APPLESOFT II: EXTENDED, FLOATING-POINT BASIC

QUICK REFERENCE GUIDE

SIMPLE VARIABLES

Type	Name	Range
Real	AB	+/- 9.99999999 E+37
Integer	AB%	+/- 32767
String	AB$	0 to 255 characters

Where A is a letter, B is a letter or digit. Name may be more than two characters, but only first two are significant: AB% and AB3QS% are the same integer variable.

ARRAY VARIABLES

Type	Name of Typical Element
Real	AB(3,12,7)
Integer	AB%(3,12,7)
String	AB$(3,12,7)

Array size is limited by available memory.

ALGEBRAIC OPERATORS

- =   Assigns value to variable (LET optional)
- -   Negation
- ^   Exponentiation
- *   Multiplication
- /   Division
- +   Addition
- -   Subtraction

RELATIONAL AND LOGICAL OPERATORS

- =   Equal
- <>   Not equal
- <   Less than
- >   Greater than
- <=   Less than or equal
- >=   Greater than or equal

- NOT   Logical "Not"
- AND   Logical "And"
- OR   Logical "Or"

Relational and logical expressions have value 1 if true, 0 if false. Relational operators can also be used to compare strings.

SYSTEM AND UTILITY COMMANDS

LOAD	Loads a program from tape.
SAVE	Saves a program on tape.
NEW	Deletes current program.
RUN	Executes program starting at lowest line number.
RUN 477	Executes program starting at line 477.
STOP	Halts execution and tells in which line.
END	Halts execution with no message.
ctrl C	Used in immediate mode to halt program or listing.
reset	Unconditional jump to Monitor. Use ctrl C or 0G to return to APPLESOFT.
CONT	Continues program execution stopped by STOP, END or ctrl C.
TRACE	Debugging aid; lists each line number as it is executed.
NOTRACE	Turns off TRACE.
PEEK(X)	Returns contents of memory location X.
POKE X,13	Changes contents of memory location X to the value 13.
WAIT X,Y,Z	Waits until contents of location X, when XORed with Z and ANDed with Y, gives non-zero result.
CALL X	Goes to machine-language subroutine beginning at memory location X.
USR(X)	Passes value X to a machine-language subroutine.
HIMEM:	Sets highest memory address available to APPLESOFT program use.
LOMEM:	Sets lowest memory address available to APPLESOFT program use.

EDITING AND FORMAT-RELATED COMMANDS

LIST	Lists entire program.
LIST X-Y	Lists from line X to line Y.
DEL X,Y	Deletes from line X to line Y.
REM XYZ	For writing program comments; ignored by program.
VTAB Y	Moves cursor to line Y (1 to 24).
HTAB X	Moves cursor to position X (1 to 40).
TAB(X)	Only in PRINT statement; moves cursor to position X (1 to 40).
POS(0)	Returns current horizontal position of cursor (0 to 39).
SPC(X)	Only in PRINT statement; puts X spaces between last item printed and next.
HOME	Clears screen and puts cursor at top.
CLEAR	Resets all variables to zero.

EDITING AND FORMAT-RELATED COMMANDS (cont'd)

FRE(0)	Returns amount of memory still available to user.
FLASH	Sets computer output to flashing.
INVERSE	Sets computer output to black on white.
NORMAL	Turns off flashing or inverse output.
SPEED=X	Sets character output rate (0 to 255).

esc A	Moves cursor one space right.
esc B	Moves cursor one space left.
esc C	Moves cursor one space down.
esc D	Moves cursor one space up.

right-arrow	Enters character under cursor into memory, and moves cursor one space right.
left-arrow	Deletes one character from line being typed, and moves cursor one space left.

ctrl X	Cancels line currently being typed.

ARRAYS AND STRINGS

DIM A(X,Y,Z)	Sets maximum subscripts for A; reserves memory space for X+1 * Y+1 * Z+1 real elements, starting with A(0,0,0).
DIM A$(X,Y)	Sets maximum subscripts for A$, which may contain X+1 * Y+1 strings elements, each of up to 255 characters.
LEN(A$)	Returns number of characters in A$.
STR$(X)	Returns numeric value of X, converted to a string.
VAL(A$)	Returns A$, up to the first non-numeric character, as a numeric value.
CHR$(X)	Returns ASCII character whose code is X.
ASC(A$)	Returns ASCII code for first character of A$.
LEFT$(A$,X)	Returns leftmost X characters of A$.
RIGHT$(A$,X)	Returns rightmost X characters of A$.
MID$(A$,X,Y)	Returns Y characters of A$, starting at character X.

+ Operator used to concatenate strings.

STORE A	Saves numeric array A on tape. Cannot be used to save string arrays, directly.
RECALL B	Loads array back from tape; array B must have been DIMensioned correctly.

INPUT/OUTPUT COMMANDS

(Also see LOAD and SAVE, STORE and RECALL.)

INPUT A$ Puts ? on screen; waits for user
    to type a string value for A$.
INPUT "XYZ";A   Prints XYZ on screen; waits
    for user to type a real number value
    for A.
GET A$ Waits for user to type a one-
    character value for A$; does not need
    RETURN key.
DATA X,"Y",Z   Establishes list of data
    elements that can be used by READ
    statements.
READ A$ Assigns next DATA element to A$.
RESTORE   Starts READing from first DATA
    element again.
PRINT "X= ";X   Prints string X= and value
    of variable X on screen. Semicolons
    concatenate printed items, commas
    separate items into three tab fields.
    The symbol ? also means PRINT.
IN#6   Takes future input from peripheral
    device in slot#6, instead of from
    keyboard (IN#0).
PR#6   Sends output to peripheral device in
    slot#6, instead of to TV screen (PR#0).
LET X=Y   LET is optional; assigns value
    of Y to variable X.
DEF FN A(X)=X+23/X   Defines a function FNA.
    In later use, the argument of FNA will
    be substituted for X in the defined
    expression. FNA(4) would return 9.75

COMMANDS RELATING TO FLOW OF CONTROL

GOTO 347   Branches to line 347.
IF X=3 THEN STOP   If the assertion X=3 is
    true (non-zero), then execution
    continues. If the assertion is false
    (zero), then execution jumps to the next
    numbered line.
FOR X=1 TO 20 STEP 4 ... NEXT X
    Executes all statements between the FOR
    statement and the corresponding NEXT,
    first with X=1, then with X=5, X=9, etc.
    until X>20, when execution continues
    after NEXT. STEP size is 1 if not
    specified.
NEXT X   Defines bottom of FOR...NEXT loop.
    The X is optional.
GOSUB 33   Branches to the subroutine at
    line 33.

COMMANDS RELATING TO FLOW OF CONTROL   (cont'd)

RETURN   Marks end of subroutine; returns to
    statement following most recent GOSUB.
POP   Removes one address from RETURN the
    address stack.
ON X GOTO 397,12,458   Branches to the Xth
    line number in the list. If X=2, goes
    to line 12.
ON X GOSUB 397,12,458   Branches to
    subroutine at the Xth line number in
    the list.
ONERR GOTO 4500   Subsequent errors cause
    branch to error-handling routine
    at line 4500 instead of message and
    program halt.
RESUME   In error-handling routine, causes
    return to statement where error occurred.

GRAPHICS AND GAME CONTROLS

Low-Resolution Graphics

GR   Sets low-resolution graphics; clears
    top 40 x 40 area to black; bottom 4
    lines text.
COLOR=X   Sets color (0 to 15) for next
    plotting.
PLOT X,Y   Places colored dot at horizontal
    coordinate X and vertical coordinate Y.
    X and Y are from 0 to 39. 0,0 is top
    left.
HLIN X1,X2 AT Y   Draws horizontal line from
    the point at X1,Y to the point at X2,Y.
VLIN Y1,Y2 AT X   Draws vertical line from
    the point at X,Y1 to the point at X,Y2.
SCRN(X,Y)   Returns color on screen at the
    point X,Y.

High-Resolution Graphics

HGR   Sets high-resolution graphics, page 1;
    clears top 280 x 160 area to black;
    bottom 4 lines text.
HGR2   Sets high-resolution graphics, page 2;
    clears entire 280 x 192 screen to black.
HCOLOR=X   Sets color (0 to 7) for next
    plotting.
HPLOT X,Y   Places colored dot at horizontal
    coordinate X and vertical coordinate Y.
    X is from 0 to 279; Y is from 0 to 159
    (HGR) or to 191 (HGR2). 0,0 is top
    left corner.

GRAPHICS AND GAME CONTROLS   (cont'd)

HPLOT X1,Y1 TO X2,Y2   Draws line from the
    point at X1,Y1 to the point at X2,Y2.
    Command may be extended to additional
    points...TO XN,YN.

SHLOAD   Loads a shape table from tape.
DRAW 3 AT X,Y   Draws shape definition #3
    from a previously loaded shape table,
    starting at the point X,Y in color set
    by HCOLOR.
XDRAW 3 AT X,Y   Draws shape definition #3
    from shape table; color of each point
    plotted is complement of color on
    screen at that point.
ROT=X   Sets rotation of shape for DRAW or
    XDRAW. ROT=0 is vertical, ROT=16 is
    90 degrees clockwise, ROT=32 is
    180 degrees clockwise, etc.
SCALE=X   Sets scale (1 to 255) of shape for
    DRAW or XDRAW.

Game Controls

PDL(X)   Returns setting from 0 to 255 of
    game control X (0 to 3).
PEEK(X-16287)   If >127, button on game
    control X (0 to 2) is being pressed.
PEEK(-16336)   "Clicks" APPLE's speaker.

SOME MATH FUNCTIONS

SIN(X)   Returns sine of X radians.
COS(X)   Returns cosine of X radians.
TAN(X)   Returns tangent of X radians.
ATN(X)   Returns arctangent, in radians, of X.
INT(X)   Returns largest integer less than
    or equal to X.
RND(1)   Returns random real number from
    0 to 0.999999999 each time used.
RND(0)   Returns last random number again.
RND(-3)   Returns 4.48217179E-08. A different
    fixed number is returned for each
    different negative argument. After
    this, RND with positive argument will
    follow a fixed sequence.
SGN(X)   Returns -1 if X<0, 0 if X=0, and 1
    if X>0.
ABS(X)   Returns absolute value of X.
SQR(X)   Returns positive square root of X.
EXP(X)   Returns e (2.718289) to the power X.
LOG(X)   Returns natural logarithm of X.