BASIC

Quick Reference Card

FLUKE ®

NOTE

The **REF** column refers to the Reference number used in the Reference Section
for the Basic Keyword.
The quantities X, Y, n%, A$, B$, etc. used in the following examples are the
arguments received by the statement, function or command.
I.M.C. = Immediate Mode Command

REF	KEYWORD	ACTION
1	ABS(X) Function	Returns |X| or the absolute value of its argument.
69	AND Operator	Logical (Boolean) AND operation.
2	Arithmetic Operators	Unary operators, addition, subtraction, multiplication, division, and exponentiation.
3	Array Variables	Describes the format and usage of array variables.
4	ASCII(A$) Function	Returns the decimal position of the ASCII character.
5	ASH(X%) Function	Signed arithmetic shift of integer.
6	ASSIGN Function	Assign a device as system device (SY0:).
7	ASSIGNMENT Operator	Using "=" to assign values.
8	ATN(X) Function	Returns arctan(X) in radians.
9	BREAK Statement	Send break signal on RS-232 port.
10	CALL Statement	Execute a FORTRAN or Assembly Language program.
11	CHR$(X%) Function	Yields a character equal to the ASCII equivalent of X.
12	CLEAR Statement	Send IEEE-488 device clear signal to device or devices.
13	CLOSE Statement	Closes a channel previously opened to a port, device, or file.
14	CMDFILE Function	Logical function: is a command file active?
15	CMDLINE$ System Function	Read the current FDOS command line.
16	COM Statement	Reserve variables and arrays in common area for chained programs.
17	CONFIG Statement	Configure or unconfigure instrument for parallel poll.
18	CONT TO I.M.C.	Resume program execution at linenumber from breakpoint caused by STOP, STOP ON, CONT TO, or CTRL /C.
19	COPY Statement	Copy a file.
20	COS(X) Function	Returns cosine(X) in radians.
21	CPOS(X%,Y%) Function	Returns the string needed to position the cursor at the given X,Y coordinates.
117	DATA Statement	Define sequence of data items to be read by READ.
150	DATE$ System Variable	Returns date as DD-MM-YY.
22	DEF FN Statement	Define function.
23	DELETE I.M.C.	Delete program lines in memory.
24	DIM Statement	Dimension array or file.

REF	KEYWORD	ACTION
25	DIR Statement	Print directory of file structured device (like FUP /L).
26	DISABLE Statement	Disable all interrupts (except ON ERROR).
27	DISABLE CMDFILE Stmt	Suspend execution of command file.
28	DUPL$(A$) Function	Create a string of duplicated characters.
29	EDIR Statement	Print extd. directory of file structured device (like FUP /E).
30	EDIT I.M.C.	Enter the EDIT mode.
31	ENABLE Statement	Enable interrupts after a DISABLE Statement.
32	ENABLE CMDFILE Stmt	Resume command file execution (see DISABLE CMDFILE).
33	END Statement	The last program statement, causes exit to OK prompt.
150	ERL System Variable	Returns line number of last error.
150	ERR System Variable	Returns error number of last error.
34	EXEC Statement	Chain to machine language (.FD2) or command file (.CMD).
35	EXIT	Exit basic, return to FDOS or SHELL.
36	EXP(X) Function	Returns natural log base e raised to power X.
37	FLEN Variable	Returns the length of a file.
38	Floating-Point Variables	Describes floating-point (real) variables, constants, and data.
39	FOR and NEXT Statement	Sets up a program loop.
40	GOSUB Statement	Subroutine call — goto linenumber, do it, come back.
41	GOTO Statement	Branch to linenumber, don't return.
42	IF-GOTO Statement	IF condition GOTO linenumber.
42	IF-THEN Statement	IF condition THEN do this.
42	IF-THEN-ELSE Statement	IF condition THEN do this ELSE do this.
43	INCHAR(X%) Function	Read single character from open channel or console.
44	INCOUNT(X%) Function	Number of characters/lines available from serial device.
45	INIT Statement	Initialize IEEE-488 port.
46	INPUT Statement	Get data from user.
47	INPUT #n Statement	Data input from system level device through channel.
48	INPUT Statement	IEEE-488 Bus input.
49	INPUT LINE Statement	Get string data from user.
50	INPUT LINE #n Statement	Get string data from I/O channel.
51	INPUT LINE @ Statement	Get string data from IEEE-488 Bus.
52	INPUT LINE WBYTE Stmt	IEEE-488 Bus input with prior Bus message.
53	INPUT WBYTE Statement	Send IEEE-488 Bus message prior to getting data item.
54	INSTR(n%,A$,B$) Function	Returns the first character position of a substring B$ within string A$ starting at n%.
55	INT(X) Function	Return the greatest integer ≤ X.
56	INTEGER Variables	Describes the format and usage of integer variables, constants, and data.
57	KEY System Variable	Returns touch sense "key" last pressed.
58	KILL Statement	Remove, erase this file from device.
59	LCASE$(A$) Function	Convert string to lower-case.
60	LEFT(A$,n%) Function	Return the leftmost n% characters of A$.
61	LEN(A$) Function	Return the number of characters in A$.
62	LET Statement	Assignment operator — LET X = 5.
63	LINK Statement	Load an object file into system RAM.
64	LIST I.M.C.	LIST program lines.
65	LN(X) Function	Return the natural log (log e) of X.
66	LOCAL Statement	Reset IEEE-488 Bus instruments to local state.
67	LOCKOUT Statement	Implement local lockout on the IEEE-488 Bus.
68	LOG(X) Function	Return the log (log 10) of X.
69	Logical Operators	Describes the AND, OR, XOR, and NOT operators.
70	LSH(X) Function	Unsigned logical integer shift (see ASH).
71	MATH Functions	Describes the mathematical functions.
72	MEM System Variable	Returns amount of available memory in bytes.
73	MID(A$,s%,n%) Function	Return substring of A$ given starting position s% and number of characters n%.
74	MOD(X) Function	Return remainder of division of division operation.
39	NEXT Statement	Closes FOR-NEXT loop.
69	NOT Operator	Logical (Boolean) NOT operation.
75	NUM$(X) Function	Convert X to a string as PRINT or PRINT USING would output it.

REF	KEYWORD	ACTION
76	OFF CTRL/C Statement	Disable CTRL /C interrupt processing.
77	OFF #n Statement	Disable interrupt processing from channel #n.
78	OFF CLOCK Statement	Disable clock interrupts.
79	OFF ERROR Statement	Disable action of previous ON ERROR GOTO statement.
80	OFF INTERVAL Statement	Disable interval interrupts.
81	OFF KEY Statement	Disable interrupt from Touch Sensitive Overlay.
82	OFF PORT Statement	Disable interrupt sensing on port.
83	OFF PPOL Statement	Disable parallel poll interrupt processing.
84	OFF PPORT Statement	Disable PPORT status checking.
85	OFF SRQ Statement	Disable service request interrupt processing.
86	OLD Statement	Load a program into memory from mass storage, do not run.
87	ON CLOCK Statement	Create interrupt at specific time of day.
88	ON CTRL/C Statement	Enable CTRL /C interrupt processing.
89	ON ERROR Statement	Enable interrupt processing on error condition.
90	ON #n Statement	Enable interrupt processing from channel #n.
91	ON...GOSUB Statement	ON condition GOSUB this linenumber.
91	ON...GOTO Statement	ON condition GOTO this linenumber.
92	ON INTERVAL Statement	Create interrupt at interval (SET INTERVAL).
93	ON KEY Statement	Enable interrupt from Touch Sensitive Overlay.
94	ON PORT Statement	Enable interrupt sensing on port when not controller-in-charge.
95	ON PPOL Statement	Enable parallel poll interrupt processing.
96	ON PPORT Statement	GOTO from parallel port interrupt.
97	ON SRQ Statement	Enable service request interrupt processing.
98	OPEN Statement	OPEN a channel to a file, device, or port.
99	OPEN Statement	OPEN a channel to a virtual array.
69	OR Operator	Logical (Boolean) OR operation.
100	PACK Statement	Pack a file structured device.
101	PASSCONTROL Statement	Give up IEEE-488 control to another controller.
102	PI User Constant	$\pi = 3.14159265358979$.
102a	PORT Expression	Direct address to port
103	PORTSTATUS(X%) Function	Determine status of interface port.
104	PPL Function	Parallel poll Bus port and return result.
105	PRINT Statement	PRINT something (usually on the controller's display).
106	PRINT @ Statement	Output something to the IEEE-488 Bus.
107	PRINT #n Statement	PRINT something to a channel.
108	PRINT USING Statement	PRINT something USING this format.
109	PROTECT Statement	Set delete protection for a file.
110	QDIR Statement	Quick directory listing of file-structured device.
111	RAD(x%,b%) Function	Integer x% to non-decimal base b% conversion.
112	RANDOMIZE Statement	Shake up the random number generator.
113	RBIN Statement	Receive binary data from IEEE-488 instruments.
114	RBIN WBYTE Statement	Output data specified by WBYTE, then perform RBIN.
115	RBYTE Statement	Read fixed-length byte from IEEE-488 instruments.
116	RBYTE WBYTE Statement	Output data specified by WBYTE, then perform RBYTE.
117	READ, DATA, and RESTORE Statement	READ the data from the DATA statements, RESTORE (resume) reading of data from the DATA statement.
118	Relational Operators	Describes =, >, <, <>, <=, and >= operators.
119	REM Statement	REMark, comment. Comment your programs.
120	REMOTE Statement	Set IEEE-488 Remote Enable line to true.
121	REN Immediate Mode Cmd	Renumber the program in memory.
122	RENAME Statement	Rename a file.
124	RESAVE Statement	Non-interactive SAVE.
124	RESAVEL Statement	Non-interactive SAVEL.
117	RESTORE Statement	Resume or re-read DATA statements(s).
125	RESUME Statement	Resume program operation after interrupt.
126	RETURN Statement	Subroutine return: go back to calling program after GOSUB.
127	RIGHT(A$,n%) Function	Return a substring at n% to the end of A$.
128	RND Function	Return a pseudorandom number.
129	RUN I.M.C.	Run a BASIC program.
129	RUN Statement	Chain to another BASIC program.
130	SAVE Command	SAVE program in file on device, ask before clobbering old file.
130	SAVEL Statement	SAVE program in lexical form, ask before clobbering old file.
131	SET CLOCK Statement	Set clock interrupt (ON CLOCK...GOTO).
132	SET CMDLINE$ Statement	Set the FDOS command line.
133	SET DATE Statement	Set the date in the system clock.

REF	KEYWORD	ACTION
134	SET ECHO Statement	Puts the keyboard into normal ("line") mode.
135	SET INTERVAL Statement	Set interval interrupt (ON INTERVAL...GOTO).
136	SET NOECHO Statement	Puts the keyboard into editing ("character") mode.
137	SET SHELL Statement	Use this program when exit occurs, rather than FDOS.
138	SET SRQ Statement	Service request from controller-in-charge.
139	SET TIME Statement	Set the system clock.
140	SGN(X) Function	Return the sign of X (-1, 0, 1).
141	SIN(X) Function	Return sine(X) in radians.
142	SPACE$(n%) Function	Return a string of n% space characters.
143	SPL(n%) Function	Return status byte of instrument by serial poll.
144	SQR(X) Function	Return the square root of X.
144a	STEP I.M.C.	Single Step program execution.
145	STIME$ System Variable	Returns the current time in 24 hour format (H:MM:SS).
146	String Comparisons	Describes the usage of relational operators on strings.
147	Strings	Describes string constants, variables, and data.
148	STOP Statement	STOP program execution.
149	STOP ON Statement	STOP program execution on this line number.
150	System Variables	Describes the various system variables.
151	TAB(n%) Function	Move the cursor or printhead to the next tab position.
152	TAN(X) Function	Returns tangent(X) in radians.
153	TERM Statement	Specify terminating character for input data (IEEE-488).
150	TIME System Variable	Returns time in milliseconds since midnight.
150	TIME$ System Variable	Returns time as HH:MM in 24 hour format.
154	TIMEOUT Statement	Limit wait time for response to IEEE-488 Bus request.
154a	TRACE OFF Statement	Disable trace facility
155	TRACE Statement	Line number trace facility.
156	TRIG Functions	Describes trigonometric functions.
157	TRIG Statement	Address specified devices as listeners (IEEE-488).
158	TRIM Statement	Trim trailing null characters from virtual array strings.
159	UCASE$(A$) Function	Convert string to upper-case.
160	UNLINK Statement	Forget previously LINKed .obj file
161	UNPROTECT Statement	Remove delete protection from a file.
162	VAL(A$) Function	Convert numeric string A$ to floating-point.
163	WAIT Statement	Suspend program execution for specified time period.
164	WAIT Statement	Suspend program execution until interrupt occurs.
164	WAIT FOR TIME Statement	Uninterruptible WAIT statement.
165	WAIT FOR KEY Statement	Suspend program execution for TSO input.
166	WAIT FOR PPOL	Suspend program execution for parallel poll on IEEE bus.
167	WAIT FOR SRQ	Suspend program execution for service request on IEEE bus.
168	WBIN Statement	Output single or double precision data (IEEE-488).
169	WBYTE Statement	Send integer array as Bus message to designated port.
69	XOR Operator	Logical (Boolean) exclusive OR operation.

REF	SYMBOL	ACTION
56	n%	Integer variable or data.
147	A$	String variable or data.
3	A$(X,Y)	String array (2 dimensional).
3	A%(X,Y)	Integer array (2 dimensional).
3	A(X,Y)	Floating-point variable array.
7	=	Assignment operator (let X = Y).
118	=	Relational equality operator.
2	+	Addition operator (X = Y + 3).
146	+	String concatenation operator.
2	-	Subtraction operator (X = Y−3).
2	*	Multiplication operator (X = Y * 5).
2	/	Division operator (X = Y / 2).
2	$\frown$	Exponentiate (X $\frown$ 2 = X * X).
118	<	Relational less than operator.
118	<=	Relational less than or equal to operator.
118	>	Relational greater than operator.
118	>=	Relational greater than or equal to operator.
118	<>	Relational not equal operator.
119	!	Denotes comment following "!" symbol.

TYPE	NUMBER	LEVEL	ERROR
OVERFLOW	0 1 2	F F F	User storage overflow Virtual array declaration too large (more than 64K-bytes) File too small for virtual array declarations
SYSTEM	100 101	F F	BASIC or FDOS system error Configuration error -- incompatible ".BAL" file format
COMMAND	200 201 202	F F F	Immediate mode command in RUN mode or vice-versa Cannot CONTinue at this point STEP outside break mode is not permitted
I/O	300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330	R R R R R R R R R R W R R F F F F R R R F R R R R R R R R R R	Diskette is not loaded Diskette is write protected Illegal channel number (<1 or >16) Channel already in use Invalid device name File not found on device No room left on device Read/write past physical end of file Channel is not open Data lost on RS-232 channel input Input line too long Non-recoverable device read/write error Illegal file name specified Channel is not open as random (DIM) file Sequential access to random (DIM) file Virtual array assigned to non-file-structured device Illegal lexical (.BAL) file name Invalid device directory Read from output file or write to input file not permitted Wrong device type for ON n interrupts Illegal object file format Device directory is full Illegal operation for device type File is delete protected – can't KILL or OPEN AS NEW FILE Can't RENAME file File medium (diskette) was swapped Can't load program - too little memory is available Illegal image (.FD2) file format Command line too long (maximum 80 characters) RS-232 port number outside range (> 9) for BREAK Parallel port number out of range (>15)
INSTRUMENT BUS CONTROL	400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416	R R R R R R R R R R R R R R R W R	Illegal IEEE-488 port number specified (<0 or >1) Illegal IEEE-488 device primary address (<0 or >30) Illegal IEEE-488 device secondary address (<0 or >31) IEEE-488 bus handshake incomplete Too many IEEE-488 ports specified for function No devices attached to IEEE-488 port No IEEE-488 ports available Unavailable IEEE-488 port specified Timeout during IEEE-488 bus I/O Illegal WBYTE data (both EOI and ATN specified) Parallel poll bit number out of range (<1 or >8) Parallel poll bit sense out of range (<0 or >1) IEEE-488 bus timeout value out of range (<0 or >32767) IEEE-488 TERM string longer than 1 character No IEEE-488 driver configured in FDOS Illegal SET SRQ status byte value (<0 or >255) Illegal operation for current IEEE-488 port state
SYNTAX	500 501 502 503 504 505 506 507 508 509 510 511 512	F F F F F F F F F F F F F	Unrecognized statement Illegal character terminating statement Badly formed array subscript Mismatched parentheses in expression Illegal LET statement Illegal IF statement Illegal line number Illegal PRINT statement Illegal PRINT USING mask Illegal INPUT statement Illegal DIMension statement Badly formed DEFine function statement Illegal FOR statement

TYPE	NUMBER	LEVEL	ERROR
SYNTAX (cont)	513	F	FOR without NEXT
	514	F	NEXT without FOR
	515	F	Mismatched quotes in string constant
	516	F	Ill-formed expression
	517	F	Illegal OPEN statement
	518	F	Illegal CLOSE statement
	519	F	IEEE-488 statement syntax error
	520	F	Illegal COMmon statement
	521	F	RETURN statement encountered when NEXT statement required
	522	F	Illegal variable name
	523	F	ON statement syntax error
	524	F	OFF statement syntax error
	525	F	TRACE statement syntax error
	526	F	Illegal file SIZE specification
	527	F	RENumber parameter error
	528	F	RENumber statement syntax error
	529	F	ELSE without IF
	530	F	NEXT syntax error
	531	F	INPUT WBYTE requires IEEE-488 input
	532	F	Illegal array subrange specified
	533	F	WBYTE/RBYTE data not integer type
	534	F	Can't specifiy column for WBYTE/RBYTE array
	535	F	Can't use undimensioned variable for WBYTE/RBYTE
	536	F	Can't use virtual arrays with WBYTE/RBYTE
	537	F	2-dimensional array illegal with WBYTE/RBYTE
	538	F	Illegal CONFIG statement
	539	F	Illegal RBYTE statement syntax
	540	F	RBYTE cycle length must be greater than zero
	541	F	Total number of RBYTE elements not a multiple of cycle length
	542	F	Illegal WBYTE clause syntax
	543	F	Illegal data type for RBIN/WBIN binary transfer
	544	F	WAIT statement syntax error
	545	F	Illegal CALL statement
	546	F	Virtual array parameter illegal for CALL
	547	F	CALL statement parameter syntax error
	548	F	Illegal SET statement syntax or option
	549	F	Require filename for SAVE/SAVEL/RESAVE/RESAVEL
	550	F	Illegal RENAME statement syntax
MATH	600	F	Illegal data type mixing in expression
	601	R	Arithmetic overflow
	602	R	Arithmetic underflow
	603	R	Divide by zero
	604	R	Square root of negative number
	605	R	Exponent too large (max is 708) for exp() function
	606	R	LOG or LN argument <= 0
	607	R	Trigonometric function argument too large (32767 maximum)
	608	R	Improper argument(s) in power
TRANSFER	700	F	Illegal GOTO or GOSUB
	701	F	RETURN without GOSUB
	702	F	Illegal RESUME -- no interrupt active
	703	F	Call to undefined function (no DEF statement for function)
	704	R	ON .. GOTO selector is out of range
	705	F	CALL to undefined subroutine
	706	F	Parameter count mismatch in CALL
	707	R	Illegal time or date specified in SET CLOCK/DATE/INTERVAL/TIME
	708	R	Timer not SET for ON CLOCK/INTERVAL
INPUT	800	R	Out of DATA in READ
	801	W	Too much data typed for INPUT statement
	802	W	Not enough data typed for INPUT statement
	803	W	Illegal character in data for INPUT or VAL function
	804	F	Badly formatted DATA statement
VARIABLE	900	F	Use of non-existent variable value
	901	F	DIM of previously declared variable
	902	R	Array subscript out of range
	903	F	COM of previously declared variable
	904	W	String too long for virtual array string field
	905	F	Incompatible COM declaration -- COM area sizes don't match
	906	F	COM after LINK statement not allowed
	907	F	Illegal XOP 1 function code

F = Fatal   R = Recoverable   W = Warning