ARITHMETIC FUNCTIONS

Statement	Syntax/Function	Example
ABS	ABS (expression) Absolute value of expression	Y = ABS (A + B)
ATN	ATN (expression) User-provided function that returns arctangent of the expression (in radians)	PRINT ATN (A)
COS	COS (expression) Cosine of the expression (in radians)	A = COS (2, 3)
EXP	EXP (expression) Raises the constant e to the power of the variable	B = EXP (C)
INT	INT (expression) Evaluates the expression for the largest integer contained	C = INT (X + 3)
LOG	LOG (expression) Gives the natural logarithm of the expression	D = LOG (Y – 2)
RND	RND (parameter) Generates a random number. Parameters are: <0 seed new sequence =0 return previous random number >0 return new random number	E = RND (1)
SGN	SGN (expression) 1 if expression > 0 0 if expression = 0 – 1 if expression < 0	B = SGN (X + Y)
SIN	SIN (expression) Sine of the expression (in radians)	B = SIN (A)
SQR	SQR (expression) Square root of the expression	C = SQR (D)
TAN	TAN (expression) Tangent of the expression (in radians)	D = TAN (3.14)

BASIC INSTRUCTION FORMAT

$00A_3A_2A_1A_0N_3N_2N_1N_0XX\ldots XX00A_3A_2A_1A_0\ldots$

Where:
- 00 = Line delimiter; i. e., start of new statement line
- $A_3A_2A_1A_0$ = Address of the start of the next statement, in binary
- $N_3N_2N_1N_0$ = Statement line number, in binary
- XX . . . XX = Tokens (statement codes) and data, in ASCII and BASIC encoded symbols

TABLE OF ERROR CODES

Code	Error
BS	Bad subscript
CN	Cannot continue
DD	Double dimension
FC	Illegal function call
ID	Illegal direct
LS	String too long
NF	NEXT without FOR
OD	Out of data
OM	Out of memory
OV	Overflow
RG	RETURN without GOSUB
SN	Syntax error
ST	String temporaries
TM	Type mismatch
UF	Undefined function
US	Undefined statement
/0	Division by zero

MESSAGES

REDO FROM START — A non-decimal character was entered in response to an INPUT function. Re-enter the entire number.

EXTRA IGNORED — An extra parameter was entered in response to an INPUT function.

BREAK — Break command (F1) or STOP command was executed.

ZERO PAGE PARAMETERS

Parameter	Hex Address	Decimal Address
USR Routine address (L, H)	04, 05	04, 05
Line width	12	18
Input Buffer	14-50	20-88
Pointer to program start (L, H)	73, 74	115, 116
Pointer to variable start (L, H)	75, 76	117, 118
Pointer to array start (L, H)	77, 78	119, 120
Pointer to top of used memory (L, H)	79, 7A	121, 122
Pointer to top free space (L, H)	7B, 7C	123, 124
Pointer to top memory (L, H)	7F, 80	127, 128
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AIM 65 8K BASIC Reference Card

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RND
SGN
SIN
SQR
TAN

Rockwell Microelectronic Devices Sales Offices

WESTERN REGION, U.S.A.
3310 Miraloma Avenue
P.O. Box 3669
Anaheim, CA 92803
Phone: (714) 632-3698

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Contact Robert O. Whitesell & Associates
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Indianapolis, Indiana 46219
Attn.: Milt Gamble, Mgr.
Phone: (317) 359-9283

FAR EAST
Rockwell International Overseas Corp
Ichiban-cho Central Building
22-1 Ichiban-cho, Chiyoda-ku
Tokyo 102, Japan
Phone: 265-8808

EUROPE
Rockwell International GmbH
Microelectronic Devices
Fraunhoferstrasse 11
D-8033 Munchen-Martinsried
Germany
Phone: (089) 859-9575

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OPERATORS

Symbol	Function
=	Assignment, or equality test
–	Negation or subtraction
+	Addition or string concatenation
*	Multiplication
/	Division (floating point result)
↑ (F3)	Exponentiation
NOT	One's complement (integer)
AND	Bitwise AND (integer)
OR	Bitwise OR (integer)
XOR	Bitwise exclusive OR (integer)
=	Equal
<	Less than
>	Greater than
<=	Less than or equal
>=	Greater than or equal
<>	Not equal

The precedence of operators is:

(1) Expressions in parentheses
(2) Exponentiation (A↑B)
(3) Negation (– X)
(4) *, /
(5) +, –
(6) Relational operators [=, <>, <, >, <=, >=]
(7) NOT
(8) AND
(9) OR
(10) XOR

SPECIAL CHARACTERS

RETURN	Ends every line typed in
LF	Advances printer paper one line
DEL	Erases last character typed
: (colon)	Separates statements typed on the same line
?	Equivalent to PRINT
F1	Break in execution
ESC	Returns control to monitor
!	Causes print even if printer control is turned off
@	Erases current line
$	Suffix, specifies string variable
%	Suffix, specifies integer variable

COMMANDS

Statement	Syntax/Function	Example
CLEAR	CLEAR Clear program variables	CLEAR
CONT	CONT Continue program execution	CONT
FRE	FRE (expression) Gives memory free space not used by BASIC	PRINT FRE (0)
LIST	LIST [[start line] [-[end line]]] List program lines at terminal	LIST 100-1000
LOAD	LOAD input device filename tape no. Load a program file.	LOAD IN = T F = NAME1 T = 1
NEW	NEW Delete current program and variables.	NEW
PEEK	PEEK (address) Reads a byte in decimal from memory at specified decimal address	PRINT PEEK (2000)
POKE	POKE address, byte Puts byte specified in decimal into decimal memory location specified	POKE 23100, 255
RUN	RUN (line number) Run a program (from line number)	RUN RUN 50
SAVE	SAVE output device filename, tape no. Save the program in memory with name "filename."	SAVE OUT = T F = PROG T = 1

PROGRAM STATEMENTS

Statement	Syntax/Function	Example
DEF FN	DEF FNx [(argument list)] = expression Define an arithmetic or string function	DEF FNA (X,Y) = SQR (X*X + Y*Y)
DIM	DIM variable (size 1, [size 2 . . .]) . . . Allocate space for arrays.	DIM A (3), B$ (10, 2, 3)
END	END Stop program and return to BASIC command level.	END
FOR	FOR variable = expression TO expression [STEP expression] Used with NEXT statement to repeat a sequence of program lines. The variable is incremented by the value of STEP.	FOR I = 1 TO 5 STEP .5 . . .
GOSUB	GOSUB line number Call a BASIC subroutine by branching to the specified line number. See RETURN.	GOSUB 210
GOTO	GOTO line number Branch to specified line number	GOTO 90
IF . . .GOTO	IF expression GOTO line number The relation X <Y is tested; if true, the GOTO clause is executed. If false the GOTO clause is not executed.	IF X <Y GOTO 100
IF . . .THEN	IF expression THEN statement [:statement] . . . The relation X<Y is tested. If true, the THEN clause is executed. If false, the THEN clause is not executed.	IF X<Y THEN Y = X
LET	[LET] variable = expression Assign a value to a variable	LET X = I + 5
NEXT	NEXT variable [,variable] . . . Delimits the end of a FOR loop	NEXT
ON. . .GOSUB	ON expression GOSUB line [,line] . . . GOSUBs to statement specified by expression. (If J + 1 = 1, to 20; if J + 1 = 2,to 20; if J + 1 = 3, to 40)	ON J + 1 GOSUB 20,20,40
ON. . .GOTO	ON expression GOTO line [,line] . . . Branches to statement specified by I (To 20 if I = 1; to 30 if I = 2)	ON I GOTO 20,30
REM	REM any text Allows user to insert comments in program (not executed). Note:":"does not terminate a REM statement.	REM comment
RESTORE	RESTORE Resets DATA pointer so that DATA statements may be re-read	RESTORE
RETURN	RETURN Return from subroutine to statement following last GOSUB performed	RETURN
STOP	STOP Stop program execution, print BREAK message, and return to COMMAND mode.	STOP
USR	USRn (argument) Calls the user's machine language subroutine with the specified argument.	PRINT USR (27000)
WAIT	WAIT address, mask [,select] Waits for input to appear on a hardware port	WAIT 21, 1

INPUT OUTPUT STATEMENTS

Statement	Syntax/Function	Example
DATA	DATA item [,item . . .] Specifies data to be used in a READ statement	DATA 2,3, "PLUS", 4
INPUT	INPUT [!] ["prompt string literal";] variable [, variable] . . . Read data from the keyboard If ! is included, the input data is printed regardless of printer control state	INPUT "VALUES"; A, B
PRINT	PRINT [!] expression [, expression] Display/print data at the terminal. If ! is included,the data is printed regardless of the printer control state	PRINT X;Y A$, B$ PRINT X, Y PRINT "VALUE"; X
READ	READ variable [, variable] Reads data into specified variables from DATA statement	READ I, X, A$
SPC	SPC (expression) Used in PRINT statement to print spaces	PRINT SPC (5)
TAB	TAB (expression) Used in PRINT statement to tab start of print to specified position.	PRINT TAB (20)

STRING FUNCTIONS

Statement	Syntax/Function	Example
ASC	ASC (string expression) Returns the ASCII value of the first character of a string	PRINT ASC (A$)
CHR$	CHR$ (expression) Returns one character, the ASCII equivalent of the expression	PRINT CHR$ (48)
GET	GET string variable Inputs a single character from the keyboard. Continues execution if no character is available.	GET A$
LEFT$	LEFT$ (string expression, length) Returns leftmost length characters of the string expression	B$ = LEFT$ (X$, 8)
LEN	LEN (string expression) Returns the length of a string	PRINT LEN (B$)
MID$	MID$ (string expression, start [,length]) Returns characters from the middle of the string starting at the position specified to the end of the string or for length characters	A$ = MID$ (X$, 5, 10)
	MID$ may also be used to assign a substring inside a string	MID$ (A$, 3, 2) = "TO"
RIGHT$	RIGHT$ (string expression, length) Returns rightmost length characters of the string expression	C$ = RIGHT$ (X$, 8)
STR$	STR$ (expression) Converts a numeric expression to a string	PRINT STR$ (35)
VAL	VAL (string expression) Converts the string representation of a number to its numeric value	PRINT VAL ("3.1")