





# BASIC Statements

BASIC Statements	PET	Apple II	TRS-80	Atari	TI 99/4	Sorcerer	ZX80
General Statements							
END	*	*	*	*	CALL CLEAR	*	*
CALL address	*	*	*	*		EN	*
CALL CHAR	*	*	*	*			*
CALL COLOR	*	*	*	COLOR	*		*
CALL JOYSTK	*	*	*	STICK	*		*
CALL SCREEN	*	HCOLOR=	*	SETCOLOR	*		*
CALL SOUND	*	*	*	SOUND	*		*
CLOSE	*	*	*	*	*		*
COLOR = n	*	*	*	*	*		*
DATA	*	*	*	*	DEF	*	*
DEF FN (name)	*	*	*	*			*
DEFINT	*	*	*	*			*
DEFDBL	*	*	*	*			*
DEFSTR	*	*	*	*			*
DEFSTR	*	*	*	*			*
DIM var(k)	*	*	*	*	*		*
DISPLAY	*	*	*	*	*		*
DRAWTO	*	H PLOT	*	*	*		*
DSP var	*	*	*	*	*		*
END	*	*	*	*	*		*
EOF	*	*	*	*	*		*
ERR OR (mm)	*	*	*	*	*		*
FOR ... TO ... STEP, NEXT	*	*	*	*	*		*
General Statements							
GOSUB linenum, RETURN	*	*	*	*	*		*
GOTO linenum	*	*	*	*	*		*
GR	*	*	*	*	*		*
GRAPHICS	*	*	*	*	*		*
H LIN ... AT	*	*	*	*	CALL HCHAR	*	*
IF expr THEN linenum	*	*	*	*	*		*
IF expr THEN ... ELSE	*	*	*	*	*		*
IF expr GOSUB ... RETURN	*	*	*	*	e	*	*
IF expr GOTO	*	*	*	*	e	*	*
IN (port)	*	IN # expr	*	*	*	*	*
INPUT "msg", var	*	*	*	*	*	*	*
INPUT #n, var	*	RECALL	*	*	*	*	*
L var = expr	*	*	*	*	*	*	*
LPRINT "msg" or LPRINT var	*	*	*	*	*	*	*
NEXT var	*	*	*	*	*		*
ON ERROR GOT linenum	*	ONERR	*	TRAP	e	*	*
ON expr GOSUB, RETURN	*	*	*	*	*	*	*
ON expr GOTO linenum	*	*	*	*	*	*	*
OPEN	*	*	*	*	*		*
OPTION BASE (x)	*	*	*	*	*		*
OUT portnum, val	*	PR # expr	*	*	*		*
PADDLE	*	PDL	*	*	*		*
PEEK	*	*	*	*	CALL GCHAR	*	*
POINT	*	*	*	*	*		*
POP	*	*	*	*	*		*
POKE locn, val	*	*	*	*	(e) Call Load	*	*
PRINT "msg" or PRINT var	*	*	*	*	*		*
PRINT@	*	*	*	*	POSITION (e) Display At	*	*
PRINT #i	*	*	*	*	*		*
PRINT USING	*	*	*	*	*		*
PRINT	*	*	*	*	e		*
READ var, var ...	*	*	*	*	*		*
RECALL	*	*	*	*	*		*
REM	*	*	*	*	*		*
RESET (x,y)	*	*	*	*	*		*
RESTORE	*	*	*	*	*		*
RESUME linenum	*	*	*	*	*		*
SET (x,y)	*	PLOT, H PLOT	*	PLOT	*		*
SPEED = expr	*	*	*	*	*		*
STOP	*	*	*	*	*		*
STORE	*	*	*	*	*		*
TAB	*	*	*	*	*		*
TEXT	*	*	*	*	*		*
UPDATE	*	*	*	*	*		*
V LIN ... AT	*	*	*	*	CALL VCHAR	*	*
V TAB (x)	*	*	*	*	*		*
WAIT A,B,C	*	*	*	*	*		*

This Basic language reference chart may be of some use in transposing programs from one computer's Basic to another's. Stars indicate the existence of the command listed at the left for a particular computer. A small (e) in the 99/4A column indicates the existence of a command in Extended Basic.

# System Commands

System	PET	Apple II	TRS-80	Atari	TI 99/4 Number	Sorcerer	ZX80
AUTO mm, n		*	*		*		BREAK
BREAK mm							*
CLEAR	CLR	*	*	*		*	
CLEAR n			*				
CLOAD	LOAD	LOAD	*	*	OLD	*	LOAD
CLOAD?	VERIFY		*				
CONTINUE	CONT	CONT	CONT	CONT	*	CONT	CONT
CSAVE	SAVE	SAVE	SAVE	*	SAVE	*	SAVE
DELETE mm		DEL	*		*		
EDIT mm	cursor	cursor	*	cursor	cursor		cursor
HOME		*					
HIMEM		*					
LIST mm-nn	*	*	*	*	*	*	*
LOMEM		*					
MAN		*					
NEW	*	*	*	*	*	*	*
RESEQUENCE mm, nn		*	*	*	*	*	*
RUN mm		*	*	*	*	*	*
SYSTEM	SYS	CALL - 151	*	BYE	BYE	BYE	
TROFF		NOTRACE	*		UNTRACE		
TRON		TRACE	*		TRACE		
UNBREAK					*		
(Screen Format)	40 by 24	40 by 24	64 by 16	40 by 24	32 by 24	64 by 30	32 by 24
(Character Resolution, m by n)		7 by 8	2 by 3	8 by 8	8 by 8	8 by 8	
(Total pixels)	128 full-screen	280 by 192	128 by 48	320 by 192	256 by 192	512 by 240	

## String Functions

System	PET	Apple II	TRS-80	Atari	TI 99/4	Sorcerer	ZX80
<b>String Functions</b>							
ASC (string)	*	*	*	*	*	*	*
CHR\$(code)	*	*	*	*	*	*	*
CODE (string)							*
FRE (X\$)	*		*	*		*	
INKEY\$	GET	GET	*		CALLKEY		
LEFT\$(string, n)	*	*	*			*	
LEN (string)	*	*	*	*		*	
MID\$(string, p, n)	*	*	*		SEG\$	*	
POS (str 1, str2, n)	*	*	*		*	*	
RIGHT\$(string, n)	*	*	*		*	*	
STR\$(expr)	*	*	*	*	*	*	*
STRING\$(n, char)			*				*
TL\$(string)			*		*	*	
VAL (string)	*	*	*	*	*	*	
VARPTR var			*	ADR			

## BASIC Math and other Functions

BASIC FUNCTIONS	PET	Apple II	TRS-80	Atari	TI 99/4	Sorcerer	ZX80
(Precision)	9	10	6 or 16	10	14	6	
ABS (expr)	*	*	*	*	*	*	*
ATN (expr)	*	*	*	*	*	*	*
CINT (expr)			*				
CDBL (expr)			*				
CLOG (expr)		*		*			
CSNG (expr)		*	*	*	*	*	
COS (expr)	*	*	*	*	*	*	
ERL (expr)			*				
ERR (expr)			*			*	
EXP (expr)	*	*	*	*	*	*	
FIX (expr)	*	*	*	*	*	*	
FRF (expr)	*		(also MEM)	*	*	*	
INT (expr)	*	*	*	*	*	*	
LOG (expr)	*	*	*	*	*	*	
MOD (expr)		*	*		*	*	
POS (expr)	*	*	*		*	*	
RANDOMIZE	RANDOM		RANDOM		*	*	*
RND (0)	*	RND	*	*	RND(1)	*	*
RND (expr)		*	*				*
SCRN (x, y)		*					
SGN (expr)	*	*	*	*	*	*	
SIN (expr)	*	*	*	*	*	*	
SPC (expr)	*	*					
SPC (num)		*		NULL		*	
SQR (expr)	*	*	*	*	*	*	
TAN (expr)	*	*	*		*	*	
TI (expr)	*	*	*			*	*
USR (X)	*	*	*			*	*
AND, OR, NOT	*	*	*			*	*



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**HP Benchmarks**

Dear Editor:

The readers of *Popular Computing* might be interested to learn the results of a comparison based on George Stewart's benchmark program for the HP-86/87 computers ("Hewlett-Packard Computers," November 1982, page 47).

Mr. Stewart tested the precision of the SQR function: I added tests of trigonometric functions. I used several versions of BASIC for the HP-87 and Apple II. Results are shown in table 1.

The point is not to make a quality judgment between the four languages based on these simple tests; accuracy to the *n*th digit is not always required. However, the results stress the need to choose the right tool for the job. Our company's aviation software requires extremely accurate trigonometry, for example.

Computers are probably the most powerful tools ever used so it makes sense to know and use them wisely and efficiently.

Ward Silver  
University City, MO

Dear Editor:

I ran your accuracy test on several computers and found the results quite surprising (see table 2).

It is interesting that the orphan among microcomputers, the TI-99/4A, scores perfectly on this test, and the two "business" computers, the ALSPA and NEC, perform least well.

Robert Wegener  
Denver, CO

*For those who missed the article, here's the benchmark program. It squares each number from 1 to 1000 and compares the square roots of the squares with the original numbers.*

```

10 K=0
20 FOR I=1 TO 1000
25 REM-R SHOULD EQUAL 0
   EVERY TIME
30 R=SQR(I*I)-I
40 PRINT "FOR": I; "THE ERROR
   IS"; R
45 REM-K ACCUMULATES THE
   ERROR IF ANY
50 K=K+ABS(R)
60 NEXT I
70 PRINT "CUMULATIVE ERROR
   IS"; K
80 END
    
```

**What's In a Name?**

Dear Editor:

Let me congratulate George Stewart on his excellent review of TK!Solver (October 1982, page 53). We at Miller Communications (public relations adviser to Software Arts, creator of TK!Solver) were delighted that you wrote such a complete and accurate description of the product.

I do, however, have one correction. The exact name of the program is TK!Solver and the exclamation point in the middle is extremely important. First, it is part of the trademarked name, and second, it represents a key element of the program itself—the exclamation point is the key users press to "solve" problems when using TK!solver.

William Gurley  
Miller Communications  
Boston, MA

*Popular Computing routinely "normalizes" trade-names that use eccentric spelling or punctuation. We discuss so many different products in each issue that observing each manufacturer's stylistic preferences would make our text look like a foreign language.*

**The Technical Side of Modems**

Dear Editor:

Although a highly technical explanation of the telecommunication network might not be necessary for the majority of your readers, I feel that some statements are misleading in Stan Miastkowski's article "Modems: Hooking Your Computer to the World," (November 1982, page 88).

First, not all of the nationwide telephone network is maintained by the Bell System. Many independent telephone companies serve large areas of the nation.

Second, the network is not just a telephone network nor is it analog only. Data of all types constitutes a reasonable percentage of total traffic nowadays, and a considerable portion of the network (especially the long-distance or toll portion) is digital. Even though almost all telephones are connected via a pair of wires to a central office and carry only analog signals between the central office and the phone, numerous digital central offices exist now and more are being installed each day.

Third, the terms *bits per second* (bps) and *baud* are not interchangeable.

I hope this helps clarify the subject. Your magazine is excellent; keep up the good work.

Richard G. Nichols  
Vienna, VA

*The word baud (derived from the name of a French telegraph officer, J.M.E. Baudot) measures the number of times the state of a communications line changes in a second. In most low-cost modems, baud is effectively the same as bit rate. But in more expensive, high-speed modems, baud does not correspond to bit rate. For example, 400 baud may produce a bit rate of 1200 bps. The word baud is gradually being replaced by the more accurate term bits per second.*

Table 1 Results of Silver's program to test the accuracy of BASIC functions.

FUNCTION TESTED  (Apple II)	CUMULATIVE ERROR			
	Applesoft BASIC (Apple CP/M)	MBASIC 5.0 (HP-87 CP/M)	CBASIC 2.0 (HP-87)	HP BASIC
SQR(I*I) - I For I = 1 to 1000	2.91E-04	8.11E-02	4.25E-09	0 (no error)
SIN(I)*2 + COS(I)*2 - 1 For I = 0 to π in steps of π/1000	5.50E-07	1.43E-04	2.16E-10	2.28E-10
ATN(TAN(I)) - I For I = .001*π/2 to .999*π/2 in steps of .001*π/2	5.93E-08	4.37E-05	4.41E-06	1.42E-10

Table 2: Results of the original benchmark program on various computers.

COMPUTER	LANGUAGE	NUMBER OF ERRORS	CUMULATIVE ERROR
ALSPA ACI-2	BASIC-80	822	0.0811372
Apple II	Applesoft	954	0.0002908
NEC PC-8001A	BASIC-80(?)	848	0.0982087
TI-99/4A	TI Extended BASIC	0	0 (no error)

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