

Order of Performing Operators

FIRST	↑
SECOND	NOT UNARY+ UNARY-
THIRD	*/
FOURTH	+—
FIFTH	Relational
SIXTH	AND
SEVENTH	OR

Between any two operators, the one higher in the preceding table is performed first. If they are at the same level, they are performed from left to right. This rule is overridden by parentheses in that all calculations within parentheses are performed first.

Error Messages

TOPTS* AND TODS* ERRORS

Example (Paper tape and disc systems unless noted)
20 2 = X
ERROR 7 IN LINE 20

Error Code	Meaning
1.	Statement ends unexpectedly.
2.	Exceeds 72 characters.
3.	System command not recognized.
5.	Bad exponent.
7.	Assignment statement has no store. Operator must be left of sign.
8.	Multiple COM statement.
9.	Missing or incorrect function identifier in DEF.
10.	Missing parameter in DEF statement.
11.	Missing assignment operator.
12.	Missing or incorrect statement type after IF.
13.	Missing or incorrect FOR variable.
14.	Missing TO.
15.	Incorrect STEP in FOR statement.
16.	Called routine does not exist.
17.	Wrong number of parameters in instrument control statement.
18.	Missing or incorrect constant in DATA statement.
19.	Missing or incorrect variable in READ-INPUT or LOAD statement.
20.	No closing quotation marks for PRINT message.
21.	Missing PRINT delimiter or bad PRINT quantity.
30.	Missing left parenthesis.
31.	Missing right parenthesis.
32.	Operand not recognized.
33.	Defined array missing subscript part.
34.	Missing array identifier.
35.	Missing or bad integer.
36.	Non-blank characters following statement's logical end.
37.	Program is too large.
39.	Doubly defined function.
40.	FOR statement has no matching NEXT.
41.	NEXT statement has no matching FOR.
42.	Out of storage for symbol table.
43.	Array appears with inconsistent dimensions.
45.	Array double dimensioned.
46.	Number of dimensions not obvious.

*TOPTS: Test Oriented Paper Tape System.
TODS : Test Oriented Disc System.

TODS* DSAVE—DLOAD—REPLACE ERRORS

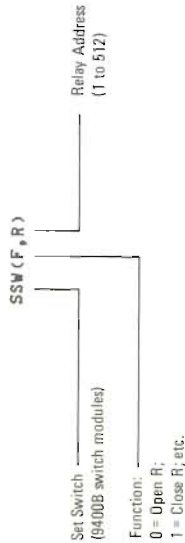
Example

1200 DSAVE 2000
ERROR TD-4 IN LINE 0
TD-1. READ error in cartridge directory.
TD-2. Requested catalog reference number not cataloged.
TD-3. Disc full.
TD-4. Duplicate program reference number.
TD-5. Program reference number nonexistent or not BASIC.
TD-6. Cartridge directory WRITE error.
TD-7. Program WRITE error.
TD-8. Catalog full.
TD-9. No program reference number in command.
TD-10. Illegal in operator mode.
TD-11. Delete protected file.

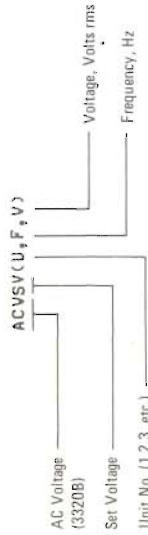
Instrument Call Examples

(A complete listing of calls for each system will be found in the system documents).

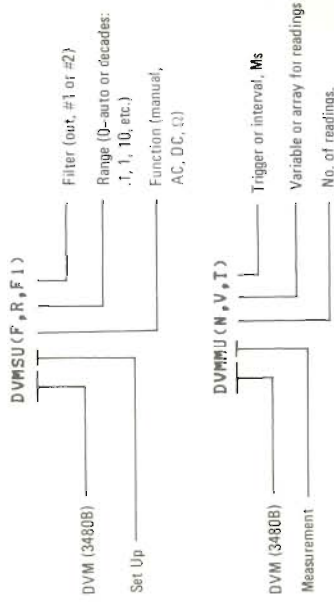
SWITCHING



STIMULUS



MEASUREMENT



Introduction

Programs for 9500 automatic test systems are usually must successful when written by technicians who understand the units to be tested. Hewlett-Packard has developed the HP ATS BASIC language specifically with this in mind. It facilitates the understanding and learning of programming by test personnel so that they may write electronic test programs with the minimum of training. This language is similar to the familiar time-share BASIC employing everyday "English" terms for instructions to the computer. But it also includes abbreviations which represent test instrument names used to call for voltages, signals, and measurements in the test.

This reference guide provides you with a convenient listing of all statements and commands needed to program 9500 systems, except for the instrument calls. The instrument calls for your system are supplied with the system documentation. Sample calls are included in the listing here as an illustration of their simplicity.

Operator's control panel inputs are listed separately from the programmer's keyboard inputs. Unless otherwise noted, all symbols may be used for both punched-tape systems and disc systems. The two operating systems are called TOPTS (Test Oriented Paper Tape System) and TODS (Test Oriented Disc System).

BASIC is an interpretive language that checks the validity of each statement as it is entered. If entered in error or incorrectly, the system replies with a coded error message. The "Error Message" listing is included to help you interpret these coded messages.

Control Panel

For both TOPTS and TODS unless noted as being for one or the other*

INDICATORS

ERROR	Lights when error occurs during test; e.g., turned-off subsystem or program error.
TEST NUMBER	Displays number of loaded or running program.
OPERATION (OP)	Displays coded number from OPNUM statement for what data is to be entered when INPUT button lights, or other information.
VALUE/LINE NUMBER	Shows data as it is entered on keyboard and VLUM statement variables. Shows line numbers of running program in supervisor mode.
COMMANDS (Actuated by pushing indicator switches)	Lights when program FAIL statement is satisfied. Pushing button for NO sets YES function to 0.
INPUT	Lights test number or data entered on keyboard. Lights for INPUT request.
LOADS (TOPTS only)	Reads in program in ASCII form using paper tape photoreader.
LOAD (TODS only)	Sets up controller to accept program number (PRN) entered on keyboard.
PASS/YES	Lights when PASS statement in program is satisfied. Pushing button for YES sets this function to 1.
PAUSE	Pushing button lights it and temporarily halts program in supervisor mode only. Button lights during programmed PAUSE (OPERATION coded display may indicate action to be taken).

*TOPTS: Test Oriented Paper Tape System.
TODS: Test Oriented Disc System

RUN/CONTINUE (TOPTS only)

RUN/CONTINUE (TODS only)

STOP/READY (TOPTS only)

STOP/READY (TODS only)

TRAP 1

TRAP 2

Keyboard

For both TOPTS and TODS unless noted as being for one or the other.*

COMMANDS

CTRL-A (TODS only)	Program request state; allows entry of test no. by operator.
CTRL-L (TOPTS only)	Same as control panel LOAD button.
CTRL-P	Temporarily halts program.
CTRL-R (TOPTS only)	Execute program; also continue from PAUSE.
CTRL-R (TODS only)	Same as for TOPTS (above) except at beginning the requested program loads from disc and then executes.
CTRL-S	Stops execution of current program.
CTRL-Q	Executes TRAP 1 subroutine.
CTRL-W	Executes TRAP 2 subroutine.
CATALOG (TODS only)	Lists all BASIC programs stored on disc.
DELETE	Deletes program or segment in core. [†]
DISPLAY	Displays statements of current program on display device. [†]
DLOAD (TODS only)	Loads BASIC program from disc into core. ^{††}
DSAVE (TODS only)	Stores BASIC program from core onto disc. ^{††}
LIST	Lists program or segment. [†]
LOAD	Reads in program in ASCII form from paper tape.
LOAD SRN (TODS only)	Loads the designated source program SRN = Source Reference Number.
N	NO in answer to question YES or NO.
REMOVE (TODS only)	Deletes program on disc cartridge. ^{††}
REPLACE (TODS only)	Replaces program on disc with program in core. ^{††}
RUN (BASIC only)	Executes BASIC program.
SAVE	Pushes program on paper tape in ASCII code. ^{††}
Y	YES in answer to question YES or NO.

[†]Will begin and end with specified statements by typing statement numbers M, N after command name.

^{††}Command followed by PRN (Program Reference Number); may also include CRN (Cartridge Reference Number) and Alphanumeric Name of Program.

STATEMENTS (TOPTS and TODS Systems)

Symbol	Example	Purpose
VARIABLE ASSIGNMENT STATEMENTS		
ASSIGN VALUE OR COMPUTE	30 X = A + B 35 X = Y - Z = 0	Assigns value of expression on right of = sign to variable on left of = sign (Optional LET).
DATA	15 DATA 95, 47, 5.2	Specifies data which is read from left to right in READ statement.
READ	80 READ A, B, C	Reads data in DATA statement from left to right.
RESTORE	85 RESTORE	Resets to beginning the pointer which indexes reading of DATA statement.
INPUT AND OUTPUT STATEMENTS		
DSPLAY	10 DISPLAY "MESSAGE" 20 DISPLAY X, Y, X	Tells computer to display information on display device; e.g., CRT terminal.
INPUT	75 INPUT X, Y, Z	Requests data to be entered from keyboard in assigned order.
LOAD	80 LOAD X, Y, Z	Reads ASCII coded input information from photoreader. Similar to INPUT except for input method.
PRINT	40 PRINT "MESSAGE" 45 PRINT A, B, C	Tells computer to output information on print device; e.g., line printer.

PRINT TAB (X)
TAB (X) prints first character in column X. () inhibits normal 5 column spacing.

SAVE
Stores ASCII format data on record device; e.g., punched tape. Same as PRINT except for device used.

PROGRAM CONTROL STATEMENTS

COM	1 COM A(10), B(3,5) 1 COM C(6), D(5), C(5)	Sets up common memory for more than one program for storing data in contiguous locations. Stores by row and column in statement order.
DIM	1 DIM R(20) 1 DIM A(5,5), B(5), Z(33)	Reserves maximum memory for array. Variable is letter from A to Z, integer refers to rows and columns.
FOR...NEXT	25 FOR V = 50 TO +50 STEP 5 30 FOR I = 1 TO 5	Repeats statements starting with FOR and ending with NEXT. Loops increment variable by 1 or by specified step value.
GO TO	330 GO TO 900	Transfers control to specified statement.
GOSUB	335 GOSUB 900	Transfers control to subroutine starting at specified statement (see RETURN statement).
IF...**	5 IF X = 5 GO TO 50 5 IF ABS (V-M) > .01 PRINT "FAIL"	Execute statement if condition is true. Use (=) signs cautiously, limit signs preferred in mathematical IF expressions.
NEXT	355 NEXT J	Lower boundary of FOR...NEXT.
PAUSE	100 PAUSE	Temporarily suspends program execution for entering data or adjustments.
RETURN	850 RETURN 90 STOP	Return from called subroutine. Terminates the program.

TRAP 1
TRAP 7

80 TRAP 1 GOSUB 9000
85 TRAP 7 GOSUB 500

WAIT

95 WAIT 1000

**Statements allowed after the IF: INPUT, PRINT, PAUSE, DISPLAY, LOAD SAVE, READ, RESTORE, GO TO, GOSUB, LET, RETURN, WAIT, STOP TRAP, and DEVICE MNEMONIC.

CONTROL PANEL STATEMENTS

(Results in control panel display or message)	
PASS	220 PASS (1)
FAIL	230 FAIL (0)
OPNUM	240 OPNUM (55)
VLNUM	250 VLNUM (M)
TSNUM	260 TSNUM (X)

STATEMENTS USED FOR TODS ONLY*

CLOSE	440 CLOSE (7,5)	Ends access to the disc file made available by the most recently OPEN statement (7 = access no., S = status parameter).
DREAD	430 DREAD (7,1, A(1), 25,S)	Reads data from disc file most recently opened (7 = access no., 1 = pointer, A(1) = first word, 25 = no. of variables, S = status parameter).
DRITE	420 DRITE (7,1, A(1), 25,S)	Writes data into disc file made available by most recent OPEN statement; otherwise is same as DREAD.
CHAIN	300 CHAIN 5000	Transfers control to the specified program.
OPEN	400 OPEN (7,5000,S)	OPENS disc file and assigns access no. (see CLOSE).
RESET	410 RESET (7,2)	Resets disc file pointers (access no. read (1)/write (2)/both (0)).
INVOKE	310 INVOKE 6020	Transfers control to specified program to be used as a subroutine.
SCOM	320 SCOM (1,1,V,5,S)	Read/write accesses to system common storage.

OPERATORS

ARITHMETICAL OPERATORS

Symbol	Example	Purpose
↑	10 X = A / 2	Exponentiate.
*	10 X = A * B	Multiply.
/	10 X = A / B	Divide.
+	10 X = A + B	Add.
-	10 X = A - B	Subtract.

RELATIONAL OPERATORS

=	10 IF X = 35 GO TO 20	Is equal to.
#	10 IF X # 15 GO TO 20	Does not equal.
>	10 IF X > B GO TO 15	Greater than.
<	10 IF X < B GO TO 15	Less than.
>=	10 IF X >= B GO TO 15	Greater than or equal to.
<=	10 IF X <= B GO TO 15	Less than or equal to.

LOGICAL OPERATORS

AND	10 IF X AND Y PAUSE	If both X and Y have a non-zero value, pause.
OR	10 IF X OR Y PAUSE	If either X or Y has a non-zero value, pause.
NOT	10 IF NOT (X = 1) PAUSE	If X ≠ 1, pause.