Starting and Stopping

- start/stop standard Calc
- start/stop X keypad Calc
- start/stop either: M-# c or M-# k
- stop standard Calc
- Calc tutorial
- run Calc in other window
- quick calculation in minibuffer

Getting Help

- transferring data
- reset Calc to default state
- edit top of stack
- recall last arguments
- undo last operation
- abort command in progress
- display recent error messages
- undo last operation
- redo last operation
- recall last arguments
- display error messages
- edit top of stack
- reset Calc to default state

Transferring Data

- grab region from a buffer
- grab rectangle from a buffer
- grab rectangle, summing columns
- grab rectangle, summing rows
- yank data to a buffer

Also, try C-k/C-y or X cut and paste.

Examples

In RPN, enter numbers first, separated by RET if necessary, then type the operator. To enter a calculation in algebraic form, press the apostrophe first.

- arithmetic 
- scientific functions

Arithmetic

- add, subtract, multiply, divide: +, -, *, / 
- raise to a power, nth root: ^, n 
- change sign: k
- reciprocal 1/x
- square root √
- set precision:
- round off last two digits:
- convert to fraction, float:
- enter using algebraic notation:
- refer to previous result:
- refer to higher stack entries:
- finish alg entry without evaluating:
- set mode where alg entry used by default: a

Stack Commands

Here S_n is the nth stack entry, and N is the size of the stack.

- key: no prefix
- prefix: n
- prefix: -n
- sign change
- add, subtract, multiply, divide
- divide
- square root
- reciprocal

Display

- scroll horizontally, vertically: <, >, { }
- home cursor: o
- line numbers on/off: b T
- trail display on/off: t d
- scientific notation: s d
- fixed-point notation: d f
- floating-point (normal) notation: n
- group digits with commas: g d

For display mode commands, no prefix prevents screen redraw and I prefix temporarily redraws top of stack.

Notations

- scientific notation: 6.02e23
- minus sign in numeric entry: ,23 or -23 n
- fractions: 3:4
- complex numbers: (x, y)
- polar complex numbers: (r, θ)
- vectors (commas optional): [1, 2, 3]
- matrices (or nested vectors): [1, 2; 3, 4]
- error forms (p key):
- integral forms:
- modulo forms (M key):
- HMS forms:
- date forms:
- infinity, indeterminate:

Scientific Functions

- ln, log_{10}, log_{e}
- exponential: e^x
- trigonometric: sin, cos, tan
- inverse, hyperbolic prefix keys: I, H
- two-argument arctan:
- degrees, radians modes:
- pi (π)
- factorial, double factorial:
- combinations, permutations:
- prime factorization:
- next prime, previous prime:
- GCD, LCM:
- random number, shuffle:
- minimum, maximum:
- error functions erf, erfc:
- gamma, beta functions:
- incomplete gamma, beta functions:
- Beisel J_ν, Y_ν functions:
- complex magnitude, arg, conjugate:
- real, imaginary parts:
- convert polar/rectangular:

Financial Functions

- enter percentage:
- convert to percentage:
- percentage change:
- present value:
- future value:
- rate of return:
- number of payments:
- size of payments:
- net present value, int. rate of return:

Above computations assume payments at end of period. Use I prefix for beginning of period, or H for a lump sum investment.

Units

- enter with units:
- convert to new units, base units:
- convert temperature units:
- simplify units expressions:
- view units table:

Common units:

- distance: m, cm, mm, km; in, ft, mi, m; f; point, ly
- volume: l or L; ml; gal, qt, pt, cup, fl oz, tsp
- mass: g, mg, kg, t; lb, oz, ton
- time: s or sec, ms, us, ns, min, hr, day, wk
- temperature: degC, degF, K

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GNU Calc Reference Card

Programmer’s Functions

binary, octal, hex display       d 2, d 8, d 6
decimal, other radix display    d 0, d r
display leading zeros            d z
entering non-decimal numbers    16#7FFF
binary word size                 b w
binary AND, OR, XOR             b a, b o, b x
binary DIFF, NOT                 b d, b n
left shift                       b l
logical right shift              b r
arithmetic right shift           b R
integer quotient, remainder     \, %
integer square root, logarithm  f Q, f I
floor, ceiling, round to integer F, I, F, R

Variables

Variable names are single digits or whole words.
store to variable                s t
store and keep on stack          s s
recall from variable             s r
shorthands for digit variables   t n, s n, r n
unstore, exchange variable      s u, s x
edit variable                   s e

Vector Operations

vector of 1, 2, ..., n            v x n
vector of n counts from a by b   C u v x
vector of copies of a value      v b
concatenate into vector          l
unpack many stack items into vector v p
length of vector (list)          v l
reverse vector                   v v
sort, grade vector               V S, V G
histogram of vector data         V H
extract vector element          V r
matrix determinant, inverse     V D, k
matrix transpose, trace         v t, v T
cross, dot products             V C, *
identity matrix                 v i
extract matrix row, column      v r, v c
intersection, union, diff of sets v * , V V, V -
cardinality of set              V #
add vectors elementwise (i.e., map *) V M
sum elements in vector (i.e., reduce *) VR +
sum rows in matrix               VR -
sum columns in matrix            VR : *
sum elements, accumulate results V U +

Algebra

enter an algebraic formula       ' 2x+3y^2
enter an equation                ' 2x^2=18
sum elements, accumulate results
symbolic (vs. numeric) mode      m s
fractions (vs. float) mode       m f
suppress evaluation of formulas  m d
sum simplify formulas automatically m s
return to default evaluation rules m D
“Big” display mode               m D
C, Pascal, FORTRAN modes         d C, d P, d F
Unformatted mode                 d U
Normal language mode             d N
sum simplify formulas            a s
put formula into rational form   a n
evaluate variables in formula    =
evaluate numerically             N
let variable equal a value in formula a 1 z=val
declare properties of variable  s d
Common decls: pos, int, real, scalar, [a..b].
expand, collect terms           a x, a c
factor, partial fractions       a f, a a
polynomial quotient, remainder, GCD a \, a %, a g
derivative, integral            a d, a i
taylor series                   a t
principal solution to equation(s) a S
list of solutions                a P
generic solution                a H
apply function to both sides of eqn a H
rewrite formula                 a r
Example: a r a*b + a*c := a*(b+c)
Example: a r sin(x)^2 := 1-cos(x)^2
Example: a r cos(n pi) := 1 :: integer(n) :: n%2 = 0
Put rules in AlgSimpRules to have them automatically.
Put rules in EvalRules to apply during a command.
Common markers: opt, plain, quote, eval, let, remember.

Numerical Computations

sum formula over a range          a +
product of formula over a range   a *
tabulate formula over a range     a T
integrate numerically over a range a R
find zero of formula or equation  a R
find local min, max of formula   a M, a X
fit data to line or curve         a F
mean of data in vector or variable u H
median of data                   u M
geometric mean of data           u G
sum, product of data             u +, u *
minimum, maximum of data         u M, u X
sample, pop, standard deviation  u S, l u S

Selections

select subformula under cursor     j s
select nth subformula             j n
select more                      j m
unselect this, all formulas       j u, j c
copy indicated subformula         j BET
delete indicated subformula       j DEL
commute selected terms            j C
commute term leftward, rightward  j L, j R
distribute, merge selection      j D, j M
isolate selected term in equation j I
negate, invert term in context    j N, j &
rewrite selected term             j r

Graphics

graph function or data            g f
graph 3D function or data         g F
replot current graph              g P
print current graph                g P
add curve to graph                 g a
set number of data points         g N
set line, point styles            g s, g S
log vs. linear, x, y axis         g l, g L
set range for x, y axis           g r, g R
close graphics window             g q

Programming

begin, end recording a macro      C-x (, C-x )
replay keyboard macro            X
read region as written-out macro  M-# m
if, else, endif                  Z [ , Z ; : Z]
equal to, less than, member of    a =, a <, ( a
repeat n times, break from loop   Z <, Z >, Z /
“for” loop: start, end; body, step Z (, Z ,
save, restore mode settings      Z ' , Z ,
display message during macro      Z =
query user during macro           Z #
put finished macro on a key      Z K
define function with formula     Z F
edit definition                   Z E
record user-defined command permanently Z P
record variable value permanently a P
record mode settings permanently  m m

For GNU Emacs Calc manual, write to the Free Software Foundation, Inc., 675 Massachusetts Ave, Cambridge MA 02139.