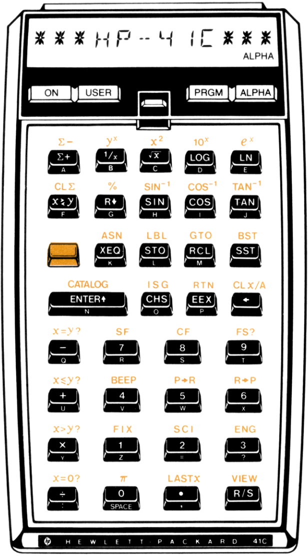
The HP-41C/41CV Quick Reference Guide

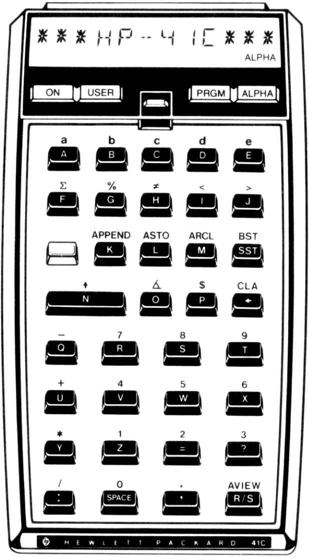
Contents

Note: The HP-41C and HP-41CV differ only in their initial Continuous Memory capacities. The term "HP-41C" is used throughout this guide, unless otherwise specified, to refer to both calculators.

The HP-41C Normal Mode Keyboard



The HP-41C ALPHA Mode Keyboard



ALPHA Operations

The ALPHA register is independent from the automatic memory stack. To place an ALPHA string into the display, place the HP-41C into ALPHA mode (press ALPHA) and press the keys associated with the desired ALPHA characters. Refer to the ALPHA keyboard illustration above, on the back of the calculator, in the Owner's Handbook for a complete ALPHA keyboard.

There are eight functions on the ALPHA mode keyboard: APPEND , ASTO , ARCL , BST , SST , CLA , ← , AVIEW , R/S . Two additional functions, ASHF and

PROMPT, are not on the keyboard. ASTO and ARCL are used to store and recall ALPHA strings into the data storage registers. Press ■ ASTO nn in ALPHA mode to store the left-most six characters in the ALPHA register into the indicated register. Press ■ ARCL nn in ALPHA mode to recall the contents of the indicated register into the ALPHA register. ASHF shifts the contents of the ALPHA register six characters to the left.

CLA clears the contents of the ALPHA register, and AVIEW places the contents of the ALPHA register into the display.

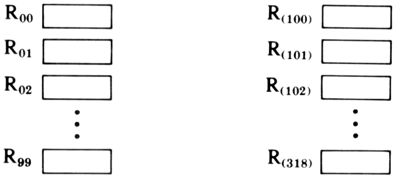
Switching out of and into ALPHA mode terminates ALPHA string entry. If you want to add to a string that is in the ALPHA register and ALPHA string entry has been terminated, press ■ APPEND and continue keying in the desired ALPHA characters.

In a program, PROMPT halts program execution and places the contents of the ALPHA register into the display as a prompt for data, etc.

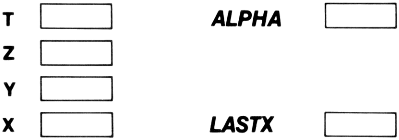
Data Storage Registers and Program Memory

Primary Data Storage Registers (up to 63 on the basic HP-41C; up to 100 on the HP-41CV).

Extended Data Storage Registers (up to 219 total).



The Automatic Memory Stack Registers



Program Memory

Up to 319 registers of program memory (up to 63 on the basic HP-41C).

Memory Extensions

Caution: Turn the HP-41C off prior to removing or inserting plug-in extensions. ***MEMORY LOST*** display indicates that Continuous Memory has been cleared.

The HP-41C can use either one HP 82170A Quad Memory Module *or* up to four HP 82106A Memory Modules. The HP-41CV does not use any memory modules.

Register Allocation

To determine the number of unused registers presently allocated to program memory, simply press ■ [GTO] [•] [•] in PRGM mode. The display will show ***00 REG nn***. The indicated number (nn) is the number of unused registers that remain in program memory.

To determine the total number of registers allocated to data storage registers, recall increasingly higher numbered data storage registers. When the next numbered recall operation results in the ***NONEXISTENT*** display, that numbered register represents the number of registers currently allocated to data storage registers. Example:

Keystrokes	**Display**	
[RCL] 19	*0.0000*	This register exists...
[RCL] 20	***NONEXISTENT***	...but the next numbered register does not. The allocation is 20 registers to data storage registers and the remainder to program memory.

To set the number of registers in data storage and program memory, execute [SIZE] and specify a three-digit register size (000 through 318). This specifies the number of data storage registers. The remainder of registers are allocated to program memory.

Register Specification

Any function that requires a data storage register to be specified can accept a two-number data storage register number (00 through 99). When you supply the register number, pressing [•] followed by X, Y, Z, T, or L (for LAST X) specifies the stack or LAST X registers. Pressing ■ followed by a two-digit number specifies an indirect address. Valid indirect addresses are 00 through 99. The indirectly addressed register can be numbered

000 through 318. Pressing ■ · followed by X, Y, Z, T, or L specifies an indirect address in the stack or LAST X registers.

Function Index

Functions with one name for keyboard execution and a second name for assigning and display execution are shown with both names (e.g., √x on the keyboard and SQRT in the display). The keyboard name is listed first. Refer to the *HP-41C/41CV Owner's Handbook and Programming Guide* for complete descriptions of all HP-41C functions. The * indicates functions printed on the normal mode keyboard.

Absolute value.	ABS
Accumulation correction.	* Σ-
Accumulations.	* Σ+
Addition operator.	* +
Advance paper.	ADV
ALPHA mode *key.*	* ALPHA
ALPHA mode off.	AOFF
ALPHA mode on.	AON
ALPHA recall.	ARCL
ALPHA shift left.	ASHF
ALPHA store.	ASTO
ALPHA view.	AVIEW
Antilogarithm (common).	* 10^x or 10↑X
Antilogarithm (natural).	* e^x or E↑X
Antilogarithm (for small arguments).	E↑X-1
Append display.	APPEND
Arc cosine.	* COS^{-1} or ACOS
Arc sine.	* SIN^{-1} or ASIN
Arc tangent.	* TAN^{-1} or ATAN
Assign.	* ASN
Beeper.	* BEEP
Back step.	* BST
Catalog list.	* CATALOG or CAT
Change sign.	* CHS
Clear all data storage registers.	CLRG
Clear ALPHA register.	* CLA

Clear display.	CLD
Clear program.	CLP
Clear program flag.	* CF
Clear automatic memory stack.	CLST
Clear statistics registers.	* CLΣ
Clear X-register.	* CLX or CLX
Copy (download or copy).	COPY
Correction key.	* ←
Cosine.	* COS
Decimal to octal conversion.	OCT
Decrement and skip if equal.	DSE
Degrees mode.	DEG
Degrees to radians conversion.	D−R
Delete program memory lines.	DEL
Division operator.	* ÷
End of program.	END
Engineering notation display.	* ENG
Enter exponent.	* EEX
Enter number in X into Y.	* ENTER↑
Exchange X- and Y-registers.	* x≷y or X<>Y
Exchange X- and any register.	X<>
Execute.	* XEQ
Exponential.	* y^x or Y↑X
Exponential.	* e^x or E↑X
Factorial.	FACT
Fixed point display.	* FIX
"Flag clear" test.	FC?
"Flag clear" test and clear.	FC?C
"Flag set" test.	* FS?
"Flag set" test and clear.	FS?C
Fractional portion of number.	FRC
Go to.	* GTO
Go to line or ALPHA label.	GTO •
Go to end of program memory.	GTO • •
Grads mode.	GRAD
Hrs. (decimal) to hr., min., s.	HMS
Hr., min., s. addition.	HMS+
Hr., min., s. subtraction.	HMS−
Hr., min., s. to decimal hrs.	HR

Increment and skip if greater.	* ISG
Integer portion of number.	INT
Label .	* LBL
Logarithm (common).	* LOG
Logarithm (natural).	* LN
Logarithm (arguments close to one).	LN1+X
LAST X register recall.	* LASTX or LASTX
Mean	MEAN
Modulo (remainder).	MOD
Multiplication operator.	* ×
Octal to decimal conversion.	DEC
Pack program memory.	PACK
Pause.	PSE
Percent.	* %
Percent of change.	%CH
Pi.	* π or PI
Polar to rectangular conversion.	* P–R
Power off.	OFF
Power on/off *key.*	* ON
Power on (continuous) *function.*	ON
Program mode *key.*	* PRGM
Prompt.	PROMPT
Radians mode.	RAD
Radians to degrees conversion.	R–D
Recall.	* RCL
Reciprocal.	* 1/x or 1/X
Rectangular to polar conversion.	* R–P
Return.	* RTN
Roll down.	* R↓ or RDN
Roll up.	R↑
Round.	RND
Run/stop.	* R/S
Set flag.	* SF
Scientific notation display.	* SCI
Shift key.	* ■
Sign, unary of x.	SIGN
Sine.	* SIN
Size of register configuration.	SIZE

Single step.	* SST
Square.	* x^2 or X↑2
Square root.	* $\sqrt{x}$ or SQRT
Standard deviation.	SDEV
Statistical register specification.	ΣREG
Stop.	STOP (R/S)
Store.	* STO
Storage register addition.	STO + or ST+
Storage register division.	STO ÷ or ST÷
Storage register multiplication.	STO × or ST×
Storage register subtraction.	STO − or ST−
Subtraction operator.	* −
Tangent.	* TAN
Tone of beeper.	TONE
USER mode *key.*	* USER
View register contents.	* VIEW
X = Y conditional test.	* x=y? or X=Y?
X = 0 conditional test.	* x=0? or X=0?
X > Y conditional test.	* x>y? or X>Y?
X > 0 conditional test.	X>0?
X < Y conditional test.	X<Y?
X < 0 conditional test.	X<0?
X ⩽ Y conditional test.	* x≤y? or X<=Y?
X ⩽ 0 conditional test.	X<=0?
X ≠ Y conditional test.	X≠Y?
X ≠ 0 conditional test.	X≠0?

The Catalog

Press ■ CATALOG 1 to review all of the program names that you have stored into program memory.

Press ■ CATALOG 2 to review all of the functions associated with currently plugged-in extensions.

Press ■ CATALOG 3 to review all of the standard HP-41C functions.

You can stop the catalog listing by pressing R/S . You can then use SST and BST to step through the catalogs manually. Press R/S again to restart the listing. Stop the listing and press ← to get out of a catalog listing operation.

As the listing of catalog 1 progresses the HP-41C is automatically set to the location in program memory of the currently displayed program name.

Function Execution and Assignment

To execute a normal mode function, simply press the corresponding key in normal mode. To execute any valid function, press XEQ ALPHA name ALPHA and supply the proper function name (refer to the function index).

Most standard HP-41C functions can be assigned to a key location for execution in USER mode (refer to the Function Index in the back of the owner's handbook). All key locations except ON , USER, PRGM , ALPHA , and ■ will accept function assignments.

All ALPHA program labels that you have written and stored into program memory can be assigned to a key location.

To assign a function or a program to a key location, press ■ ASN ALPHA name ALPHA and supply the function or program name. Then press the key or ■ and the key to which you wish the function or program to be assigned. The key location is identified in the assignment function execution by a row-column keycode (shifted locations are indicated by a minus sign before the keycode).

To return to the normal mode function for any key, press ■ ASN ALPHA ALPHA and that key.

To execute any reassigned function or program, simply place the HP-41C into USER mode (press USER) and press the reassigned key. The name of the function will appear in the display if you hold the key down momentarily. If you hold the key down for more than about a half second, the function is nullified (***NULL***) and is not executed when you release the key.

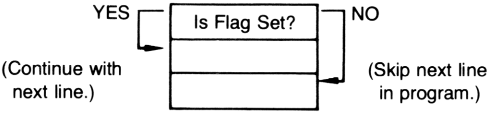
Statistics Operations

There are six statistical registers used for accumulations and by the statistical functions. The location of these six registers is controlled by the [ΣREG] function. When you execute [ΣREG] and supply a two-digit register address, that address specifies the beginning of the six-register statistical register block. Initially the statistical registers are R_{11} through R_{16}. Pressing [Σ+] accumulates and pressing [Σ-] deletes accumulations from the registers:

First Register:	Σx	Fourth Register:	Σy^2
Second Register:	Σx^2	Fifth Register:	Σxy
Third Register:	Σy	Sixth Register:	n

Flags

The HP-41C has 30 user flags and 26 system flags. The user flags can be set, tested and cleared. System flags can be tested only. The keyboard flag functions are [SF] *(set flag),* [CF] *(clear flag),* and [FS?] *("flag set" test).* The non-keyboard flag functions are [FC?] *("flag clear" test),* [FS?C] *("flag set" test and clear),* and [FC?C] *("flag clear" test and clear).* If the answer to a flag "test" is yes, program execution continues with the next line. If no, the next line in the program is skipped before execution continues. Manually from the keyboard, test function answers are displayed as ***YES*** and ***NO***, and no program lines are executed or skipped. Display annunciators **0** through **4** turn on when flags 00 through 04 are set.



User Flags
(00 through 29)

Flag Name	Flag Number
General Purpose User Flags (11)	00 through 10
Special Purpose User Flags (10)	11 through 20
Automatic Execution Flag (Special Purpose Flag 11)	11
Printer Enable Flag	21
Numeric Input Flag	22
ALPHA Input Flag	23
Range Error Ignore Flag	24
Error Ignore Flag	25
Audio Enable Flag	26
USER Mode Flag	27
Decimal Point Flag	28
Digit Grouping Flag	29

System Flags
(30 through 55)

Flag Name	Flag Number
Catalog Flag	30
Peripheral Flags (5)	31 through 35
Number of Digits Flags (4)	36 through 39
Display Format Flags	FIX 40 ENG 41
Grads Mode Flag	42
Radians Mode Flag	43
Continuous On Flag	44
Data Entry Flag	45
Partial Key Sequence Flag	46
Shift Set Flag	47
ALPHA Mode Flag	48
Low Battery Flag	49
Message Flag	50
SST Flag	51
PRGM Mode Flag	52
I/O Flag	53
Pause Flag	54
Printer Existence Flag	55

Programming Information

To begin a new program, press ■ GTO · · . This sets the calculator to the end of program memory and tells you the number of unused registers left in program memory (***00 REG nn***).

To key in a program, place the HP-41C into program mode (press PRGM) and press the keys associated with the desired functions. Functions not on the keyboard are keyed in just as you would execute them from the keyboard (press XEQ ALPHA name ALPHA). In USER mode, reassigned functions are loaded into program memory as you press the associated keys. When you are finished keying in a program, press ■ GTO • • to place an END instruction at the end of the program (also sets the HP-41C to the end of program memory).

Programs must be named with up to seven ALPHA characters. To execute the program, press XEQ ALPHA name ALPHA, supplying the program name. The program is executed when you have keyed in the name and pressed ALPHA. Programs can also be executed by assigning the name to a key (press ■ ASN ALPHA name ALPHA), and then pressing that key in USER mode.

Controlled Looping

ISG *(increment and skip if greater)* and DSE *(decrement and skip if equal)* use a number that is interpreted in a special way to control program loops. The number is stored into any data storage register. The format of the number is: **iiiii.fffcc** where:

iiiii is the current counter value,
fff is the counter test value, and
cc is the increment value.

The **iiiii** portion of the number tells the HP-41C that you wish to count the number of passes through the loop beginning with that number. When the **iiiii** portion exceeds five digits, the decimal portion of the number (**.fffcc**) is truncated on the right for each excess **iiiii** character.

The **fff** portion of the number tells the HP-41C that you wish to stop the counting at that number. The **fff** value must always be specified as a three-digit number (e.g., an **fff** value of 10 would be specified as 010).

The **cc** portion of the number tells the calculator how you wish to count. Current counter value **iiiii** is incremented or decremented by the increment value of **cc**. If you do not specify a **cc** value, the HP-41C assumes you wish to count by one's (**cc**=01). A **cc** value must be specified as two digits (e.g., 01, 03, 55).

Using ISG, when **iiiii** is greater than **fff**, the HP-41C skips the next line in the program. If **iiiii** is not greater than **fff**, no lines are skipped. Using DSE, when **iiiii** is less than or equal to **fff**, the next line in the program is skipped. If **iiiii** is not less than or equal to **fff**, no lines are skipped.

Conditionals

The conditional operations on your HP-41C are useful as program instructions to allow your programs to make decisions. The 10 conditionals available in the HP-41C are shown in the function index on page 9.

Two of these conditionals, x=y? and X≠Y? can be used to compare ALPHA strings as well as numbers. All of the other conditionals compare only numbers. If two strings are "equal" (x=y?), then they are *exactly* equal in length and have identical characters.

Conditionals follow the "do if true" rule. If the conditional test is true, the next program line is executed. If false, the next line is skipped. Executed manually from the keyboard, these conditionals return an answer to the display: ***YES*** if true, and ***NO*** if false. No program lines are executed or skipped.

Indirect Operations

An indirect address is selected by following a function with the shift key, ■, and then a register address. The function then uses the number in the specified register as an *address*. Pressing ■ . and X, Y, T, Z or L (for LAST X) specifies an indirect stack address.

Valid indirect address specifications are 00 through 99 and X, Y, Z, T, L. The indirectly addressed register can be numbered 000 through 318. Here is a complete listing of all HP-41C functions that can be used with indirect addresses (valid parameters are given where applicable):

STO ■ nn	Store.
STO + ■ nn	Store add (keyboard form).
STO − ■ nn	Store subtract (keyboard form).
STO × ■ nn	Store multiply (keyboard form).
STO ÷ ■ nn	Store divide (keyboard form).
ST+ ■ nn	Store add (display form).
ST− ■ nn	Store subtract (display form).
ST× ■ nn	Store multiply (display form).
ST÷ ■ nn	Store divide (display form).
ASTO ■ nn	ALPHA store.
RCL ■ nn	Recall.
ARCL ■ nn	ALPHA recall.
VIEW ■ nn	View register contents.
GTO ■ nn	Go to (00 through 99).
XEQ ■ nn	Execute (00 through 99 or ALPHA name).
FIX ■ nn	FIX display format (0 through 9).
SCI ■ nn	SCI display format (0 through 9).
ENG ■ nn	ENG display format (0 through 9).
DSE ■ nn	Controlled decrement loop.
ISG ■ nn	Controlled increment loop.
TONE ■ nn	Audible tone pitch (0 through 9).
ΣREG ■ nn	Define accumulation registers.
SF ■ nn	Set flag (00 through 29).
CF ■ nn	Clear flag (00 through 29).
FS? ■ nn	"Flag set" test (00 through 55).
FC? ■ nn	"Flag clear" test (00 through 55).
FS?C ■ nn	"Flag set" test and clear (00 through 29).
FC?C ■ nn	"Flag clear" test and clear (00 through 29).
X<> ■ nn	Exchange X and any register.
CATALOG ■ nn	Catalog List (1, 2, or 3).

The COPY Function

Functions in application modules may be executed by following the instructions given in the corresponding application book. However, if you wish to alter the way a program works, use COPY to copy it from an application module into program memory. These programs can be altered and the altered programs executed only while they are in program memory. They cannot be saved in the application module. With the application module in place and the desired program name in mind, execute COPY and spell out the program name (ALPHA name ALPHA).

Here is what happens when you execute COPY :

1. The HP-41C searches for the specified name. If not found the display will show ***NONEXISTENT***.
2. If the unused portion of program memory is large enough to accept the entire application program, it is copied into program memory.
3. If there is not enough room, the HP-41C will pack program memory. You will momentarily see ***PACKING*** and then ***TRY AGAIN*** in the display: reenter the COPY function.
4. If there is enough room after packing, the application program will be copied into program memory. If there is still not enough room, the calculator will again display ***PACKING*** and ***TRY AGAIN***; when this happens you must clear programs from program memory or (in the HP-41C only) insert a memory module.

Attempting to COPY a program from program memory to another location in program memory will result in the ***RAM*** message. Attempting to DEL , CLP , ←, or insert into a program that is currently in an application module will result in the ***ROM*** display.

COPY ALPHA ALPHA copies the application module program that the calculator is currently positioned to into program memory.

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