Ambient humidity	5% to 80% at 40° C

Size and Weight

Height	15.9 cm (6.3 in.)
Width	41.9 cm (16.5 in.)
Depth	45.2 cm (17.8 in.)
Cube	0.16 m ³ (5.8 cu ft)
Weight: Net	9.06 kg (20 lb)
Shipping	16.8 kg (37 lb)

Power Requirements

Source	115 Vac nominal (90-127 Vac)
	230 Vac nominal (200-254 Vac)
Line frequency	50-60 Hz
Consumption	25 watts nominal

Clock and Timers

Time is maintained as seconds since midnight, along with year and day in year. Three timers can be programmed to generate individual interrupts periodically, at intervals from .5 ms to 99 999 999 ms (1.16 days)

Beeper

The beeper is programmable with parameters for duration and tone. The frequency range is approximately 0 to 4575 Hz.

Ordering Information

Read/Write Memory *RAM*

Item	HP Part Number
HP-85A with 16K bytes	Standard
16K memory module	82903A

Accessories Supplied

HP-85 Owners Manual and Programming Guide	00085-90002
HP-85 Pocket Guide	00085-90040
HP-85 BASIC Reference card	00085-90039
Standard Pac manual & cartridge	
Blank tape cartridge	
Registration card	
Accessory data sheet	
User's Library form	
Roll of thermal paper	
Power cord	
Fuses and fuse cap holders	
1.0 amp (for 115 Vac nominal) and U.S. fuse cap holder	
0.5 amp (for 230 Vac nominal) and European fuse cap holder	
Three ring manual binder and dividers	

Accessories Available

Five blank cartridges	98200A
Thermal paper (2 rolls)	82931A
Tape cartridge binder	82932A
Carrying case	82933A
Three-ring manual binder	82935A
ROM drawer	82936A

Purchase Plan

Contact one of the Hewlett-Packard worldwide sales and service offices for specific prices and plans in your area.

Maintenance Agreements

Maintenance agreements are available for all HP desktop computer products. These agreements represent HP's best level of support. Major advantages include:

- fixed annual cost,
- priority service response,
- on-site service,
- regular maintenance,
- individualized contracts.

Appendix

ROM

HP-85A BASIC Functions and Statements

System Functions

ABS	— returns absolute value of the numeric expression.
ACS	— returns the principal value (1st or 2nd quadrant) of the arccosine of the numeric expression in the current angular units.
ASN	— returns the principal value (1st or 4th quadrant) of the arcsine of the numeric expression in the current angular units.
ATN	— returns the principal value (1st or 4th quadrant) of the arctangent of the numeric expression in the current angular units.
ATN2	— returns the arctangent of Y/X in proper quadrant.
CEIL	— returns the smallest integer greater than or equal to the numeric expression.
COS	— returns the cosine of the angle represented by the numeric expression.
COT	— returns the cotangent of the angle represented by the numeric expression.
CSC	— returns the cosecant of the angle represented by the numeric expression.
DATE	— returns the Julian date in the format YYDDD, assuming system timer was set.
DTR	— converts the value of the numeric expression from degrees to radians.
EPS	— returns a constant equal to the smallest positive real precision number, 1E-4999.
ERRL	— returns the line number in which the last error occurred.
ERRN	— returns the error number of the last error.
EXP	— returns the value of Napierian e raised to the power of the computed expression.
FLOOR	— returns the largest integer less than or equal to the evaluated expression.
FP	— returns the fractional part of the evaluated expression.
INF	— a constant equal to the largest real number possible, 9.99999999999E499.
INT	— returns the largest integer less than or equal to the evaluated expression (equivalent to FLOOR).
IP	— returns the integer part of the numeric expression.
LGT	— returns the common logarithm (base 10) of a positive numeric expression.
LOG	— returns the natural logarithm (base e) of a positive numeric expression.
MAX	— returns the larger of two values.
MIN	— returns the smaller of two values.
PI	— returns the value of pi (#).
RMD	— returns the remainder resulting from a division operation according to $X - (Y * IP(X/Y))$.
RND	— generates a number that is greater than or equal to zero and less than one, using a predetermined, pseudo-random sequence.
RTD	— converts the value of the numeric expression from radians to degrees.

SEC — returns the secant of the angle represented by the numeric expression.
SGN — returns a 1 if the expression is positive, -1 if negative and 0 if exactly 0.
SIN — returns the sine of the angle represented by the numeric expression.
SQR — returns the square root of a positive numeric expression.
TAN — returns the tangent of the angle represented by the numeric expression.
TIME — returns the time in seconds since midnight if the timer is set, or since machine turn-on otherwise, resetting automatically after 24 hours.

String Functions

CHR\$ — converts a numeric value between 0 and 255 into a character corresponding to that value.
LEN — returns the number of characters in a string.
NUM — returns the decimal value corresponding to the first character of the string expression.
POS — returns the position of the first character of a substring within another string or 0 if the substring is not found.
UPC\$ — converts all lowercase letters in a string to uppercase letters.
VAL — returns as a numeric value, including exponent, a string of digits so that the value may be used in calculations.
VAL\$ — returns the value of a numeric expression as a string of digits.

BASIC Statements

General Statements

BEEP — outputs a tone of specified frequency for a specified duration.
CLEAR — clears the CRT.
COM — dimensions and reserves memory so chained programs can access the same data.
COPY — prints a copy of the CRT on the printer, in both the alphanumeric and graphics modes.
CRT IS — allows the definition of either the printer or the actual CRT as the current "CRT".
DATA — provides constants and text characters for use with READ statements.
DEFAULT ON — makes numeric overflows, underflows and the use of uninitialized variables non-fatal by substituting an appropriate approximate value.
DEFAULT OFF — makes numeric overflows, underflows and the use of uninitialized variables fatal.
DEF FN — defines a single or multiple-line function.
DEG — sets degree mode for evaluation and output of the arguments and results of trigonometric functions.
DIM — declares the size and dimensions of array and string variables.
DISP — outputs the values or text on the current CRT.
DISP USING — displays values and text according to format specified by IMAGE statement or literal IMAGE.
END — terminates program execution (same as STOP).
FLIP — changes the keyboard from BASIC mode to typewriter mode or vice versa.
FN END — terminates a multiple-line function.

FOR/NEXT — defines a program loop and the number of iterations.
GOSUB — transfers program control to a subroutine and allows subsequent return of control.
GOTO — transfers program execution to the specified line.
GRAD — sets grad mode for evaluation and output of the arguments and results of trigonometric functions.
IF...THEN...ELSE — allows statements to be either executed or bypassed depending on the outcome of a logical expression.
IMAGE — specifies the format used with PRINT USING or DISP USING statements.
INPUT — allows entry of values or text from the keyboard during program execution.
INTEGER — declares variables as integers as well as the size and dimensions of integer arrays.
KEY LABEL — displays in the lower portion of the CRT, an eight-character prompt for each Special Function Key defined by an ON KEY statement. Also returns cursor to upper left corner of the CRT.
LET — assigns a value to a variable or array element.
LIST — lists the program on the CRT, filling one screen each time it is executed. Also outputs bytes remaining at the end of a program.
NORMAL — cancels the effect of the PRINT ALL, AUTO or TRACE statements.
ON ERROR — sets up a branch to the specified line or subroutine anytime an error occurs.
OFF ERROR — cancels any ON ERROR statement previously executed.
ON KEY # — sets up a branch to the specified line or subroutine each time the Special Function Key is pressed.
OFF KEY # — cancels the branch set up by an ON KEY # statement.
ON TIMER # — sets up a branch to the specified line or subroutine on a time-dependent interrupt basis.
OFF TIMER # — cancels any interrupts from a timer set up by an ON TIMER # statement.
OPTION BASE — allows specifying the lower bound of an array as 1 rather than the default of 0.
PAUSE — suspends program execution.
PLIST — lists the program on the printer.
PRINT — used to print values or text on the current printer.
PRINT ALL — sets a mode such that all inputs, messages and results are printed on the printer.
PRINT USING — prints values and text according to format specified by an IMAGE statement or literal IMAGE.
PRINTER IS — allows the definition of either the printer or the CRT as the current "Printer".
RAD — sets radian mode for evaluation and output of the arguments and results of trigonometric functions.
RANDOMIZE — re-evaluates the random number seed.
READ — assigns values from a DATA statement to the variables specified.
REAL — declares full-precision variables as well as the size and dimensions of full-precision arrays.
REM — declares the subsequent characters as remarks for documentation only.

RESTORE — resets data pointer to the start of the specified DATA statement, or the first DATA statement if none is specified.

RETURN — transfers program control back to the statement following a GOSUB.

SHORT — declares variables as being short-precision as well as the size and dimensions of short-precision arrays.

STOP — suspends program execution (same as END).

TAB — used in a DISP or PRINT statement to allow information to be placed at a specified character position.

TRACE — traces program logic flow in all or part of a program as specified and prints this information.

TRACE ALL — traces all program logic flow and variable assignments in all or part of a program as specified and prints this information.

TRACE VAR — traces all value changes of specified variables and prints this information.

SETTIME — sets the system clock with the parameters of seconds since midnight and Julian day in form YYDDD.

WAIT — holds program execution for the specified number of milliseconds.

Mass Storage Statements

ASSIGN# — opens a data file by assigning a buffer number to it.

CAT — displays a file directory on the CRT screen.

CHAIN — loads a new program from tape and continues executing while retaining any data in common.

CREATE — establishes a data file of specified length and record length on mass storage devices.

CTAPE — conditions the tape by running it to end, then rewinding it to assure smooth operation of the entire tape.

ERASETAPE — initializes a tape by creating a blank directory.

LOAD — brings into memory a program previously stored on a mass storage device.*

LOAD BIN — brings a binary program into memory.

PRINT # — records data onto the referenced file.

PURGE — erases the specified file from the tape directory, rendering it inaccessible.

READ # — retrieves values from a specified file.

RENAME — changes the name of an existing file.

REWIND — rewinds the tape to its beginning point.

SECURE — disallows unauthorized listing, editing, duplicating or cataloging of a program.

STORE — records a program onto the mass storage device.*

STORE BIN — records a binary program onto the mass storage device.

UNSECURE — allows files previously secured to be listed, edited, duplicated and cataloged.*

Graphics Statements

ALPHA — puts the CRT into its alphanumeric mode.

BPLOT — allows plotting any series of dots on the CRT by conversion to an alphanumeric string.

DRAW — lowers the pen and draws a line from current pen position to a specified destination position.

GCLEAR — clears all or a specified lower section of the graphics display.

IDRAW — lowers the pen and draws a line of specified incremental length from the present position.

IMOVE — lifts the pen and moves the pen an incremental distance from the present position.

LABEL — allows printing of text in the graphics mode.

LDIR — specifies horizontal or vertical direction of a label.

MOVE — lifts the pen and moves the cursor to a specified absolute location.

PEN — sets a positive or negative pen color.

PEN UP — raises the "pen" so that plotting is possible without drawing lines between points.

PLOT — moves to a specific point if pen is up; draws a line to the point if pen is down.

SCALE — defines the incremental units and range of x and y on the CRT.

XAXIS — draws a horizontal line of specified length, with or without tic marks, at a specified y intercept.

YAXIS — draws a vertical line of specified length, with or without tic marks, at a specified x intercept.

Non-Programmable Commands

AUTO — allows automatic generation of line numbers during program entry.

CONT — allows continuation of a program which has been paused.

DELETE — deletes program lines specified.

INIT — initializes a program by allocating memory for the variables required, and performs a check for certain errors.

REN — renames program lines with specified increments.

RUN — initializes a program and begins its execution.

SCRATCH — clears memory of all programs and data.

*Not programmable.



3404 E. Harmony Road, Fort Collins, Colorado 80525

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