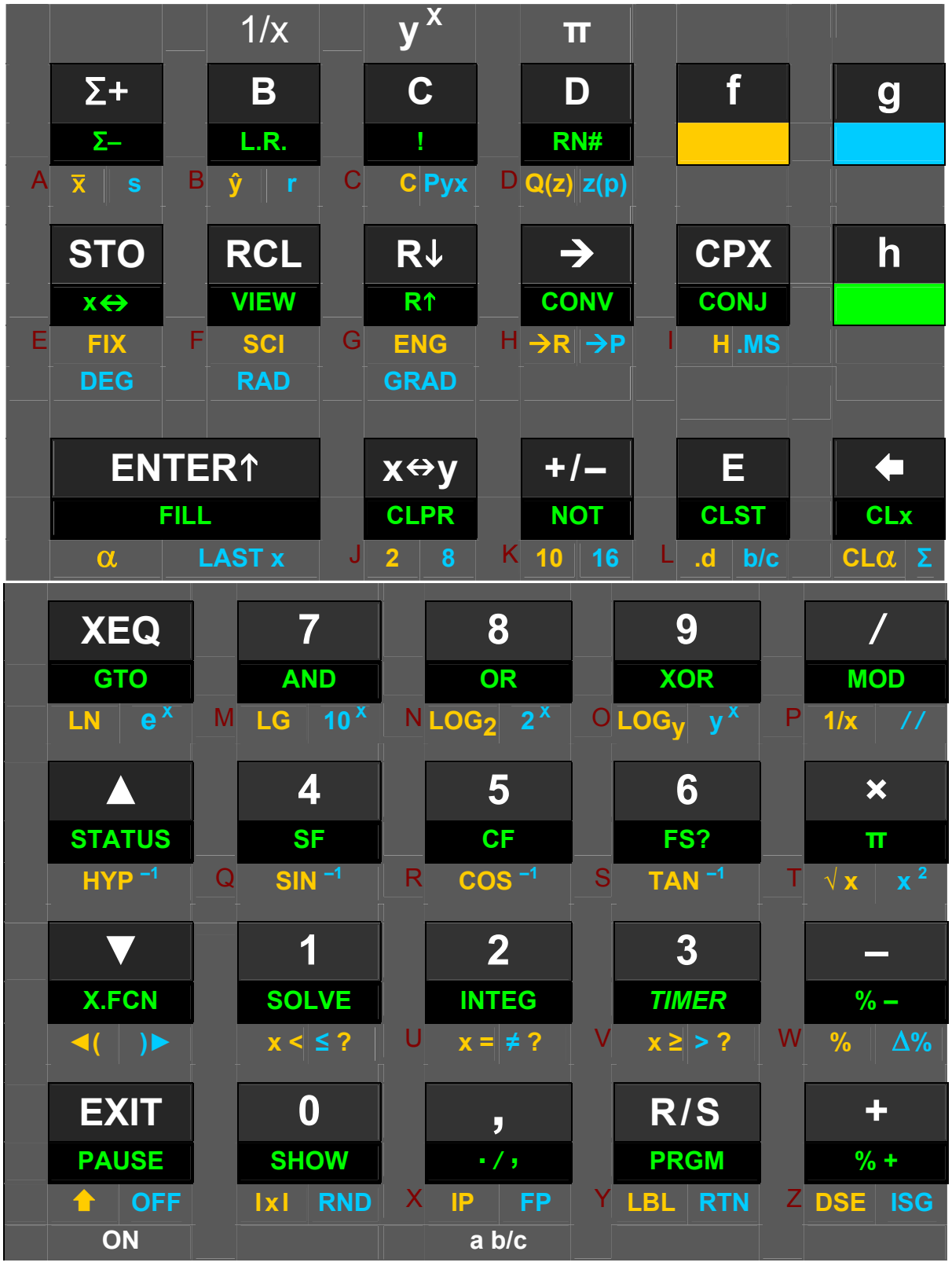
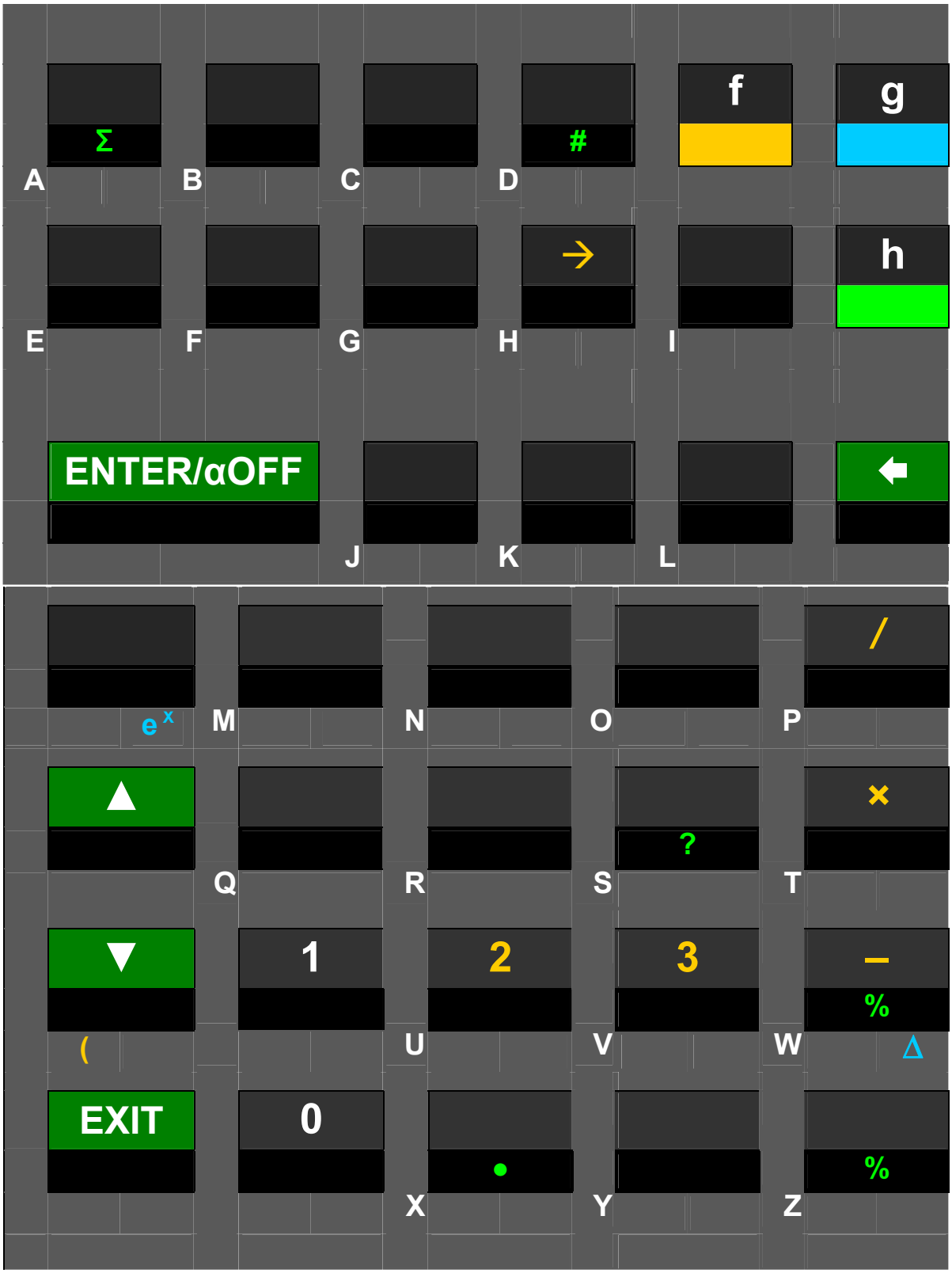


Keyboard layout (TIMER may be dropped for some reasons):

- CPX may be combined with +, -, x, /, ±, x^2, √x, 1/x, //, !, Γ, π, |x|, RND, as well as e.g. (HYP) SIN, COS, TAN, logs and their inverses. See the index for more.
- Modes are H.MS, T, 2, 8 etc., FLOAT, /c, FIX, SCI, ENG, DEG, RAD, GRAD.
- → is combined with H, H.MS, DEG, RAD, GRAD, 2, 8, 10, 16 for conversions.
- The keys B, C, and D immediately call the respective user programs if existent.

Active operations in hexadecimal mode. ➡ is for addressing only (see below). The primary functions of the top left 6 keys are numeric input, so their default primary functions are accessed using f-shift. – In the other integer modes, the active keyboard will look alike, but the keys not needed for numeric input in the respective base will keep their default primary functions (except Σ+).

Active operations in alpha mode. Therein, the 15 bytes alpha register is displayed. All labels not printed on green or red background here will insert the respective character. The primary function of most keys will be inserting the letter printed bottom left of such a key, dark red on the original keyboard. For these keys, f-shift will be necessary to reach the function on key top. PAUSE will insert a space. ⬆ toggles upper and lower case.



Active operations in temporary alpha mode. This mode is called when opening catalogues and during some addressing. The functions printed on green background allow for catalogue browsing, error recovery, and leaving. See regular alpha mode and the addressing tables for more.

MEMORY

Stack

L	**I**

T
Z
Y
X

Display

In complex arithmetic, stack registers **X** and **Y** contain the real and imaginary part of the first complex number, while **Z** and **T** carry the second. Stack register **I** takes the imaginary part of the last argument if a complex function is used. See LASTx.

As long as no complex function is used, **I** may be taken as another general purpose register.

The top 13 general purpose registers (87 through 99) take the statistical sums indicated as soon as [Σ+] is used.

General purpose registers

00
01
02
…
86
87 Σ ln x
88 Σ ln² x
89 Σ ln y
90 Σ ln² y
91 Σ (ln x · ln y)
92 Σ (x ln y)
93 Σ (y ln x)
94 n
95 Σ x
96 Σ x²
97 Σ y
98 Σ y²
99 Σ xy

Flags

00
01
02
…
…
97
98
99

Alpha

Program memory

000
001
002
…
…
497
498
499

ADDRESSING REGISTERS

1	User input	x= ? or any of the other comparisons				RCL, STO, aRCL, aSTO, VIEW, x≷, DSE, ISG, DSZ, ISZ, CF and the other flag commands, FIX, SCI, ENG, BASE, CB and many more bit commands		
	Display	OP _ (e.g. x > _) Temporary alpha mode is on.				OP _ (e.g. RCL _) Alpha mode is off.		
2	User input [1]	0 or 1	Y, Z, T, L, or I	ENTER↑ closes alpha.	→	X, Y, Z, T, L, or I [2]	*Number of register or flag or bit(s) or decimals* [3]	→
	Display	**OP *n*** e.g. x ≤ 0	**OP *x*** e.g. x ≥ y	**OP r _**	**OP → _**	**OP s *x*** e.g. STO sZ	**OP *nn*** e.g. SF 15	**OP → _** (indirect addressing)
3	User input			*Register no.* [3]	Look right for more about indirect addressing.	Store ***x*** on stack level **Z**.	X, Y, Z, T, L, or I	*Register number* [3]
	Display	Compare ***x*** with the number in reg. **23**.		**OP r *nn*** e.g. x ≠ r23		Show the content of the register where **LASTx** is pointing to.	**OP →s *x*** e.g. VIEW →sL	**OP → *nn*** e.g. SCI →03
								Choose scientific display with the number of decimals specified in register **03**.

[1] For **RCL** and **STO**, an arithmetic operator (+, –, ×, /) as well as MAX or MIN may precede step 2. See the index of operations.

[2] For **RCL**, **STO**, **VIEW**, and **x<>** only. For **VIEW** and **x<>**, you may address these registers directly without switching to alpha mode before. For **RCL** and **STO**, only the stack registers **X, Y, L** and **I** may be addressed directly this way.

[3] Register and flag numbers may be 0 0 … 9 9 , number of decimals up to 1 1 , bases up to 1 6 . Integer word size may be 0 1 … 6 4 , thus bit numbers have the same range. For numbers <10, you may key in e.g. 5 ENTER↑ instead of 0 5 where applicable.

ADDRESSING LABELS

1	User input	GTO, XEQ , LBL, SOLVE or INTEG [4]		
	Display	**OP "_** (e.g. GTO _) Alpha mode is on.		
2	User input	*Label* [5] + ENTER↑ Last key closes alpha.	ENTER↑ → closes alpha.	
	Display	**OP "*name*"** e.g. SLV"STF"	**OP → _** (indirect addressing)	
3	User input	Solve the function **STF** (with STF keyed in).	Any stack level, i.e. X , Y , Z , T , L, or I [6]	*Register number*
	Display		**OP →s *x*** e.g. INT →sY	**OP → *nn*** e.g. XEQ →44
			Integrate the function which's label is on stack level **y**.	Execute the routine which's label is in register **44**.

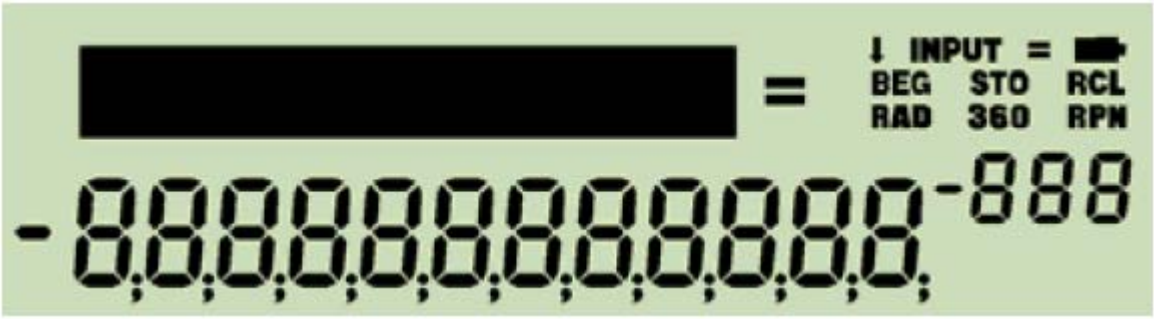
[4] **SOLVE** and **INTEG** will be displayed and listed as SLV and INT, respectively. No indirect addressing with **LBL**.

[5] A label may consist of up to 3 alphanumeric characters. ENTER↑ is only needed if less than 3 characters are entered. The labels B, C, and D correspond to the 3 keys top left on the keyboard.

[6] You may address these registers directly without switching to alpha mode before.

DISPLAY

The display features 3 sections: numeric, dot matrix and fixed symbols. The latter are called annunciators, they are for indicating modes (see next paragraph). The dot matrix is 6 dots high and 43 dots wide, allowing for some 10 characters, depending on their widths. The numeric section features a sign, 12 digits for the mantissa, a sign for the exponent, and 3 digits for the exponent.



The 34S uses the dot matrix for indicating some more modes than the annunciators allow, for showing the alpha register, and for passing additional information to the user.

INDICATORS

There are a number of indicators signaling the mode the calculator is running in.

Indicator	***INPUT*** **a**	**b**	**d**	**h**	**o**	***STO*** **PRG**
Set by operation	αON [7]	BASE 2	BASE 10	BASE 16	BASE 8	PRGON
Cleared by operation	αOFF	BASE ≠2 FLOAT FRACT	BASE ≠10 FLOAT FRACT	BASE ≠16 FLOAT FRACT	BASE ≠8 FLOAT FRACT	PRGOFF

Indicator	***360***	**g**	**H.MS**	***RAD***	**T**	**/c**
Set by operation	DEG	GRAD	H.MS >H.MS TIMER	RAD ACOSH ASINH ATANH	TIMER	BASE 1 FRACT 2nd [,] in input (\HMS)
Cleared by operation	GRAD RAD ACOSH ASINH ATANH	DEG RAD ACOSH ASINH ATANH	BASE FLOAT >H	DEG GRAD	TIMEX	BASE ≠1 FLOAT

INPUT, STO, 360, and RAD are annunciators (see previous paragraph). Outside integer modes, everything else is indicated in the text line. A capital **C** shows the last operation executed was a complex one, so you know you have to look at ***x*** and ***y*** then. The different date modes are signaled by **D.MY** or **M.DY**. Defaults Y.MD and FLOAT are not indicated. RPN may be shown permanently.

Within integer modes, word size and complement setting are shown in the dot matrix. The exponent is used for further indications: its sign and its first digit show the base, a “c” in the second digit signals a carry bit set, an “o” in the third an overflow. Integer bases are indicated as follows:

Base	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Display	b	3	4	5	6	7	o	9	d	-1	-2	-3	-4	-5	h

All inputs are interpreted according to the mode set at input time.

[7] Alpha mode may be temporarily entered and left during addressing – see the tables above for more information. Alpha mode will also be entered opening the catalogues X.FCN, CONST, or CONV to allow for easy finding and selecting the item you are interested in. Keying in a character will jump to the first item starting with it, entering more will jump to the first item starting with this sequence, or anything following in the alphabet if this is not found. [ENTER↑] will select this item. After executing it, mode will return to the state it had before calling the catalogue, except the command chosen did change the mode in execution.

INDEX OF OPERATIONS

This lists all functions available on the 34S with the necessary keystrokes. Functions accessible via X.FCN will show up in the catalogue with their names unless specified differently explicitly. The characters necessary to specify the function in the catalogue are printed bold in this index.

The operations will work like on the HP-42S, special bit and integer functions like on the HP-16C, unless stated otherwise under remarks. Functions available on the 34S for the first time on an RPN calculator are highlighted under remarks, as are functions deviating from known ones carrying the same name. If no parameters are specified though required, they will be taken from the stack. Modes are abbreviated by their indicators. In this column a backslash stands for "all but", so e.g. ABS works in all modes but alpha. General operations with modes printed on red background are not programmable.

Name in listings	Keys to press	Works in modes	Remarks
ABS	f |x|	\a	CPX f |x| calculates $\sqrt{x^2+y^2}$.
ACOS	g COS^{-1}	FLOAT, H.MS	
ACOSH	g HYP^{-1} COS	FLOAT	
ALL	h X.FCN **ALL**	FLOAT	
AND	h AND	Integer	
ASIN	g SIN^{-1}	FLOAT, H.MS	
ASINH	g HYP^{-1} SIN	FLOAT	
ASR	h X.FCN **ASR** *n*	Integer	Works like *n* consecutive ASRs on HP-16C. See opportunities for *n* in the table above.
ATAN	g TAN^{-1}	FLOAT, H.MS	
ATAN2	*n/a*	FLOAT, H.MS	Internal support function.
ATANH	g HYP^{-1} TAN	FLOAT	
BASE	h X.FCN **BASE** *n*	\a	Sets the base for integer calculations, with $2 \le n \le 16$. Popular bases are directly accessible on the keyboard. Furthermore, BASE 0 calls FLOAT, and BASE 1 calls FRACT. See additional opportunities for *n* in the table above.
BASE 2	f 2		
BASE 8	g 8		
BASE 10	f 10		
BASE 16	g 16		
BC?	h X.FCN **BC?** *n*	Integer	Tests the *n*-th bit in ***x***. See opportunities for *n* in the table above.

Name in listings	Keys to press	Works in modes	Remarks
BESTF	h X.FCN **BES**TF	FLOAT	Selects the best curve fit model according to the correlation found like BEST in HP-42S.
BETA	h X.FCN **BET**A	FLOAT	Calculates Euler's Beta function.
BS?	h X.FCN **BS**? *n*	Integer	Works in analogy to "BC?".
B#	h X.FCN **B#**	Integer	Counts bits set like **#B** on HP-16C.
C …	CPX …	FLOAT	Indicates complex operations, acting on ***x*** and ***y***, where **X** contains the real part and **Y** the imaginary of the complex number. This key may be combined with any function which's name is printed in *italics* in this table. The three dots will be replaced in the listing by the name of the function attached.
CB	h X.FCN **CB** *n*	Integer	Clears the *n*-th bit in ***x***. See opportunities for *n* in the table above.
CEIL	h X.FCN **CE**IL	FLOAT	Computes largest integer ≤ ***x***.
CF	h CF *n*	\a	See opportunities for *n* in the table above.
CLALL	h X.FCN **CLA**LL	\PRG	Global clear after confirmation.
CLPR	h CLPR	PRG	Clears current program after confirmation.
		\PRG, \a	Clears active program after confirmation.
CLREG	h X.FCN **CLR**EG	\a	Clears all general purpose registers.
CLSTK	h CLST	\a	
CLx	h CLx	\a	CPX h CLx clears **X** and **Y**.
	←	\a	If no input is pending.
CLα	f CL(α)	All	Clears the alpha register like CLA in HP-42S.
CLΣ	g CLΣ	FLOAT	
COMB	f Cy,x	FLOAT	
CONJ	h CONJ	FLOAT	Changes the sign of ***y***.
CORR	g r	FLOAT	
COS	f COS	FLOAT, H.MS	
COSH	f HYP COS	FLOAT	

Name in listings	Keys to press	Works in modes	Remarks
DATE	h X.FCN **DAT**E	FLOAT	Recalls the date from the real time clock. The function DATE in HP-12C corresponds to DAYS+ (see below).
DAY	h X.FCN **DAY**	FLOAT	Takes ***x*** as a date and returns the day of week in the dot matrix and a corresponding integer in the numeric display (Sunday = 7).
DAYS+	h X.FCN **DAYS+**	FLOAT	Adds a number of days in ***x*** on a date in ***y*** and displays the resulting date including the day of week (Sunday = 7). This function works like DATE in HP-12C.
DBLR	h X.FCN **DBLR**	Integer	Double precision commands like in HP-16C, but now for up to 128 bits.
DBL*	h X.FCN **DBL***		
DBL/	h X.FCN **DBL/**		
DEG	g DEG	FLOAT	
DENMAX	h X.FCN **DE**NMAX	FLOAT	Sets the maximum denominator for fractions like **/c** does in HP-32SII. Default and maximum is 1000000.
DISP	h X.FCN **DI**SP *n*	FLOAT	Changes the number of decimals while keeping the mode (FIX, SCI, ENG). See opportunities for *n* in the table above.
DROP	h X.FCN **DROP**	\a	Changes stack contents from [***x, y, z, t***] to [***y, z, t, t***].
DROPY	h X.FCN **DROPY**	\a	Changes stack contents from [***x, y, z, t***] to [***x, z, t, t***].
DSE	f DSE *reg*	PRG	See opportunities for *reg* in the table above.
DSZ	h X.FCN **DSZ** *reg*		
D.MY	h X.FCN **D.**MY	FLOAT	Sets the format for date calculations.
D→J	h X.FCN **D→J**	FLOAT	Assumes ***x*** is a date and converts it to a Julian day number.
D→R	h X.FCN **D→R**	FLOAT	Assumes **X** containing degrees and converts them to radians. Mode is kept constant.
ENG	f ENG *n*	FLOAT	See opportunities for *n* in the table above.
ENTER↑	ENTER↑	\a	
EXPF	h X.FCN **EX**PF	FLOAT	Selects the exponential curve fit model.

Name in listings	Keys to press	Works in modes	Remarks
E3OFF	h X.FCN **E3OF**F	\a	Toggles the thousands separator (being either a "," or a "." depending on the radix setting).
E3ON	h X.FCN **E3ON**		
e^x	g e^x	FLOAT	
e^x -1	h X.FCN e^x-1	FLOAT	
FB	h X.FCN **FB** *n*	Integer	Inverts ("flips") the *n*-th bit in ***x.*** See opportunities for *n* in the table above.
FCSTx	h X.FCN **FCS**TX	FLOAT	FCSTx (*FCSTy*) predicts a forecast x (*y*) for a given y (*x*) according to the curve fit model chosen. See L.R. for more.
FCSTy	f ŷ		
FC?	h X.FCN **FC?** *n*	\a	See opportunities for *n* in the table above.
FC?C	h X.FCN **FC?C** *n*		
FC?F	h X.FCN **FC?F** *n*		
FC?S	h X.FCN **FC?S** *n*		
FF	h X.FCN **FF** *n*	\a	Flips the flag specified. See opportunities for *n* in the table above.
FIB	h X.FCN **FI**B	\a	Calculates the Fibonacci number.
FILL	h FILL	\a	Copies ***x*** in **Y**, **Z**, and **T**.
FIX	f FIX *n*	FLOAT	See opportunities for *n* in the table above.
FLOAT	f .d	\a	Works like DECM in HP-42S. Additionally, converts H.MS data in **X** to decimal.
	g H	H.MS	
FLOOR	h X.FCN **FL**OOR	FLOAT	Computes the smallest integer ≥ ***x***.
FP	g FP	FLOAT	
FRACT	g b/c	FLOAT	Sets fraction mode like in HP-32SII.
FS?	h FS? *n*	\a	See opportunities for *n* in the table above.
FS?C	h X.FCN **FS?C** *n*		
FS?F	h X.FCN **FS?F** *n*		
FS?S	h X.FCN **FS?S** *n*		
F(p)	h X.FCN **F(**p)	FLOAT	Like in HP-21S. Equals FINV(***x; r01; r02***) in MS Excel.

Name in listings	Keys to press	Works in modes	Remarks
GAMMA	h X.FCN **GA**MMA	FLOAT	
GCD	h X.FCN **GC**D	\a	Returns the Greatest Common Divisor of ***x*** and ***y***.
GRAD	g GRAD	FLOAT	
GTO	h GTO *label*	PRG	Like in HP-32S.
		\PRG, \a	
	h GTO . *label*	\PRG, \a	
	h GTO . .		
H.MS	g H.MS	FLOAT	Sets H.MS mode.
H.MS+	+	H.MS	
H.MS–	–	H.MS	
INT	h INTEG *label*	FLOAT	Integration parameters will be transferred like in HP-15C.
IP	f IP	FLOAT	
ISG	g ISG *reg*	PRG	See opportunities for *reg* in the table above.
ISZ	h X.FCN ISZ *reg*		
J→D	h X.FCN **J→**D	FLOAT	Assumes ***x*** is a Julian day number and converts it to a date.
LASTx	g LASTx	\a	CPX g LASTx recalls ***I*** and ***i*** into **X** and **Y**.
LBL	f LBL *label*	PRG	
LCM	h X.FCN **LC**M	\a	Returns the Least Common Multiple of ***x*** and ***y***.
LEAP?	h X.FCN **LE**AP?	PRG	Checks if the integer part of ***x*** corresponds to a leap year.
LINF	h X.FCN **LI**NF	FLOAT	Selects the linear curve fit model.
LJ	h X.FCN **LJ**	Integer	
LN	f LN	FLOAT	
LNBETA	h X.FCN **LNB**ETA	FLOAT	Calculates the natural logarithm of β or GAMMA, respectively. See these functions.
LNGAMM	h X.FCN **LNG**AMM		
LN1+X	h X.FCN **LN1**+X	FLOAT	

Name in listings	Keys to press	Works in modes	Remarks
LOGF	h X.FCN **LO**GF	FLOAT	Selects the logarithmic curve fit model.
LOGy	f LOGy	FLOAT	Calculates the logarithm for base ***y***.
LOG_{10}	f LG	FLOAT	
LOG_2	f LOG2	\a	Calculates the logarithm for base 2.
LR	h L.R.	FLOAT	Calculates the parameters of the fit curve (through the data points accumulated) according to the model selected. Returns A0 in **X** and A1 in **Y**. In the linear model, A0 is the intercept and A1 the slope of the regression line.
MASKL	h X.FCN MASKL *n*	Integer	Work like MASKL and MASKR on HP-16C, but with the parameter following the command instead of taken from **X**. See opportunities for *n* in the table above.
MASKR	h X.FCN MASKR *n*		
MAX	h X.FCN **MAX**	\a	Returns the maximum of ***x*** and ***y***.
MEAN	f x̄	FLOAT	
MIN	h X.FCN **MIN**	\a	Returns the minimum of ***x*** and ***y***.
MIRROR	h X.FCN **MIR**ROR	Integer	Reflects bit patterns (e.g. 000101 → 101000 for word size 6)
MOD	h MOD	\a	
M.DY	h X.FCN **M.**DY	FLOAT	Sets the format for date calculations.
n	h X.FCN **N**	FLOAT	Recalls the number of accumulated data points. Necessary for basic statistics.
NAND	h X.FCN **NA**ND	Integer	
NOP	h X.FCN **NOP**	PRG	
NOR	h X.FCN **NOR**	Integer	
NOT	h NOT	Integer	
OFF	h X.FCN **OF**F	PRG	
ON	h X.FCN **ON**	PRG	
OR	h OR	Integer	
PAUSE	h PAUSE	PRG	Like PSE in HP-42S.
PERM	g Py,x	FLOAT	

Name in listings	Keys to press	Works in modes	Remarks
PROMPT	h X.FCN **PR**OMPT	PRG	
PWRF	h X.FCN **PW**RF	FLOAT	Selects the power curve fit model.
Q(F)	h X.FCN **Q(F)**	FLOAT	Like in HP-21S. Equals 1 – FDIST(***x***; ***r01***; ***r02***) in MS Excel.
Q(t)	h X.FCN **Q(t)**	FLOAT	Like in HP-21S. Equals 1 – TDIST(***x***; ***r01***; 1) in MS Excel.
Q(z)	f Qz	FLOAT	Like in HP-32E and HP-21S
Q(χ^2)	h X.FCN **R** ▲	FLOAT	Like in HP-21S. Equals 1 – CHIDIST(***x***; ***r01***) in MS Excel.
RAD	g RAD	FLOAT	
RAND#	h RN#	\a	Like RAN in HP-42S.
RCL	RCL *reg*	\h, \a	See RCL+ for more details.
	f RCL *reg*	h	
RCLWS	h X.FCN **RC**LWS	Integer	Recalls the word size set. See WSIZ.
RCL+	RCL + *reg*	\h, \a (needs f in hex mode)	Calls the content of address *reg* , executes **OP** ***x*** on it and stores the result in **X**. RCL▲ (▼) takes the maximum (minimum) of the value in *reg* and ***x***. See opportunities for *reg* in the table above. CPX RCL recalls the register specified and the next adjacent register to **X** and **Y**.
RCL–	RCL – *reg*		
RCL×	RCL × *reg*		
RCL/	RCL / *reg*		
RCL▲	RCL ▲ *reg*		
RCL▼	RCL ▼ *reg*		
RDX,	h .,/,	FLOAT	Toggles radix mark.
RDX.			
RJ	h X.FCN **RJ**	Integer	Works in analogy to LJ.
RL	h X.FCN **RL** *n*	Integer	Works like *n* consecutive RLs / RLCs on HP-16C. See opportunities for *n* in the table above.
RLC	h X.FCN **RLC** *n*		
RNDINT	h X.FCN **RN**DINT	FLOAT	Round ***x*** to next integer. ½ rounds to 1.
ROUND	g RND	FLOAT	Like RND in HP-42S.

Name in listings	Keys to press	Works in modes	Remarks
RR	h X.FCN **RR** *n*	Integer	Works like *n* consecutive RRs / RRCs on HP-16C. See opportunities for *n* in the table above.
RRC	h X.FCN **RRC** *n*		
RTN	g RTN	PRG	
RTN+1	n/a	PRG	Internal support routine.
R/S	R/S	\PRG, \T, \a	
		T	Starts/stops incrementing the timer.
R↑	h R↑	\a	
R↓	R↓		
R→D	h X.FCN **R→D**	FLOAT	Assumes **X** containing radians and converts them to degrees. Mode is kept constant.
SB	h X.FCN **SB** *n*	Integer	Sets the *n*-th bit in ***x***. See opportunities for *n* in the table above.
SCI	f SCI *n*	FLOAT	See opportunities for *n* in the table above.
SDEV	g s	FLOAT	
SEED	STO h RN#	FLOAT	
SERR	h X.FCN **SE**RR	FLOAT	Calculates $\frac{SDEV}{\sqrt{N}}$.
SETDAT	h X.FCN **SETDA**T	FLOAT, H.MS	Sets the date for the real time clock.
SETTIM	h X.FCN **SETTI**M		Sets the time for the real time clock.
SET24	h X.FCN **SET2**4		Toggles 24h and p.m. time display.
SF	h SF *n*	\a	See opportunities for *n* in the table above.
SIGMA	h X.FCN **SIGM**A	FLOAT	Calculates $SDEV \cdot \sqrt{\frac{N}{N-1}}$.
SIGN	h X.FCN **SIGN**	\a	
SIGNMT	h X.FCN **SIGNM**T	\a	Sets sign-and-mantissa mode for integers.
SIN	f SIN	FLOAT, H.MS	
SINC	h X.FCN **SIN**C	FLOAT	Calculates $\frac{\sin(x)}{x}$.

Name in listings	Keys to press	Works in modes	Remarks
SINH	f HYP SIN	FLOAT	
SL	h X.FCN **SL** *n*	Integer	Works like *n* consecutive SLs on HP-16C. See opportunities for *n* in the table above.
SLV	h SOLVE *label*	FLOAT	
SR	h X.FCN **SR** *n*	Integer	Works like *n* consecutive SRs on HP-16C. See opportunities for *n* in the table above.
STO	STO *reg*	\-5, \h, \a	See STO+ for more details.
	f STO *reg*	-5, h	
STOP	R/S	PRG	
STO+	STO + *reg*	\-5, \h, \a (needs f in modes -5 and h)	Calls the content of address *reg* , executes **OP *x*** on it and stores the result into said address. STO▲ (▼) takes the maximum (minimum) of the value in *reg* and ***x***. See opportunities for *reg* in the table above. CPX STO stores ***x*** and ***y*** into the register specified and the next adjacent register.
STO–	STO − *reg*		
STO×	STO × *reg*		
STO/	STO / *reg*		
STO▲	STO ▲ *reg*		
STO▼	STO ▼ *reg*		
SUM	RCL Σ+	FLOAT	
TAN	f TAN	FLOAT, H.MS	
TANH	f HYP TAN	FLOAT	
TIME	h X.FCN **TI**ME	FLOAT, H.MS	Recalls the time from the real time clock.
TIMER	h TIMER *reg*	\T, \a	Enters the timer application (sets indicator T, and H.MS if not set yet). See opportunities for *reg* in the table above. Clears the register specified.
TIMEX	h TIMER	T	Leaves the timer application, i.e. stops the timer, clears indicator T, but H.MS stays on, and the accumulated time is kept in the register specified by TIMER.
t(p)	h X.FCN **t**(p)	FLOAT	Like in HP-21S. Equals TINV(2****x; r01***) in MS Excel.
UNSIGN	h X.FCN **UN**SIGN	\a	
VIEW	h VIEW *reg*	\a	See opportunities for *reg* in the table above.

Name in listings	Keys to press	Works in modes	Remarks
W	h X.FCN **W**	FLOAT	Calculates Lambert's W for a given x ≥ -1/e
WINV	h X.FCN **WI**NV	FLOAT	Inverts W, i.e. calculates x for a given W (≥ -1).
WMEAN	h X.FCN **WM**EAN	FLOAT	Calculates the weighted mean.
WSIZ	h X.FCN **WS**IZ *n*	\a	Works like WSIZE on HP-16C, but with the parameter following the command instead of taken from **X**. See opportunities for *n* in the table above.
XEQ	XEQ *label*	PRG	Calls the respective subroutine.
		\PRG, \a	Executes the respective program.
	B , C , or D	PRG	Calls the respective subroutine, so e.g. XEQ B will be inserted in the program when B is pressed.
		\PRG, \a	Executes the respective program if defined.
	f B , C , or D	-2, -3, -4, -5, h	
XNOR	h X.FCN **XN**OR	Integer	
XOR	h XOR	Integer	
x ^{2}	g x^2	\a	
x !	h !	FLOAT	
x → α	h X.FCN **X→α**	\a	Works like XTOA in HP-42S.
***x*↔**	h x≷ *reg*	\a	See opportunities for *reg* in the table above. CPX h x≷ will exchange ***x*** and ***y*** with the register specified and the next adjacent register.
x*↔*y	x≷y	\a	This performs **Re <> Im** if a complex operation was executed before. CPX x≷y will exchange ***x*** and ***y*** with ***z*** and ***t***.

Name in listings	Keys to press	Works in modes	Remarks
x < … ?	f x < ? *arg*	\a	Compares ***x*** with *arg*. See opportunities for *arg* in the table above. The three dots will be replaced in the listing by *arg* according to the samples given in said table.
x ≤ … ?	g x ≤ ? *arg*		
x = … ?	f x = ? *arg*		
x ≠ … ?	g x ≠ ? *arg*		
x ≥ … ?	f x ≥ ? *arg*		
x > … ?	g x > ? *arg*		
Y.MD	h X.FCN **Y**.MD	FLOAT	Sets the format for date calculations.
***y*^x**	g y^x	FLOAT	
	C	FLOAT	As long as no reassignment took place.
z(p)	g zp	FLOAT	Like in $\mathbf{Q^{-1}}$ in HP-32E and $\mathbf{z_P}$ in HP-21S.
αAPP	h X.FCN f α **APP** *char*	\a	Switches to alpha mode for the input of 1 character, appends this to the alpha register, and returns to the mode set before. Eventually, this equals the sequence αON *char* αOFF.
αDAY	h X.FCN f α **DAY**	\a	Takes ***x*** as a date, recalls the name of the day and appends it to the alpha register.
αIP	h X.FCN f α **IP**	\a	Like AIP in HP-42S.
αLENG	h X.FCN f α **LENG**	\a	Like ALENG in HP-42S.
αMONTH	h X.FCN f α **MONTH**	\a	Takes ***x*** as a date, recalls the name of the month and appends it to the alpha register.
αRCL	f RCL *reg*	a	Takes the contents of *reg* interpreted as characters and appends these to the alpha register. See opportunities for *reg* in the table above.
αRC#	h X.FCN f α **RC#** *reg*	a	Takes the contents of *reg* interpreted as a number and appends this in current format to the alpha register. See opportunities for *reg* in the table above.
αROT	h X.FCN f α **ROT** *n*	\a	Like AROT in HP-42S, but with the parameter following the command instead of taken from **X**. See opportunities for *n* in the table above.

Name in listings	Keys to press	Works in modes	Remarks
αSHIFT	h X.FCN f α **SHIFT** *n*	All	Shifts the *n* left-most characters out of the alpha register, similar to ASHF in HP-42S. See opportunities for *n* in the table above.
αSTO	f STO *reg*	a	See opportunities for *reg* in the table above.
αVIEW	h X.FCN f α **VIEW**	\a	
α → x	h X.FCN f α →X	\a	Like ATOX in HP-42S.
ΔDAYS	h X.FCN **ΔDAYS**	FLOAT	Calculates the number of days between 2 dates ***x*** and ***y***. Works like in HP-12C.
Δ%	g Δ%	FLOAT	
π	h π	FLOAT	CPX h π puts π in **X** and clears **Y** for using π in complex calculations.
	D	FLOAT	As long as no reassignment took place.
Σlnx	h X.FCN **ΣLNX**	FLOAT	Recalls the respective statistical sum. These sums are necessary for the curve fitting models beyond pure linear. See below for more.
$\Sigma \ln^2 x$	h X.FCN **ΣLN2X**		
Σlnxy	h X.FCN **ΣLNXY**		
Σlny	h X.FCN **ΣLNY**		
$\Sigma \ln^2 y$	h X.FCN **ΣLN2Y**		
Σxlny	h X.FCN **ΣXLNY**		
Σylnx	h X.FCN **ΣYLNX**		
Σx	h X.FCN **ΣX**	FLOAT	Recalls the respective statistical sum. These sums are necessary for basic statistics and linear curve fitting. Calling them by name greatly enhances readability of programs.
Σx^2	h X.FCN **ΣX2**		
Σxy	h X.FCN **ΣXY**		
Σy	h X.FCN **ΣY**		
Σy^2	h X.FCN **ΣY2**		
Σ+	Σ+	FLOAT	
Σ–	h Σ–	FLOAT	
$\chi^2(p)$	h X.FCN **1** ▲	FLOAT	Like in HP-21S. Equals CHIINV(***x***; ***r01***) in MS Excel.

Name in listings	Keys to press	Works in modes	Remarks
1COMPL	h X.FCN **1**COMPL	\a	Like 1's complement in HP-16C.
10^x	g 10^x	FLOAT	
1/x	f 1/x	FLOAT	
	B	FLOAT	As long as no reassignment took place.
2COMPL	h X.FCN **2**COMPL	\a	Like 2's complement in HP-16C.
2^x	g 2^x	\a	
+	+	\a	
–	–		
×	×		
/	/		
+/–	+/–		
//	g //	FLOAT	Calculates $\left(\frac{1}{x}+\frac{1}{y}\right)^{-1}$.
√‾	f √x	\a	
%	f %	FLOAT	
%T	h X.FCN h % **T**	FLOAT	Calculates $\frac{x}{y}\cdot 100$.
%Σ	h X.FCN h % h Σ	FLOAT	Calculates $\frac{x}{\sum x}\cdot 100$.
%+	h %+	FLOAT	Adds a markup of ***x*** % to ***y***.
%–	h %–	FLOAT	Subtracts a discount of ***x*** % from ***y***.
→DEG	→ g DEG	FLOAT	Assumes **X** containing angles in actual angular mode and converts them to degrees or gon, respectively. Mode is kept constant.
→GRAD	→ g GRAD		
→H	→ f H	H.MS	Takes the hours or degrees in **X** and converts them into decimal numbers.
→H.MS	→ g H.MS	FLOAT	Assumes **X** containing *decimal* hours or degrees and converts them in the format HHH.MMSS.
→POL	g ▶P	FLOAT	Assumes **X** and **Y** containing the coordinates x and y and converts them to r and ϑ.

Name in listings	Keys to press	Works in modes	Remarks
→RAD	→ g RAD	FLOAT, H.MS	Works like →DEG, but converts to radians.
→REC	f ▶R	FLOAT	Assumes **X** and **Y** containing the coordinates r and ϑ and converts them to x and y.
			Pure input commands:
0 … 9	0 … 9 ,	\a, depending on base setting	Numeric input. The 6 top left keys on the keyboard will be used for input of hexadecimal numbers >10 in HEXM by default. For bases <16, their defaults are switched as applicable. For bases <10, the default primary functions of some numeric keys may be blocked.
A … F	A …F (dark red print on keyboard)	-1, -2, -3, -4, -5, h	
EEX	E (the key)	FLOAT	
[.] or [,]	,	FLOAT	Inserts the radix mark as selected.
		a	Inserts a comma.
	h ./,	a	Inserts a point.
[ ] or [/]	,	/c	First input inserts a space, second a fraction mark, e.g. 2 , 3 , 4 results in 2 ¾ in the display.
[°]	,	H.MS	Separates degrees (or hours) from minutes and seconds.
[.]	,	Y.MD, D.MY, M.DY	Separates the leading unit in date modes. It is left to the user to decide if a number displayed represents a date or not.
			Catalogues (non programmable):
CONST	RCL C	FLOAT	Calls the catalogue of constants like in HP35s and sets alpha mode to allow for keying in the name of the constant wanted. The constants stored are listed in a separate table below. ▲ and ▼ browse the catalogue, ENTER↑ recalls the constant displayed into **X**. Use EXIT to leave the catalogue without picking a constant. CPX RCL C will clear **Y** in recalling.
CONV	h CONV	FLOAT	Calls the catalogue of conversions and sets alpha mode to allow for keying in the name of the source unit. The conversions stored are listed in a separate table below. ▲ and ▼ browse the catalogue, ENTER↑ converts ***x*** according to the conversion displayed. Use EXIT to leave the catalogue without converting.

Name in listings	Keys to press	Works in modes	Remarks
X.FCN	h X.FCN	FLOAT, a	Calls the catalogue of extra real functions and sets alpha mode to allow for keying in the name of the operation wanted. ▲ and ▼ browse the catalogue, ENTER↑ executes the function displayed. Use EXIT to leave the catalogue without picking a function. CPX h X.FCN calls the catalogue of extra complex functions.
		Integer	Calls the catalogue of extra integer functions. See above for more.
			Pure navigation, mode switching and information commands (all non programmable):
	←	All	Deletes the last digit or character put in.
EXIT	EXIT	All	Exits catalogues and other operations with pending input, canceling the execution of this operation.
	g OFF	All	
	ON	Calc. off	
PRGOFF	h PRGM	PRG	Toggle programming mode.
PRGON	h PRGM	\PRG, \a	
SHOW	h SHOW	FLOAT	Shows the full mantissa.
STATUS	h STATUS	\PRG, \a	Similar to HP-16C.
VERS	h X.FCN **VERS**	\PRG	Displays the firmware version.
αOFF	ENTER↑	a	Toggle alpha mode like AOFF and AON in HP-42S.
αON	f α	\a	
→BIN	→ f 2	\a	Shows ***x*** in target representation until the next command is executed. Mode is kept constant.
→DEC	→ f 10		
→HEX	→ g 16		
→OCT	→ g 8		
	f ◀|	Integer	Shift the display window like in HP-16C. Useful for numbers with small bases.
	g |▶		

Name in listings	Keys to press	Works in modes	Remarks
	▲ / ▼	Catalogue open	Go to previous / next item in this catalogue.
		a	Move the cursor 1 character to the left / right in alpha register. Shifts the display window if necessary.
		PRG	Like BST / SST in HP-42S.
		\PRG, \a	
	f ⇧	a	Toggles upper and lower case.

TABLE OF CONSTANTS

This lists all constants contained in the catalogue CONST. Names printed bold represent fundamental or measured constants, while the other ones may be derived from them. The constants π and **e** are found on the keyboard directly.

Name	Value	Dimension	Remarks
a	365,2425	d	Gregorian year (per definition)
a_0	5,291772083E-11	m	Bohr radius $= \alpha / 4\pi R_\infty$
atm	101325	Pa / atm	Standard pressure p_0
c	299792458	m / s	Vacuum speed of light (per definition)
c_1	374177107E-16	$m^2 \cdot W$	First radiation constant $= 2\pi \cdot h \cdot c^2$
c_2	0,014387752	$m \cdot K$	Second radiation constant $= hc / k$
eV	1,602176462E-19	J = V A s	= Electron charge x 1V
F	96485,3415	$\frac{A \cdot s}{mol}$	Faraday's constant = e N_A
g	9,80665	m / s^2	Standard earth acceleration
G	6,6742867E-11	$\frac{m^3}{kg \cdot s^2}$	Newton's gravitation constant
$\mathbf{g_e}$	2,002319304362	1	Landé's g-factor

Name	Value	Dimension	Remarks
G_o	7,748091696E-5	$1/\Omega$	Conductance quantum $= 2e^2/h$
h	6,62606876E-34	J s	Planck constant
$\hbar$	1,054571596E-34	J s	$= h/2\pi$
k	1,3806503E-23	J/K	Boltzmann constant $= R/N_A$
m_e	9,10938188E-31	kg	Electron mass
m_n	1,67492716E-27		Neutron mass
m_p	1,67262158E-27		Proton mass
m_u	1,66053873E-27		Atomic unit mass = 1g / N_A
m_μ	1,88353109E-28		Myon mass
N_A	6,02214199E23	$1/mol$	Avogadro's number
R	8,314472	$\frac{J}{mol \cdot K}$	Molar gas constant
r_e	2,817940285E-15	m	Classical electron radius $= \alpha^2 \cdot a_0$
R_K	25812,80756	Ω	Von Klitzing constant $= h/e^2$
R_∞	10973731,5685	$1/m$	Rydberg constant $= \frac{\alpha^2 m_e c}{2h}$
T_o	273,15	K	= 0°C, standard temperature (per definition)
V_m	0,022413996	m^3/mol	Molar volume of ideal gas at standard conditions $= RT_0/p_0$
Z_o	376,730313461	Ω	Characteristic impedance of vacuum $= \sqrt{\mu_0/\varepsilon_0} = \mu_0 c$
α	7,297352533E-3	1	Fine-structure constant $= \frac{e^2}{4\pi\varepsilon_0\hbar c}$
γ_{EM}	0,57721566490153286 06	1	Euler-Mascheroni constant
γ_p	267522212	$\frac{1}{s \cdot T}$	Proton gyromagnetic ratio $= 2\mu_P/\hbar$

Name	Value	Dimension	Remarks
ε_o	8,854187817E-12	$\frac{A \cdot s}{V \cdot m}$	Electric constant, vacuum permittivity $= 1/\mu_0 c^2$
λ_c	2,426310215E-12	m	Compton wavelength of electron $= h/m_e c$
λ_{cn}	1,319590898E-15		Compton wavelength of neutron $= h/m_n c$
λ_{cp}	1,321409847E-15		Compton wavelength of proton $= h/m_p c$
μ_B	9,27400899E-24	J/T	Bohr's magneton $= e\hbar/2m_e$
μ_e	-9,28476362E-24		Electron magnetic moment
μ_N	5,05078317E-27		Nuclear magneton $= e\hbar/2m_p$
μ_n	-9,662364E-27		Neutron magnetic moment
μ_p	1,410606633E-26		Proton magnetic moment
μ_o	1,2566370614E-6	N/A^2	Magnetic constant, vacuum permeability $= 4\pi \cdot 10^{-7}$ (per definition)
μ_μ	-4,49044813E-26	J/T	Myon magnetic moment
σ	5,6704E-8	$\frac{W}{m^2 \cdot K^4}$	Stefan Boltzmann constant $= \frac{2\pi^5 k^4}{15h^3 c^2}$
Φ	1,6180339887498948482	1	Golden ratio $= \frac{1+\sqrt{5}}{2}$
Φ_o	2,067833636E-15	V s	Magnetic flux quantum $= h/2e$
∞		1	Infinity

TABLE OF CONVERSIONS

This lists all conversions contained in the new catalogue CONV. The constants **atm** and $\mathbf{T_o}$ may be useful for conversions, too – they are found in the catalogue CONST.

Conversion	Remarks	Class
acres→ha	Remember 1 ha = 10^4 m²	Area
au→km	Astronomic units	Length
cm→inch		Length
feet→m		Length
flozUK→ml	Remember 1 m³ = 10^3 l	Volume
flozUS→ml		Volume
g→oz		Mass
galUK→l		Volume
galUS→l		Volume
ha→acres		Area
inch→cm		Length
kg→lbm		Mass
km→au		Length
km→ly	Light years	Length
km→mi		Length
km→nmi	Nautical miles	Length
l→galUK		Volume
l→galUS		Volume
lbm→kg		Mass
ly→km		Length
m→feet		Length
mi→km		Length
ml→flozUK		Volume
ml→flozUS		Volume
nmi→km		Length
oz→g		Mass
°C→°F		Temperature
°F→°C		Temperature

Functions on the waitlist (personal priorities given by W):

1. **TIMER** and real time clock (accuracy down to 0.1s is sufficient, we can't press keys more precisely – included in the index already but not implemented yet)
2. Nothing more!

Edition	Date	Remarks
1	9.12.08	Start
1.1	15.12.08	Added the table of indicators; added NAND, NOR, XNOR, RCLWS, STOWS, //, N, SERR, SIGMA, < and >; deleted HR, INPUT, 2 flag commands, and 2 conversions; extended explanations for addressing and COMPLEX & …; put XOR on the keyboard; corrected errors.
1.2	4.1.09	Added ASRN, CBC?, CBS?, CCB, SCB, FLOAT, MIRROR, SLN, SRN, >BIN, >DEC, >HEX, >OCT, BETA, D>R, DATE, DDAYS, D.MY, M.DY, Y.MD, CEIL, FLOOR, DSZ, ISZ, D>R, R>D, EMGAM, GSB, LNBETA, LNGAMMA, MAX, MIN, NOP, REAL, RJ, W and WINV, ZETA, %+ and %-; renamed the top left keys B, C, and D, and bottom left EXIT.
1.3	17.1.09	Added AIP, ALENG, ARCL, AROT, ASHF, ASTO, ATOX, XTOA, AVIEW, CLA, PROMPT (all taken from 42S), CAPP, FC?C, FS?C, SGMNT, and the ….# commands; renamed NBITS to BITS and STOWS to WSIZE; specified the bit commands closer; deleted the 4 carry bit operations.
1.4	10.2.09	Added CONST and a table of constants provided, D>J and J>D, LEAP?, %T, RCL and STO ▲ and ▼, and 2 forgotten statistics registers; deleted CHS, EMGAM, GSB, REAL and ZETA; purged and renamed the bit operations; renamed many commands.
1.5	5.3.09	Added RNDINT, CONV and its table, a memory table, the description of XEQ B, C, D to the operation index, and a and g_e to the table of constants; put CLSTK on a key, moved CLΣ and FILL, changed the % and log labels on the keyboard, put CLALL in X.FCN; checked and cleaned alpha mode keyboard and added a temporary alpha keyboard; rearranged the alphabet to put Greek after Latin, symbols after Greek consistently; separated the input and non programmable commands; cleaned the addressing tables.
1.6	12.8.09	Added BASE, DAYS+, DROP, DROPY, E3OFF, E3ON, FC?F, FC?S, FIB, FS?F, FS?S, GCD, LCM, SETDAT, SETTIM, SET24, SINC, TIME, VERS, αDAY, αMONTH, αRC#; %Σ, as well as F-, t-, and χ^2-distributions and their inverses; reassigned DATE, modified DENMAX, FLOAT, αROT, and αSHIFT; deleted BASE arithmetic, BIN, DEC, HEX, and OCT; updated the alpha keyboards; added flags in the memory table; included indirect addressing for comparisons; added a paragraph about the display; updated the table of indicators; corrected errors.