HP-41CV
Quick Reference Guide

Contents

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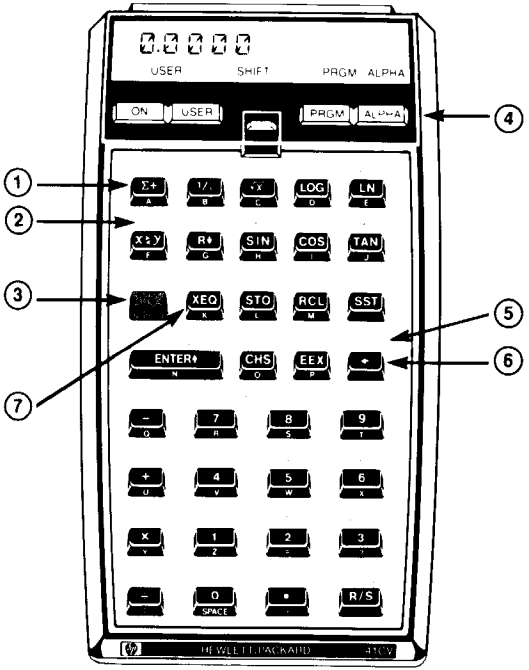
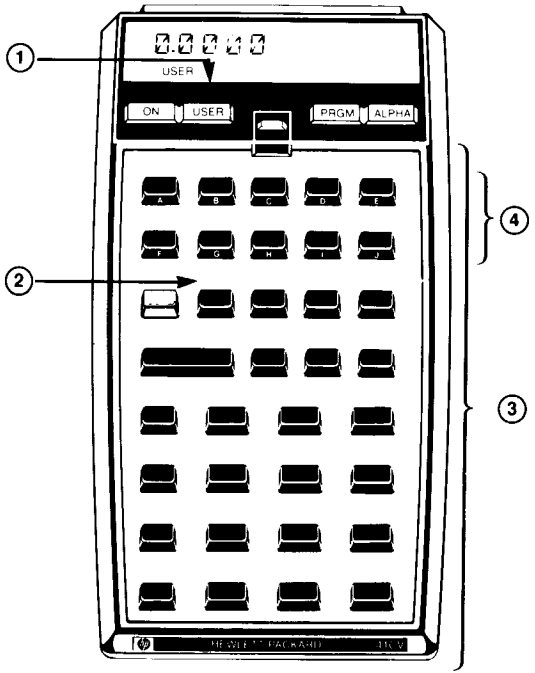
The Normal Keyboard



1. **Primary Function.**
2. **Alternate Function.**
3. **Shift Key.**
   Press first to carry out an alternate function.
4. **Toggle Keys.**
5. **Clear X or Clear Alpha.**
   Clears the entire register.
6. [←] **Back Arrow.**
   Backspaces and erases one character at a time (if entry has not been terminated).
7. [XEQ] **Execute.**
   Used to execute functions and programs not assigned to keys. See page 8 in this guide.

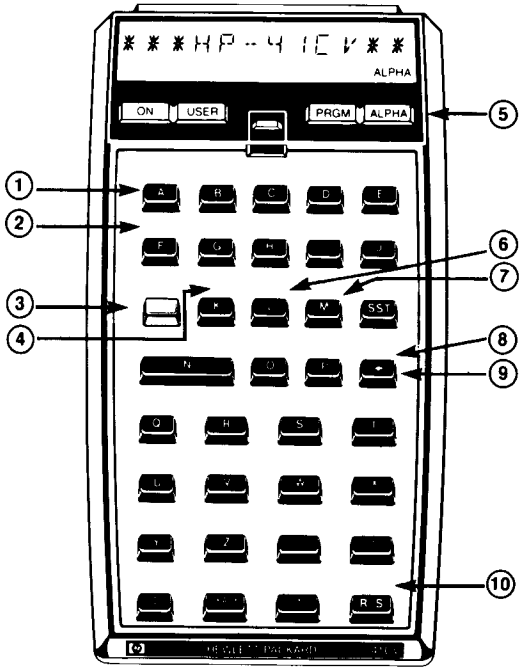
The User Keyboard



1. [USER] **User.**
   Activates and deactivates the User keyboard.
2. **Assigning a Function or Global Label to a Key.**
   1. Press
   2. Press [ALPHA].
   3. Enter the function name or global label.
   4. Press [ALPHA].
   5. Press the key to which you want the function assigned. (To restore a key to its Normal function, skip step 3.)
3. **Executing a User Function.**
   1. Make sure the User keyboard is active.
   2. Press the redefined key.

   Any key *not* redefined retains its Normal function (except in the top two rows).
4. **Local Label Searching.**
   If a key in the top two rows (or shifted top row) is not reassigned, the HP-41CV will perform local label searching if one of those keys is pressed when the User keyboard is active. If a matching local label (A through J or a through e) is found in the current program, execution of the program starts there. If that label is not found in the current program, the Normal function of that key is executed.

The Alpha Keyboard



1. **Primary Function.**
2. **Alternate Function.**
3. **Shift Key.**
   Press first to carry out an alternate function.
4. **Append.**
   Press first to have the following Alpha entry *be appended to* (rather than overwrite) the previous Alpha entry.
5. [ALPHA] **Alpha.**
   Activates and deactivates the Alpha keyboard.
6. **Store From Alpha.**
   Stores the leftmost six characters of the Alpha register into the specified register.
7. **Recall Into Alpha.**
   Recalls the contents of the specified register and appends them to the Alpha register.
8. **Clear Alpha Register.**
9. [←] **Back Arrow.**
   Backspaces and erases one character at a time (if entry has not been terminated).
10. **View Alpha Register.**
    Used primarily as a program instruction to display the Alpha register during a running program.

How to Execute Functions (Alpha Execution)

If a function has its own key (whether on the Normal keyboard or the User keyboard), you can perform its operation by pressing that key—such as for [1/x]—or by pressing the shift key and then that key—such as for (Remember to supply any necessary numbers or labels first.)

If a function does not appear on the keyboard—such as [COPY]—you can perform it using either Alpha execution or a User-defined key on the User keyboard. How to assign functions to User keys is shown on page 5 of this guide. Alpha execution is shown below:

1. Press [XEQ].
2. Press [ALPHA] to activate the Alpha keyboard.
3. Spell out the Alpha name of the desired function, or the global label of the desired program.
4. Press [ALPHA] to deactivate the Alpha keyboard and end the procedure.

If the function needs a parameter, it will cue for it with the _ input cue.

Function Set

This is an alphabetical list of the HP-41CV functions, including brief definitions. For page references to the complete descriptions within the owner's manual, refer to the Function Index in the owner's manual.

Note that usually you supply any needed operands *before* you execute the function (the operator). The exceptions are the *parameter functions*, which cue you for information *after* you execute the function. Parameter functions are shown below with their parameters, such as *nn*.

Function names printed in blue are *Alpha names* and use Alpha execution or User-keyboard execution. Function names printed in black or gold are *keyboard names*, and have keys for execution on the Normal keyboard.

Function	Definition
[←]	*Back arrow.* Deletion.
	Append to Alpha register.
[+] ([+])	*Plus.*
[−] ([−])	*Minus.*
[*] ([×])	*Multiplied by.*
[/] ([÷])	*Divided by.*
[1/X] ([1/x])	*Reciprocal.*
[10↑X] ( )	*Common exponential.*
[ABS]	*Absolute value.*
[ACOS] ( )	*Arc cosine.*
[ADV]	*Advance* printer paper.
[ALPHA]	Alpha keyboard toggle.
[AOFF]	*Alpha keyboard off.*
[AON]	*Alpha keyboard on.*
[ARCL] *nn* (*nn*)	*Alpha recall.* Append reg. *nn* to Alpha reg.
[ASHF]	*Alpha shift* six characters to the left.
[ASIN] ( )	*Arc sine.*
[ASN] *name, key* ( )	*Assign* function or label to User key.
[ASTO] *nn* (*nn*)	*Alpha store.* Copy first six characters from Alpha reg. into reg. *nn*.
[ATAN] ( )	*Arc tangent.*
[AVIEW] ( )	*Alpha view.*

Function	Definition
[BEEP] ( )	*Beeper.*
[BST] ( )	*Back step* through program lines.
[CAT] *n* (*n*)	List *catalog n* (1 to 3).
[CF] *nn* (*nn*)	*Clear flag nn* (00 to 29).
[CHS] ([CHS])	*Change sign.*
[CLA] ( )	*Clear Alpha.*
[CLD]	*Clear display* of message.
[CLP] *label*	*Clear program* specified by global label.
[CLRG]	*Clear all data registers.*
[CLΣ] ( )	*Clear summations.* Clear statistics regs.
[CLST]	*Clear stack.*
[CLX] ( )	*Clear X*-register (the usual display).
[COPY]	Copy ROM program specified by global label.
[COS] ([COS])	*Cosine.*
[D-R]	*Degrees to radians* conversion.
[DEC]	*Decimal.* Octal to decimal conversion.
[DEG]	*Degrees* mode set.
[DEL] *nnn*	*Delete nnn* program lines, incl. current line.
[DSE] *nn*	*Decrement and skip if less than or equal.* Given *iiiii.fffcc* in R_{nn}, decrement *iiiii* by *cc* and skip next line if *iiiii* is now $\leq$ *fff*.
[EEX]	*Enter exponent.*
[END]	End of program.
[ENG] *n* (*n*)	*Engineering* display. Use $n+1$ digits and powers of 10^{3n}.

Function	Definition
[ENTER↑] ([ENTER↑])	Separate sequential numbers.
[E↑X] ( )	*Natural exponential.*
[E↑X-1]	For arguments close to zero.
[FACT]	Factorial.
[FC?] *nn*	*Flag nn clear*? If not, skip next line.
[FC?C] *nn*	*Flag nn clear*? If not, skip next line. *Clear flag nn.*
[FIX] *n* (*n*)	*Fixed-point* display with *n* decimal places.
[FRC]	*Fractional part.*
[FS?] *nn* (*nn*)	*Flag nn set*? If not, skip next line.
[FS?C] *nn*	*Flag nn set*? If not, skip next line. *Clear flag nn.*
[GRAD]	Set Grads mode.
[GTO] *label* (*label*)	*Go to.* Program branch to given label.
[·] *nnn*	*Go to (dot).* Move current line to line *nnn* or *global label.*
[·][·]	*Go to (dot dot).* Move current line to end of program memory and pack memory.
[HMS]	*To hours-minutes-seconds.* Convert from decimal hours.
[HMS+]	*Hours-minutes-seconds plus.* Add degrees or times.
[HMS-]	*Hours-minutes-seconds minus.* Subtract degrees or times.
[HR]	*To decimal hours.* Convert from HMS.
[INT]	*Integer part.*

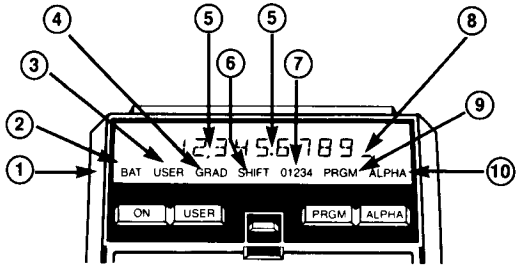
Function	Definition
[ISG] *nn* (*nn*)	*Increment and skip if greater.* Given *iiiii.fffcc* in R_{nn}, increment *iiiii* by *cc* and skip next line if *iiiii* is now > *fff.*
[LASTX] ( )	Recall number from LAST X reg.
[LBL] *label* ([LBL] *label*)	*Label.*
[LN] ([LN])	*Natural log.*
[LN1+X]	For arguments close to 1.
[LOG] ([LOG])	*Common log.*
[MEAN]	Means of accumulated *x*- and *y*-values.
[MOD]	*y* mod *x*.
[OCT]	*Octal.* Decimal to octal conversion.
[OFF]	Turn off computer.
[ON]	*Continuous on.* (Cancels automatic turn-off.)
[ON]	On/off toggle.
[P-R] ( )	*Polar to rectangular* conversion. Enter θ, then *r*. Returns *x* in X-reg., *y* in Y-reg.
[PACK]	Pack program memory.
[%] ( )	*x* percent of *y*.
[%CH]	*Percent change* from *y* to *x*.
[PI] ( )	Value of π to nine decimal places.
[PRGM]	*Program mode* toggle.
[PROMPT]	Display the message in Alpha reg. and stop program (allowing input).
[PSE]	*Pause.* Interrupt program for a second.

Function	Definition
[R↑]	*Roll up* stack.
[R-D]	*Radians to degrees* conversion.
[R-P] ( )	*Rectangular to polar* conversion. Enter *y*, then *x*. Returns *r* in X-reg., θ in Y-reg.
[R/S]	*Run/stop* program.
[RAD]	*Radians* mode.
[RCL] *nn* ([RCL] *nn*)	*Recall* (copy) value from R_{nn}.
[RDN] ([R↓])	*Roll down* stack.
[RND]	*Round.*
[RTN] ( )	*Return* program flow from subroutine to main program.
[SCI] *n* (*n*)	*Scientific* notation with *n* decimal places.
[SDEV]	*Standard deviations* of accumulated *x*- and *y*-values.
[SF] *nn* (*nn*)	*Set flag nn* (00 to 29).
[Σ+] ([Σ+])	*Summation plus.* Add data value(s) to statistical accumulation.
[Σ−] ( )	*Summation minus.* Delete data value(s) from statistical accumulation.
[ΣREG] *nn*	*Statistics registers* set to R*nn* through R*nn*+5.
[SIGN]	1 or −1 for numbers, 0 for non-numbers, +1 for zero.
[SIN] ([SIN])	*Sine.*
[SIZE] *nnn*	Allocates *nnn* regs. to data storage.
[SQRT] ([√x])	*Square root.*
[SST] ([SST])	*Single step* to next program line.

Function	Definition
[ST+] *nn* ([STO] [+] *nn*)	*Store plus.* $R_{nn} + x$; result in R_{nn}.
[ST−] *nn* ([STO] [−] *nn*)	*Store minus.* $R_{nn} - x$; result in R_{nn}.
[ST*] *nn* ([STO] [×] *nn*)	*Store multiply.* $R_{nn} \times x$; result in R_{nn}.
[ST/] *nn* ([STO] [÷] *nn*)	*Store divide.* $R_{nn} \div x$; result in R_{nn}.
[STO] *nn* ([STO] *nn*)	*Store* copy of x in R_{nn}.
[STOP] ([R/S])	Stop a running program.
[TAN] ([TAN])	*Tangent.*
[TONE] *n*	$0 \leq n \leq 9$.
[USER]	User keyboard toggle.
[VIEW] *nn* (*nn*)	Display contents of R_{nn}.
[X↑2] ( )	*Square.*
[X = 0?] ( )	Conditional. If not true, skips next program line.
[X ≠ 0?]	
[X < 0?]	
[X <= 0?]	
[X > 0?]	
[X = Y?] ( )	
[X ≠ Y?]	
[X < Y?]	
[X <= Y?] ( )	
[X > Y?] ( )	
[X <>] *nn*	*X exchange* with R_{nn} contents.
[X <> Y] ([x ⇄ y])	*X exchange Y* contents.

Function	Definition
[XEQ] *name* ([XEQ] *name*)	*Execute* given function or label.
[Y↑X] ( )	y to the x power (enter y, then x).

Display Features



1. **Display Annunciators.**
2. **Low-Power Condition.**
3. **User Keyboard Active.**
4. **Current Angular Mode.**
5. **Digit Separator and Radix Mark: Flag 28 set.**
   28 reverses them.
   29 removes the digit separator.
6. **Shift Set.**
   (To cancel, press again.)
7. **Flag(s) Set**
   (flags 00 through 04).
8. **Input Cue.**
9. **Program Mode**
   or program running.
10. **Alpha Keyboard Active.**

The display message **MEMORY LOST** indicates that Continuous Memory has been cleared and reset.

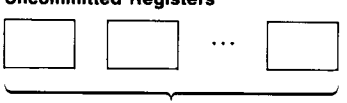
The program execution indicator, ▸, appears and moves each time the program encounters a label.

Organization of Memory

Data Storage Registers

(default allocation)

Uncommitted Registers



program lines
alarms
key assignments

$R_{(273)}$ to $R_{(318)}$

The number of uncommitted registers still available for use is displayed at the end of catalog 1 and after pressing [·][·] in Program mode.

Whenever Continuous Memory is cleared, R_{00} through $R_{(272)}$ are allocated to data storage. This distribution of registers in main memory exists until you change it by executing [SIZE] *nnn* (where *nnn* is the number of registers to be in data storage).

Storing and Executing Programs

To store a program in main memory:

1. Press [PRGM] to activate Program mode.
2. Press [·][·] to pack memory and move to the end of program memory.
3. Key in a global label of up to seven Alpha characters.
4. Key in each subsequent instruction.
5. Optional: press [·][·] to automatically add an [END] instruction and pack program memory.
6. Press [PRGM] to activate Execution mode.

If you make any mistakes, use [←] to delete individual characters and entire lines.

To execute a program in main memory:

1. Make sure Execution mode is active (no **PRGM** annunciator).
2. Start the program by executing its global label—by Alpha execution (page 8) or by User key (page 5 in this guide). Program execution *starts* at that global label.

While the program is actually running, the **PRGM** annunciator is on. The ▸ program execution indicator also appears.

Pressing [R/S] will either start the current program (from its current line) or stop a running program. If a running program stops to prompt for data, for example, you key in the data and then press [R/S] to continue the program.

To run (and re-run) the current program, you can simply press [R/S].

The Catalogs

There are three catalogs (press *n*) in the HP-41CV:

- **Catalog 1: User Programs.** A list of all global labels and END instructions, listed in the order in which they were stored. The permanent END (**.END.**) shows the number of unused registers in uncommitted memory (and therefore still available for programming).
- **Catalog 2: External Functions.** A list of all functions and programs currently available to the computer from peripheral devices, and plug-in modules. The list of functions is grouped by source.
- **Catalog 3: Standard Functions.** An alphabetical list of the standard functions.

When you execute *n*, the catalog listing begins. You can stop and restart it with [R/S]. With the automatic listing stopped, you can step through it forwards with [SST] and backwards with , or exit the catalog with [←].

Most automatic catalog listings slow down when you press an undefined key. If a printer is attached, the catalogs will print out in Trace mode only.

The Flags and Their Status

0 = clear. ? = depends on other conditions.
1 = set. M = maintained by Continuous Memory.

Flag Number	Flag Name	Status at Reset, Turn-On
00–10	**User Flags** **You can test and alter these flags.**	0, M
11–29	**Control Flags** **You can test and alter these flags.**	
11	Automatic Execution	0, 0
12–20	External Device Control	0, 0
21	Printer Enable	?, ?
22	Numeric Data Input	0, 0
23	Alpha Data Input	0, 0
24	Range-Error Ignore	0, 0
25	Error Ignore	0, 0
26	Audio Enable	1, 1
27	User Keyboard	0, M
28	Radix Mark	1, M
29	Digit Separator Mark	1, M
30–55	**System Flags** **You can test but not alter these flags.**	
31	Date Format	0, M
36	Number of Digits	0, M
37	〃	1, M
38	〃	0, M
39	〃	0, M
40	Display Format	1, M
41	〃	0, M
42	Grads Mode	0, M
43	Radians Mode	0, M
44	Continuous On	0, 0
48	Alpha Keyboard	0, 0
49	Low Power	?, ?
50	Message	0, 0
55	Printer Existence	?, ?

List of Errors

Following is a short description of each error message. The function that caused an error does not get executed. You can clear an error message by pressing [←].

Error	Meaning
ALPHA DATA	Nonnumeric data used.
DATA ERROR	Illegal operand.
MEMORY LOST	Continuous Memory has been cleared and reset.
NONEXISTENT	The register, label, or function specified does not exist.
OUT OF RANGE	Number too large.
PRIVATE	Program on card or cassette is private.
RAM	The global label specified already exists in main memory.
ROM	You cannot modify a program in ROM.