HP-27S Quick Reference

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Miscellaneous

Memory	Stack, Last-X, 6933 free bytes for equations and number lists. Continuous memory
Number range	1E-499 to 9.9999999999E+499
Display contrast	Hold down CLR and press "+" or "-" to adjust the contrast
Display lines	Normal mode: Top line: Previous result Bottom line: Calculator line for input & result display The top-row function key directly perform the function printed in blue letters Menu display mode: Top line: Calculator line for menu input & result display Bottom line: Menu selection thru top-row function keys To access the normal tow-row functions press the blue prefix key and the appropriate top-row key
MEM	Displays the amount of free memory in bytes and percent
SHOW	Briefly displays all digits of X
STO 0..9	Save result in storage register
STO + - x ÷ y^x 0..9	Storage register arithmetic: storage OP result → storage
RCL 0..9	Recall storage register. Recall arithmetic is not supported!
MAIN	Closes all menus
EXIT	Exit current menu and return to previous level or to normal display
LAST	Retrieves the previous result (which is usually displayed on the upper calculator line)
INPUT	Can be used instead of "=" during normal calculations. It is also used to enter values in various submenus
∧ and ∨	Can be used to scroll thru 4 previous results – sort of like a "stack"
CLR	Turns calculator on. Clears the calculator line
←	Delete input characters or entire input numbers
CLEAR DATA	Clears the calculator line and the result history. Within menus it is used to clear equations, appointments and variables
Operator priority	Operators follow usual priority rules. When numbers and operators (including parentheses) are entered all possible calulations are immediately performed and the text replaced by the numerical result
PRT	Print contents of calculator line
Reset machine	Press CLR and 3rd menu key from left (exp-x)
Erase all memory	Press CLR and leftmost (sqrt) and rightmost menu key (1/x)
Self test	Press CLR and 4th menu key from left (LN). The test runs until CLR + 3rd menu key from left is pressed (exp-x)

Functions

√x x² 1/x e^x LN +/- 10^x LOG SIN COS TAN ASIN ACOS ATAN	These functions operate immediately on the last argument entered. Ie. enter: "3+4x7" and press LN – this will calculate the logarithm of 7 so that in FIX 2 mode you end up with "3.00+4.00x1.95"
y^x	Must be entered between arguments
%	If the operator between the previous two number is "+" or "-" the given percentage of the former number is calculated. Ie. entering "3+50" and pressing "%" results in "3.00+1.50". However, when the operator is not "+" or "-" the result is a factor which corresponds to the percentage. Ie. entering "3x50" and pressing "%" results in "3.00x0.50"

Menus

General	• Menus are located on the lower part of the keyboard. The keys are shaded gray • In general, EXIT returns to the previous menu level, MAIN closes all menus • There are *numeric function menus* which can be used to perform some immediate calculations, ie. %CH in the %CHG menu. These menus can be temporarily activated from other menus. Pressing EXIT returns to the previous menu • In many menus it is possible to assign a value to a variable or to solve for that variable (ie. for the payment PMT in the TVM menu). Assign value: Enter number then press menu key for variable Or enter number and press STO and menu key Solve for value: Press menu key for variable *without* prior number entry Recall value: Press RCL and the menu key for the variable • ∧ and ∨ can be used to scroll thru previous (possibly named) results • CLEAR DATA usually clears values assigned to variables (0 is assigned). Other uses of CLEAR DATA are explicitl mentioned in the menu descriptions below • Sometimes it is necessary to enter character string, ie. to name lists or variables. Besides normal characters, a wealth of symbol is available. Also, the key symbols can be used directly (ie. number digits)

SOLVE Menu

Use this menu to solve an equation • Multiple equations can be entered, use ∧ and ∨ to scroll thru them, f ∧ and f ∨ to jump to the beginning or end of the list • Use CLEAR DATA to erase all equations • See section **Solver Functions** below for a list of functions that can be used in equations	
CALC	Solve the currently displayed equation: • A list of the equations's variables is displayed. Enter known values and then press the variable name you want to solve for without prior number entry • *Initial guesses for the solution*: • Store one or two values in the variable your are solving for in order to specify one or two initial guessesUse CLEAR DATA to set all of the equation's variables to 0
EDIT	Enter edit mode to modify the existing equation
DELET	Delete an equation
NEW	Add a new equation. Use the character menu to enter the equation. Do not terminate the equation with "=". Press INPUT to terminate entry and to store the equation

STAT Menu

This menu allows to enter and store named lists of numbers and calculate various characteristics. • To append numbers to the current list enter the value and press INPUT. The value and the list index will be displayed. • Use ∧ and ∨ to scroll thru the list values, f ∧ and f ∨ to jump to the beginning or end • To modify a list value display it, then type a new value and press INPUT • To copy a list value to the calculator line display the list item and press RCL INPUT • To discard the current list and start a new one press CLEAR DATA or name the current list and press GET & *NEW • Multiple lists are required for advanced functions in the FRCST submenu!		
CALC	Perform various calculations on the current list of numbers: TOTALSum of all values MEAN Mean value MEDN Calculate "median" but it is totally unclear what this should be!! STDEVStandard deviation RANG Overall range: higher-lowest value MIN Minimum value MAX Maximum value SORT Sort list from smallest to highest values FRCSTFirst displays a submenu that lets you select the list holding the X variables. Then another submenu to select the list holding Y variables – *these lists must have identical length!*	
		Finally a submenu with the following options: <X> Name of X list. Also used to calculate a prediction for an X value according to the curve fitting model – the Y value must have been entered by pressing the <Y> key after the

		number entry <Y> Name of Y list. Also used to calculate a prediction for a Y value, see above CORR Correlation between the two lists: ±1=very good, 0=very poor M Calculate the value of M according to the fitting model (see below) B Calculate the value of B according to the fitting model (see below) MODL Select a curve fitting model to be used between X and Y values: LIN Linear: $y=B+Mx$ LOG Logarithmic: $y=B+M\bullet\ln(x)$ EXP Exponential: $y=Be^{Mx}$ PWR Power curve: $y=Bx^{M}$ W.MN Weighted mean of X values using the Y values as weights G.SD Calculates the standard deviation of the set of X values occuring with the integer frequencies specified by the Y values SIZE Display the length of the list ΣX Display sum of values of X list ΣY Display sum of values of Y list ΣX2 Display sum of squares of X list ΣY2 Display sum of squares of Y list ΣXY Display sum of X•Y values of both lists
INSR	Insert a new item at the current position with value 0	
DELET	Delete currently displayed list item	
NAME	Store the current list of values under a name using the subsequent character menu	
GET	Recall an existing named list of values that has previousely been stored with NAME or create a new list with *NEW. If there's an unnamed list it must be named or it must be cleared using CLEAR DATA before another list can be recalled	
TOTAL	Display the sum of all entered values	

TVM Menu

Time Value of Money submenu. Calculates compound interest and amortization	
N	Enter/calculate number of payments
I%YR	Enter/calculate annual interest rate
PV	Enter/calculate present value
PMT	Enter/calculate periodic payment
FV	Enter/calculate future value
P/YR	Enter the number of compounding periods per year
BEG	Select payment at the beginning of the compounding time period
END	Select payment at the end of the compounding time period

AMRT	Enters the amortization submenu. The amortization calculations use the values stored in PV, PMT and I%YR rounded to the number of digits specified by current display setting. #P Enter number of payments INT Amount applied towards interest PRIN Amount applied towards principal BAL Balance of loan after the payments have been made NEXT Calculate amortization schedule for next #P payments TABLE Displays a submenu for printing a table of amortizations: FIRST Select the number of the first payment LAST Select the number of the last payment INCR Select the number of payments per table entry GO Start the printout

TIME Menu

CALC	Date/time calculations DATE1 Enter/calculate first date and display its weekday DATE2 Enter/calculate second date and display its weekday DAYS Enter/calculate days between DATE1 & DATE2 D360 Calculate days between DATE1 & DATE2 on the basis of a 360 day year D365 Calculate days between DATE1 & DATE2 on the basis of a 365 day year
APPT	Appointment management • This menu displays the numbers of *due* and *set* menus. • To clear all appointments press CLEAR DATA The next submenu level lets you select one out of 10 appointsments. The selection of an appointment leads to yet another menu: DATE Enter appointment date in the form DD.MM or MM.DD depending on the M/D setting (see SET menu below) TIME Enter appointment time in the form HH.MM A/PM Select AM or PM MSG Enter an appointment message by using the hierarchical character menus and press INPUT RPT Leads to this submenu: NONE Appointment not repeated MIN Repeat every given number of minutes HOUR Repeat every given number of hours DAY Repeat every given number of days WEEK Repeat every given number of weeks HELP Displays formatting requirements for DATE &TIME • In this menu press CLEAR DATA to clear a single appointment
ADJST	Current time adjustments: Increments or decrements hours, minutes or seconds

SET	Set date & time DATE Set date, must be in the form DD.MMYYYY or MM.DDYYYY depending on the display format (see M/D below) TIME Set time, must be in the form HH.MMSS A/PM Select AM or PM M/D Select DD.MM.YY or MM/DD/YY display format 12/24 Select 12 or 24 hour display format HELPDisplays formatting requirements for DATE &TIME

BASE Menu

- When this menu is exited the calculator returns to decimal mode
- Only a limited set of functions works in HEX, OCT and BIN mode
- If a lengthy number (ie. in BIN mode) doesn't fit on the calculator line press & hold SHOW to see all digits
- HEX, OCT & BIN numbers are 36 bit wide. Most significant bit is the sign bit

DEC	Decimal
HEX	Hexadecimal. This shows a submenu with number keys A..F
OCT	Octal
BIN	Binary

PROB Menu

X	Enter X for Px,y or Cx,y
Y	Enter Y for Px,y or Cx,y
C X,Y	Calculate the number of possible combinations when taking out Y elements from a group of X different elements. Different element orders only count once
P X,Y	Calculate the number of possible permutations when taking out Y elements from a group of X different elements. Different element orders count separately
N!	Factorial of integer value
RAN#	Returns a random number $0 \leq X < 1$. STO RAN# specifies a new seed for the random number generator

CONVET Menu

>DEG	Convert from radians to degrees
>RAD	Convert from degress to radians
>HR	Convert h.mmss to fractional hours
>HMS	Convert fractional hour to h.mmss
Rectangular $\leftrightarrow$ polar coordinate conversions:	
XCORD	Enter/calculate X coordinate
YCORD	Enter/calculate Y coordinate
R	Enter/calculate radius
$\angle$	Enter/calculate angle
D/R	Switch between degrees (360) and radians (2π)

HYP Menu

HYP	SINH, COSH, TANH, ASNH, ACSH, ATNH

%CHG Menu

OLD	Enter/calculate old value
NEW	Enter/calculate new value
%CH	Enter/calculate percentual difference from old to new value

PARTS Menu

IP	Integer part
FP	Fractional part
RND	Round number to the current FIX/SCI/ENG setting
ABS	Absolute value

MODES Menu

FIX	Selects fix point format with 0-11 fractional digits
SCI	Selects scientific (exponential) format with 0-11 fractional digits
ENG	Selects exponential engineering format with 0-11 fractional digits where the exponent always is a multiple of 3
ALL	Selects a FIX point format where all non-0 trailing digits are displayed
./,	Switch between dot and comma for the decimal separator
D/R	Switch between degrees (360) and radians (2π)
BEEP	Controls the beeper. Options are: ON: Beeps for appointments and errors Appointments only: Beeps only for appointments OFF: Beeper is always off
PRNT	Controls the printing mode. Options are: AC adapter: Fast printing No AC adapter: Slow pritning

PRINTER Menu

Allows to print out various things:	
LIST	Print current menu data: Variables & their contents, number lists, solver equations, appointments. In some menus nothing is printed at all
STK	Print history stack (4 numerical results)
REGS	Print storage registers 0..9
TIME	Print current date & time
MSG	Allow to enter a character string which is then printed
TRACE	Toggles trace mode. Trace mode prints out all key presses and the calculator result

Solver Functions

ABS(x)	Absolute value
ACOS(x)	Arc cosine
ACOSH(x)	Hyperbolic arc cosine
ALOG(x)	Base 10 logarithm
ANGLE(x:y)	Angle of (x,y) converted to polar coordinates
ASIN(x)	Arc sine
ASINH(x)	Hyperbolic arc sine
ATAN(x)	Arc tangent
ATANH(x)	Hyperbolic arc tangent
CDATE	Current date in the currently selected format
COMB(x:y)	Combinations, see Cx,y
COS(x)	Cosine
COSH(x)	Hyperbolic cosine
CTIME	Current time in 24-hour format
DATE(date:n)	The date n days before or after *date*
DDAYS(d1:d2:cal)	Number of days between date d1 and d2. *cal* values: 1: True days 2: Days based on 365-day year 3: Days based on 360-days year
DEG(x)	Convert x from radians to degrees
EXP(x)	Exponential function
EXPM1(x)	EXP(x)-1
FACT(x)	Factorial for positive integer x
FP(x)	Fractional part
HMS(x)	Convert from decimal hours to h.mmss
HRS(x)	Convert x from h.mmss to decimal hours
IDIV(x:y)	Interger part of quotient x/y
IF(cond:alg1:alg2)	cond: Conditional expression alg1: Algebraic expression if "cond" is true alg2: Algebraic expression if "cond" is false Logical operators: AND, OR, XOR, NOT Relational operators: >, <, =, >=, <=, <>
INT(x)	Greatest interger ≤ x
INV(x)	Reciprocal 1/x
IP(x)	Integer part
ITEM(listname:idx)	Return a value from a named list, *idx* is the index starting from 1
LN(x)	Natural logarithm
LNP1(x)	LN(1+x)
LOG(x)	Logarithm base 10
MAX(x:y)	Larger of x and y
MIN(x:y)	Smaller of X and Y
MOD(x)	Reminder of division x/y
PERM(x:y)	Permutations, see Px,y
PI	π
RAD(x)	Convert x from degrees to radians
RADIUS(x:y)	Return the vector length of (x,y) converted to polar coordinates

RAN#	Return random number
RND(x:y)	x rounded to y decimal digits
SGN(x)	Sign of X: -1, 0 or 1
SIN(x)	Sine
SINH(x)	Hyperbolic sine
SIZES(listname)	Returns number of items in specified list
SPFV(i%:n)	Future value of a single value-1 payment after n compounding periods: (1+i%/100)^n
SPPV(i%:n)	Present value of a single value-1 payment: 1/SPFV(i%:n)
SQ(x)	x^2
SQRT(x)	Square root
TAN(x)	Tangent
TANH(x)	Hyperbolic tangent
TRN(x:y)	x truncated to y decimal places
USFV(i%:n)	Future value of n uniform value-1 payments: [SPFV(i%:n) – 1] / [i%/100]
USPV(i%:n)	Present value of n uniform value-1 payments: USFV(i%:n) / SPFV(i%:n)
XCOORD(R:a)	X-coordinate of polar coordinate (R,angle)
YCOORD(R:a)	Y-coordinate of polar coordinate (R,angle)

Special Solver Functions

S(var)

var must be a variable name.
This function returns true if *var* is the variable being solved for.
This makes it possible to solve different equations depending on what menu key is pressed!

Σ(var:start:end:step:expr)
Used to sum up values generated in a loop. Together with functions SIZES() and ITEM() (see above) it can be used to perform summing operations on lists

var: Loop counter variable name
start: Start value of *var*
end: End value of *var*
step: Steps size of *var*
expr: Expression evaluated for every value of *var*. The expression results are added up and form the result of the Σ function