HEWLETT-PACKARD CO.

SYSTEM PART LIST

2100A Computer w/Option 032 32K memory
- (1) 12901A Floating Point Hardware
- (1) 12895A DMA
- (1) 2155A I/O Expander

12960A 7900B Disk Drive, Power Supply, and Interface

29407B Cabinet (3 bay)
Option 1 7 3/4 inch extension
Option 10 Power

6940A Multiprogrammer
- (1) 14540A Cable Assembly
- (1) 12566B Option 001 Microcircuit I/O card
- (8) 69321B w/option J12
- (1) 69351A Voltage Regulator Card
- (3) 69501A Resistance Cards

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FORM NO 7830-006-L

9401B	(2)	DTU BOX
	(20)	25002A Test Module Assembly
	(2)	28035-60003 5V Power Supply Cable
	(2)	28035-60004 17V Power Supply Cable
	(1)	28035-60006 Extend Transmitter Card
	(1)	28035-60007 Extend Receiver Card
	(1)	28035-60005 Jumper Cable
	(20)	09402-60030 DTU to Patch Panel Cable
	(1)	09401-60003 Timing and Control
	(1)	09401-60004 Load Card
	(1)	12566-60024 (12566B) Microcircuit Interface Card
	(1)	28035-60002 Interface Cable
	(2)	25006-60001 Extender Board
	(2)	62005G w/option 104 5v Supply
	(4)	62018E 18V Supply
	(2)	62410A Rack Mounting Tray
	(2)	62411A Blank Front Panel

9403A	Control Panel	
	12661-60001	DVS Program Card
	09300-60533	Cable for DVS
	12566-60025	Micrologic Card (12566A)
	28052-60001	Cable for Micrologic

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59310A	ASCII Bus Interface and Cable Bus Cables: 10631C 12Ft (8120-1835) 10631B 6Ft (8120-1834) 10631A 3Ft (8120-1833)
3490A	DVM Option 30 ASCII Option H49 to disconnect ohm terminal Option 40
5345A	Counter Option 001 Option 011 Option 012 Programmable level
59307A	(3) Relay Boxes
6201B	(3) UUT Power Supplies (1) 14513A Rack Kit (1) 14523A Rack Kit for two 3 1/2" supplies

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HEWLETT-PACKARD CO.

12925A	Paper Tape Reader (2748B) and Interface
12927A	Paper Tape Punch and Interface (2753B)
9866A	Printer 12566B Option 001 Ground True
2600A	CRT Terminal 12880-60003
180A	Scope 1801A 1820A
12531C	TTY Interface Board
9402A	Interface Panel 25001A Adapter Panel

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HEWLETT-PACKARD CO.

ASCII BUS LISTING

TALK AND LISTEN ADDRESSES

DEVICE	LISTEN	TALK	ID
A3490	6	V	DØØA
A5345	4	T	DØ1A
A59307	1	Q	DØ2A
B59307	2	R	DØ2B
C59307	3	S	DØ2C
D59307	5	U	DØ2D
A3320	7	W	DØ3A
A8349	8	X	DØ4A

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MODEL	STK NO
BY Bill Birdsell	DATE 3-6-75
APPD	SHEET NO 1 OF 1
SUPERSEDES	DWG NO A-ET9500-91001-1

FORM NO 7830-006-L

SELF LOGGING OF PERCENTAGE EMPIRIC

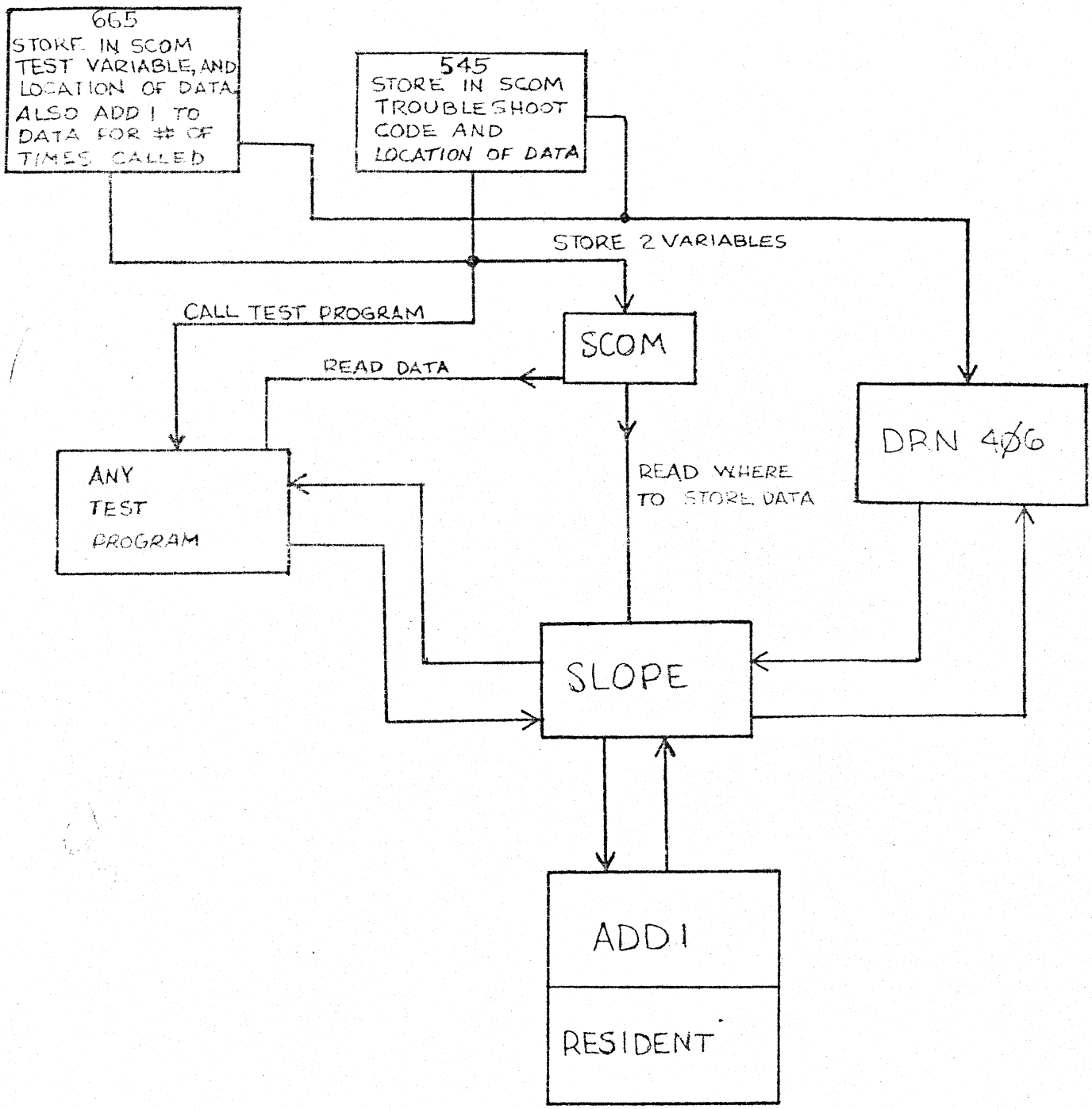
SLOPE is a data gathering program for the TODS system. It is desinged as a primary data gathering routine in the test ssytem. Any number of secondary programs can then be written (as the need arises) to access this data and output information in any form that is required by the use or application.

SYSTEM INTERFACE

SLOPE requires external storage in the resident. The main body of SLOPE is an ASCII program called VACUM. VACUM uses other system subprograms and 2 new system programs that were added for SLOPE. The programs that were added are TIME and ADD 1. Time is a BASIC callable routine also. ADD 1 is a ASCII program that is added to the resident. It contains storage for TIME and VACUM. If data is going to be kept, SLOPE requires two variables to be stored in SCOM at location 2 and 3 by the calling program. Test calling programs are PRN 665 and 545. It also interrogates TODS resident to see if the program was called by PRN 665 or 545. If no data is going to be kept, SCOM is not used and the test program can be called by the keyboard. The variables stored by PRN 665 or 545 are: SCOM location 2 = code # to indicate if troubleshoot or normal test is to be run. SCOM location 3 = where in DRN 406 data for the particular test that was called is to be stored.

To summarize: SLOPE is called by a test program. SLOPE uses the following:

1. SCOM - To find where in DRN 406 to store data
2. ADD 1 - To store and read flags (temp. storage)
3. TIME - To read elapsed time
4. TODS RESIDENT - To see if PRN 665 or 545 called program
5. DRN 406 - To store data



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SUPERSEDES	DWG NO A-ET 9500-97000-1

FORM NO 7830-005-L

PROGRAMMING

SLOPE maintains data with a minimum of operator intervention. Therefore, it is necessary for the programmer that uses it to have good understanding of it's basic structure and use.

In ATS BASIC SLOPE is called by the VACUM (F,D) command.

Following is a description of the variables:

VACUM (F,D)

where F = 0 to turn off vacuum
= 1 to turn on vacuum
= 2 to release for retest wait 1/2 second and pull down again
= 3 to not actuate vacuum, just keep data

where D = 0 to take data on a failed test
= 1 to take data on a good test
= 2 to not take any data
= 3 to take data for troubleshoot

Examples of turn on reaction and response:

Command	System Reaction	Looking for response
VACUM (I,1)	Display "FIRST TIME TESTED" light panel YES, NO	Press YES, NO or TRAP 2 on panel or Y, N key on CRT
If Y or YES is pressed	Continue running prgm. (turn on vacuum)	
If N or NO is pressed	Display "SECOND TEST?"	Same as above
If TRAP 2 is pressed	Continue and retest	
VACUM (1,Ø)	Same as above	
VACUM (1,2)	Display "PAUSE"	Press RUN or CTRL R
VACUM (1,3)	Display "TROUBLESHOOTING A NEW BOARD?"	Looks for YES, NO
If YES or NO is pressed	continue	

When the vacuum is shut off the operator is asked for information under two circumstances. If it is the second time tested and the test failed, the operator is asked "IS THE ERROR THE SAME AS ON FIRST PASS?". If the system is in the troubleshoot mode and the test passes, the operator is asked "ARE YOU GOING TO SHIP GOOD BOARDS?".

Data is not kept if the variable for not taking data appears in either the turn on or the shut off vacuum call.

SLOPE DATA

SLOPE maintains a data field on the disk. The data on the disk is updated when a vacuum turn-off command is executed at the end of each test. The disk data file used is DRN 406. The size of data File 406 is 6400 disk words. This is equivalent to 3200 COM words in BASIC. This data file is set up to keep data for 200 test programs. Each test program is allotted 16 digits of storage (32 disk words or 16 floating point numbers in BASIC) in the data field. There are no flags or test numbers stored in the data file to indicate the start or end of the 16 digit groups. The data is in a continuous stream and is located by the formula:

V= (((P-4000)/10)*16) + 1

where P = PRN of the test that data was taken from.
V = the location of the first digit, of the 16 digit group, in the 3200 digit file.

An example of how you could retrieve the data for a particular board, using TODS ATS BASIC, follows:

```
10  COM A (16)
20  DSPLAY "INPUT PRN NUMBER OF TEST"
30  INPUT P
40  LET V = (((P-4000)/10)* 16) + 1
50  OPEN (7,406,Q1)
60  DREAD (7,V,A (1), 16,Q2)
80  CLOSE (7,Q3)
90  IF Q1#0 or Q2#0 or Q3#0 DSPLAY "ERROR"
100 STOP
```

The COM storage A (1) - A(16) now contains the 16 digits of data for the PRN that was input.

A description of the 16 digits of data that is kept during the test and is stored on the disk is in table 1.

TABLE 1

1. Passed first test - Incremented if the unit passed the first time tested

2. Failed first test - Incremented if the unit failed the first time tested

3. Passed second test- Incremented if unit passed the second time tested

4. Failed second test- Incremented if unit failed the second time tested

5. Total number of tests - Incremented once when vacuum is shut-off when running the normal test reqardless of how many times the unit has been tested. It is not incremented during retest or troubleshoot.

6. Total good boards - Incremented any time a board test is good in a normal test. It is not incremented in retest mode. In troubleshooot it is incremented if the test passes and the operator anwers the ship question yes.

7. Times test was called - Incremented when normal test call is executed (665 is used)

8. Number of retest - Incremented if TRAP 2 is executed

9. Number of troubleshoot - Is incremented when operator answers first question in troubleshoot mode yes (trouble-shooting a new board)

10. Number of fix - Incremented when unit is being tested second time and it fails with a different problem than the first. (The question is asked "THE ERROR THE SAME AS ON FIRST PASS?")

11-13 Time spent in troubleshoot - 11= hours, 12=min, 13=sec

14-16 Total time - Time is kept any time data is being taken on the unit. The time spent in troubleshoot is also added here.

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FORM NO 7830-006-L

DATA ARRAY HANDLER
PRN 408,407

The data handler stored in PRN 408 is a program that is used to save or transfer data by paper tape. Any of the TODS system DRNs can be dumped on paper tape or loaded from tape back into the system with this routine. The information needed to run the program is the DRN number of the data and how many COM words it contains. The number of COM words is the number of data words in the COM area of ATS BASIC. There is a two to one relation between the number of disk words and COM words in BASIC.

The program stored in PRN 408 is a BASIC program. While it is running it SLINKS to an ASSEMBLY program stored in PRN 407. The assembly performs the I/O functions with the tape punch and photoreader. It also handles the varification if requested.

Upon entry to this assembly program it is assumed that the calling program had the COM area in the proper form. It starts dumping computer memory 14006 words down in COM area and dumps the number of words it was instructed to dump. The 14006 computer memory words is equal to 7003 words in ATS BASIC.

The data handler has three functions. One is to punch a tape of the data stored on the disk. Another is to take the tape that has been punched by the handler and store it back on the disk. The third is to verify that a tape contains the same data as a disk file. The program gives all the instructions needed while running. The user just answers the questions asked and follows instructions given.

399

MONTHLY DATA DUMP

This location is called by FRN 1000 at the first of the month to dump a tape of last months data. After instructions are given it loads last months data that is stored in the daily data file into COM and SLINKS to the assembly language portion of the Save Data routine (see ET-9500-97003-1). After the data is dumped, the tpae is then verified. The routine then stores the monthly data file, which contains only 1 days worth of data via FRN 1000, into the daily data file to set the files equally ready for the next days data. The next and last function the routine performs is to set up the data in COM necessary for the Fraction Defective program. A LINK is then made to it (see ET 9500-97013-1)

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SUPERSEDES	DWG NO A-ET 9500-97007-1

410
DAILY DATA DUMP

PRN 410 is a BASIC software routine that uses SLOPE data to help the operator keep track of time spent and boards tested. The data that this routine outputs is board or cable number of every unit tested, time it took in test, work order number, and time in tenths of an hour that has been rounded off. This program can be run at any time and the data for all the boards that has been tested so far that day will be output as described above. After the data is printed the program will ask "Do you want to reset data?". If the operator answers no, the program stops and nothing is changed. If yes is the reply, the monthly data file is written on the disk in the daily data file location making them equal so the next day's data can be recognized. When the data is input in the reset data routine it is checked to see if it is the start of a month. If it is, the new data is written on the daily data file and a SLINK is made to the fractional defective routine rather than a LINK. After the report is output control will be returned so a LINK can be made to FRN 399 to dump a tape of the months data and clear the data files.

For description of FRN 2000 and 399 see ET-9500 97013-1 and ET-9500-97007-1 documentation.

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PRN 665
TEST CALL ROUTINE

The purpose of this program is to locate a test program, set up the necessary codes for SLOPE, and call the program from the disk. The fixture for the board to be tested is selected and plugged into the computer system before FRN 665 is called and run. When 665 is run, it looks at the code of the fixture that is plugged into the system and compares it to the DICTATORS data table. If a match is found, FRN 665 then reads the test routines FRN from the data table, decodes the data for SLOPE and stores in in SCOM, and call the test FRN. If a match isn't found or there is no fixture code, the operator is asked to input the board number. The search is then made for the board number instead of the fixture code.

The data that this routine stores in SCOM for SLOPE is a code that tells SLOPE that the program called is to be treated as a test, and the number of the initial words in the 3200 word data file that the 16 words of data for the board is to be stored at.

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HEWLETT-PACKARD CO.

PRN 545
TROUBLESHOOT TEST CALL

This routine is the routine used to call test if the test is going to be run in troubleshoot mode. This routine preforms the same function as FRN 665. The only difference is the variable stored in SCOM for use by SLOPE. For a description and flowchart see ET-9500-97009-1 FRN 665. The only change is in line 430 of the BASIC program. FRN 545 stores a 3 in SCOM on this line instead of Ø.

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HEWLETT-PACKARD CO.

666
WARRANTY TEST CALL

This routine is the routine used to call the test if a warranty board is going to be tested. This routine performs the same function as FRN 665. For a description see ET-9500-97009-1 The difference between 665 and this program is the variable stored in SCOM is 2 in this program, and it is Ø in 665; see line 430. The other difference is contained in lines 1000-1120. In this area this program examines the data file to see if there is a revision assigned to this board. If there is the operator is asked for the revision of the board to be tested. The proper test for that revision is then called.

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	REVISIONS				

FORM NO 7830-006-L

DICTATOR

There is a need in a test system to do test organization and book-keeping. In the TODS system there is a librarian which serves to keep track of everything on the disk. The DICTATOR routine serves the purpose of keeping track of test routines and aiding programmers by assigning FRN, DRN, and fixture codes for his programs. This feature not only keeps our test programs in order but saves the programmers time searching for a place to put their program and an unused fixture code. The data file established by the DICTATOR is also used by many other routines in the system for data gathering, listing, locating, sorting, and test calling functions. Because of the fact that other software routines use the data, caution must be used if a feature is added or the DICTATOR software is changed in anyway. Table 1 shows the structure of the DICTATOR data file.

DATA

The data kept by the DICTATOR is all the pertinent data for the location and organization of test programs in the system. When the data is read into BASIC COM area there is two double dimensioned arrays and two single dimensioned arrays. The arrays are large enough to accommodate data for 200 units. The number of digits reserved for each unit is 34. The structure of the way data is kept is the first digit in each of the double dimensioned arrays is the index for a unit. The COM area is A (200,4), B(200,30), E(21), G(21). If data for a particular unit is stored in location 1, then A(1.1) through A(1.4), is 4 digits of data for that unit and B(1,1) - B(1,30) is 30 digits of data for the same unit. The area reserved is 4 + 30 or 34 digits. The other two arrays are used to keep track of units that are deleted so their codes or storage areas can be reused. See Table 1 for a description of what and where data is kept.

OPERATION

The DICTATOR is a BASIC program stored in PRN 404. The program is structured such that the person wishing to use it doesn't need to know a lot about its operation. When the program is called and run the first message displayed is "DICTATOR?". If a "?" is input a list of functions is displayed showing the two letter code to call them. The operator then types the two letters for the function he wants to perform and answers the questions asked of him as the function is executed. At the end of the job the program returns to its initial state, "DICTATOR?", waiting for the next command.

NOTE: Data is changed and stored in core only as long as the program is running. To store new data on the disk as permanent, ST for a stop command must be given.

As the note above indicates, the DICTATOR data is read from the disk into core memory and as the program is running changes or additions are not written back on the disk. The normal mode of operation is to call the program and make all the changes required then give the "STOP" command. At this time the data as it appears in core is written on the disk. If a CTP1 A or CTP1 is executed before the stop command is given, the disk memory is not changed. Any data that may have been changed in core is lost.

TIME

TIME is a BASIC callable routine. In TIME there is also a system routine that SLOPE uses. It has an entry point called INTM. TIME works with a real time clock ET-7435. Besides the service it provides for SLOPE, this routine has 3 functions (see Table 1). The first function is to read the time and return it to the caller in hours, minutes, and seconds. The second function is to allow the clock to be set. The three front panel switches on ET-7435 is not normally active. If the call is given to set time, the switches are activated until the operation is completed. The third function is a two call function. The first call initiates a time interval and the second call gets the elapsed time. This time interval is kept regardless of what the system is doing. The only thing that can effect the time interval is if the system is shut down and rebooted.

TIME (X,V)

X = 1 Read time return 3 variables in V

= 2 Enable set and wait for clock to be set

= 3 Start time interval

= 4 Stop interval calculate and return elapsed time

V = Start of a 6 word buffer for 3 floating point words
(Hours, minutes, seconds)
V is not used in set time call

NOTE: In basic calls the variable has to be three words in COM.

TABLE 1

SSTAT MICROLOGIC

The Micrologic card in the system that the SSTAT call controls is used as a general purpose I/O card. It has 16 input and 16 output lines. This routine makes it possible to output to, or read the status of these lines. This card is used to communicate with some of the devices on the system. Examples of these are the control of the vacuum and reading the clock (ET 7435). For a description of what lines are currently used and what function they perform see ET 7441 -95003-1

SSTAT is a BASIC callable routine as well as a subroutine used by other assembly programmers. The name of this routine is MIC. It has two entry points SSTAT and BTN.

BTN is another entry point that is used to read line 0.

PROGRAMMING

SSTAT call uses two variables. The first determines if the call is to input or output and which line(s) are involved. The second is used to determine output or give a variable for return data storage. Examples of BASIC call:

100 SSTAT (I,U)
where I = 1 through 15 to read the stat use of the line called out (1 or Ø)

=-1 through -15 to output to the line called out

= 20 to read all lines and mask to the top 8 bits and return a fixture code

=-20 to output to all the lines

U = the variable to return the data to if I was positive

= 1 to output a 1 to the line(s) indicated by a negative I value

= Ø to output Ø to the line(s) indicated by a negative I value

BTN call is used as a pause for remote control.

EXAMPLE:

100 BTN
result: a message will be displayed, "press the button";if line 0 is grounded a message will be displayed and the program will continue.

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	REVISIONS				

FORM NO 7830-006-L

59307A DRIVER

The purpose of this Driver is to control the 59307 relay boxes in the TODS system. The Driver is setup to control three or four units. The Driver is an assembly language program that is BASIC callable. There is a function call and an individual unit call incorporated in the Driver. See the Programming Section for a description of the calls.

The purpose of the 59307 relay boxes in the system is to provide some coaxial switching capability fron UUT (Unit Under Test) to test instruments. With three units in a system the switching is set up to connect a test instrument up to the UUT. One of up to four instruments can be connected to the UUT by a pair of leads. The pair can then be switched individually to different points on the UUT.

One of the pair can be switched to 10 different positions and the other can be switched to 4 different positions. If there are 4 switch units in the system the switching is arranged to allow instruments to be connected to the UUT in some applications. See the Programming Section for switching details.

PROGRAMMING

Programming is accomplished with a BASIC call containing 3 variables. The first variable is used to designate a test instrument hookup or to designate an individual switching unit to be switched. The second and third variables are used to give switch positions. See Drawing B-ET9500-97005-2 for unit and instrument connections.

Program call example:

100 PSW (U,S,G)

Where

U = > 1 and U < = 4 to switch unit 1 A and B to the value of U. Also designates variables S, G to be used to determine switch positions of unit 2 and 3

= > 11 and U < = 14 to switch unit (U-10) to positions indicated by S for switch A, G for switch B

U-10 = Unit

S = > 1 and S < = 10 if U is 1-4 switch units 2 and 3, switch A and B to connect unit 1 terminal A to point 1-10 as called out on Drawing Number B-ET9500-97005-2

= Terminal A switch of unit called out by U variable if U = 11-14

G = > 1 and G < = 4 if U is 1-4 unit 3 terminal B is switched to value of G

= > 1 and G < = 4 if U is 11-14 the unit indicated by U terminal B is switched to value of G

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MODEL	STK NO
BY Bill Birdsell	DATE 2-19-75
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SUPERSEDES	DWG NO A-ET9500-90005-1

FORM NO 7830-006-L

HP 28094A (3490A) DMM DEVICE SUBROUTINE

GENERAL

HP 25124-60002 is an ATS-BASIC device subroutine with two Call entries for handling the HP 3490A Digital Multimeter which is equipped with Option 030, ASCII Remote Control.

This subroutine is provided with two Calls so that the user may program and initiate a 3490A measurement with one Call and then, while 3490A is actually performing the measurement, perform other testing/computing. The second Call allows the user to retrieve the previously initiated measurement. The second Call may also be used to initiate a measurement and wait to retrieve the results.

NOTE: The 3490A requires approximately one second to make an AC measurement (with no AUTO ranging), and approximately 1/5 of a second to make a DC measurement and 200-550 msec (depends on range) to make an OHM measurement for an Option 060 (60 Hz Power Source) 3490A.

This subroutine does not directly input or output to the 3490A, but rather interprets and converts the Call parameters to the appropriate ASCII Programming Codes, and passes them on to the BUS Supervisor, together with the device. The second Call of the subroutine passes the device's Talk Address to the BUS Supervisor and then after interpreting and converting the returned results (measurement and status), passes it on via one of the Call parameters.

SUBROUTINE ENTRIES AND FUNCTIONS

When used in ATS-BASIC, the subroutine entry names are determined by the ATS-BASIC Mnemonic Table

DMM (U,F,R,T) DVM SET FUNCTION

where:

U = Unit

F = Function
- 0 = DC with Sample and Hold (S/H) off
- 1 = OHMS
- 2 = AC
- 3 = Test
- 4 = DC with S/H in Track and Hold (See User Note 4) nur bei neueren Sys
- 5 = DC with S/H in Acquire and Hold (See User Note 4)

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MODEL	STK NO
HP 28094A (3490A) DMM DEVICE SUBROUTINE	
BY Bill Birdsell	DATE 2-27-75
APPD	SHEET NO 1 OF 2
SUPERSEDES	DWG NO A-ET9500-97015-1

R = Range

R	OHMS	AC/DC	TEST
0	AUTO	AUTO	-
0.1	0.1K	0.1V (DC Only)	-
1	1K	1V	1
2	-	-	2
3	-	-	3
4	-	-	4
5	-	-	5
6	-	-	6
7	-	-	7
10	10K	10V	-
100	100K	100V	-
1,000	1000K	1000V	-
10,000	10000K	-	-

T = Trigger

0 = Front Panel SAMPLE RATE Control or Manual Trigger Push-button (See User's Note 1)
1 = Computer Initiated Trigger
2 = External Trigger Enable or Front Panel Manual Trigger Pushbutton
3 = None (To be initiated by DMMR Call with M = 1)

DMMR (U,M,V) → DVM READ

Read

where:

U = Unit immer 1
M = Mode
0 = Retrieve measurement initiated or enabled by the DMM Call (T = 0, 1, or 2) (See User's Note 3)
1 = Initiate new measurement defined by DMM Call and wait to retrieve the measurement.

V = Value
Value (Measurement) returned by the subroutine, scaled to fundamental units of VDC, VRMS, or OHMS. (See User Note 4)

NOTE: If the reading is out-of range (overload) the device subroutine will return a value of 9.99999E30.

If external trigger has not initiated a measurement (DMM T = 2), the returned value will be -9.99999E30 (See User Note 3). wenn kein Triggerpuls

LTR	P.C. NO	APPROVED	DATE	REVISIONS

MODEL	STK NO
HP 28094A (3490A) DMM DEVICE SUBROUTINE	
BY Bill Birdsell	DATE 2-27-75
APPD	SHEET NO 2 OF 2
SUPERSEDES	DWG NO A-ET9500-97015-1

5345A DRIVER

The 5345A Software Driver is designed to allow easy programming by ATS BASIC in the TODS System.

The 5345A Driver interprets an ASCII string sent to it by a BASIC program. It then converts the string to ASCII coded groups and performs the functions indicated. For ease in programming, the input ASCII string is in the form of a description of the functions desired. This allows the programmer to describe the setting of the counter by terms commonly used on front panel controls. For example if a measurement was to be made on the period of a signal with the gate time set at 10ms and we wanted to hold the measurement until we went to look at it, the BASIC call would be as follows:

100 count ("period, 10ms, hold, wait", Ø)

The next counter call would probably instruct it to read and return the value. The 5345A has a memory that remembers how it is set up. Therefore, it is only necessary to change the settings that differ from the previous set up.

When the counter goes to remote mode a setting is assumed. This setting is indicated by the asterisk (*) in each of the groups on the Remote Programming Code sheet. When the counter goes to remote or an initialize command is given the indicated states are assumed.

In the program call the ASCII string does not have to be the full word for a particular function, for example the letters "FR" gives the 5345A Driver Software the same information as the complete word "FREQUENCY". The complete word can be used if the programmer desires, for his own reference. The length of the word to describe the function doesn't matter beyond the minimum required to describe the function. The minimum is indicated on the Remote Programming Code sheet by the underlined letters at the first of the word. The form of the BASIC program call is as below:

100 count ("STRING", "2 STRING" OR Ø)

WHERE:

STRING = ASCII string of any length with a comma separating commands.

2 STRING = Same as above except zero will act as a filler to satisfy BASIC.

LTR	P C NO	APPROVED	DATE
	REVISIONS		

MODEL	STK NO
5345A DRIVER	
BY Bill Birdsell	DATE 3-20-75
APPD	SHEET NO 1 OF 2
SUPERSEDES	DWG NO A-ET9500-97016-1

100 count ("READ", V)

WHERE:

READ = Command to return a reading.

V = The variable in BASIC the reading is returned to.

100 count ("TAKE", Ø)

WHERE:

TAKE = Command to take a reading as called out in Remote Program sheet Section 5b.

Ø = Filler for BASIC.

mit TAKE wird Counter vorbereitet.

z.B.

10 Count ("IN, T1, 1M, B-, A+, AL.150, BL.150, HO, WA", Ø

20 Count ("TAKE", Ø)

30 ↵

40 Count ("READ", V) ← In diese Var. wird Messergebn. eingelesen

				MODEL	STK NO
				5345A DRIVER	
				BY Bill Bridsell	DATE 3-20-75
				APPD	SHEET NO 2 OF 2
LTR	P.C. NO	APPROVED	DATE	SUPERSEDES	DWG NO A-ET9500-97016-1
	REVISIONS				

FORM NO 7830-006-L

HEWLETT-PACKARD CO.

REMOTE PROGRAMMING CODES FOR 534A OPT 12

1. FUNCTION

a.	Plug in	F2
b.	*Frequency A	FØ
c.	Period	F1
d.	Time Interval A to B	F3
e.	Ratio B/A	F5
f.	Start	F4
g.	Stop	F6

2. GATE TIME

a.	10000sec	G4
b.	1000sec	G3
c.	100sec	G2
d.	10sec	G1
e.	*1sec	GØ
f.	100ms	G?
g.	10ms	G>
h.	1ms	G=
i.	100µs	G<
j.	10µs	G;
k.	1µs	G:
l.	100nsec	G9
m.	Min	G5

3. SLOPE

Slope B+	EØ
B-	E8
Slope A+	E6
A-	E>

4. TRIGGER LEVELS

Level A	ADDD
Level B	BDDD

D=ASCII Gigit 0-9

Trigger Level in Voltage =

+ .499 to -.500

A±.DDD

5. SAMPLE RATE

(Wait Time Between Measurement)

a.	*Not Hold	E1
	1. SAM Min Time (1-5 msec	E<
	2. SA+ 50 msec time (Required for Start Function)	E4
b.	Hold	E9
	1. Take a measurement (Sample trigger, only in b above)	J1

6. OUTPUT MODE

*a.	ONLY Output only if addressed to Talk, bypass if not	E2
b.	WAIT Hold current measurement until addressed to Talk	E:

7. RESET

a.	Machine Reset	I1
b.	Remote Program Initialize	I2

				MODEL	STK NO
				REMOTE PROGRAMMING CODES FOR 534A OPT 12	
				BY Bill Birdsell	DATE 3-12-75
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	REVISIONS				

FORM NO 7830-006-L

8. DECIMAL POINT POSITION WITHIN 11 DIGIT MANTISS DISPLAY

(Digit Position Defined from Right to Left, Decimal Point on Right Side of Digit)

	DIGITS	
a.	DØ	D;
b.	D1	D:
c.	D2	D9
d.	D3	D8
e.	D4	D?
f.	D5	D>
g.	D6	D=
h.	D7	D<
i.	D8	D3
j.	D9	D2
k.	D1Ø	D1
l.	*Auto Position + Auto Suffix Multiplier	DØ

9. SET DISPLAY MULTIPLIER SUFFIX

(When not in Auto: DØ)

IN FREQ.	IN PERIOD	
GHz	nsec	C7
MHz	µsec	C6
kHz	msec	C5
Hz	sec	C4
MLH	Ksec	C3

10. CHECK

a.	COM A or Separate	E7
b.	Check	E?

11. REMOTE GATING

a.	Enable a Rear Panel External Gate	E;
b.	Disable Rear Panel External Gate	E3

12. A-B SW

*A+B	E5
A-B	E=

13. READ

Return a Reading

14. LOCAL - REMOTE

Goes to Remote per Bus Rules

LTR	P C NO	APPROVED	DATE
	REVISIONS		

MODEL	STK NO
REMOTE PROGRAMMING CODES FOR 534A OPT 12	
BY Bill Birdsell	DATE 3-12-75
APPD	SHEET NO 2 OF 2
SUPERSEDES	DWG NO A-ET9500-97016-2

FORM NO 7830-006-L

TTL

TTL is a software routine that sets up from 3 to 11 reference and power supply voltages with a single call. It is called in ATS BASIC by the command:

TTL (X)
where X = code number of call for desired settings.

For a listing of call codes and the action they perform see Table 1.

This routine was written so it may be expanded. To add a group of settings to the program, add one entry to the NS group, and add the group in the format indicated in the software. Then reassemble the software and load the new program in the appropriate overlay in the system.

The external subroutines called by the TTL driver are in the TODS system. See system documentation for their description.

ENGINEER RESPONSIBILITY ▨ SEPIA ▨

0	1	2		4	5	6	7	8	9	10	11	12	14	15	
16	17	18	19	20	21	22			33	34	38		42	43	
		63			90			93							

SYM	REVISIONS	APPR.	DATE

A-ET9500-97002-1

POWER SUPPLY

TTL CODE	1	2	3	4	5	6	7	8	9	10	11
0	0	0	0	N	N	N	N	N	N	N	N
1	3	0	0	2.4	0.4	4.8	0.1	2.4	0.4	4.8	0.1
2	5	12	12	N	N	N	N	N	N	N	N
3	0	0	0	0.4	0.1	0.5	0	0.4	0.1	0.5	0

N = NO CHANGE

Reference A R

	C.H.	C.L.	D.H.	D.L.	C.H.	C.L.	D.H.	D.L.

NOTE: supply
12,13,1-3 = UUT supplies
4-7 = A REF. STU 1-96,
8-~~9~~ 11 = B REF. " 97-120,

N = NO change

REF A 1-96, 121-216

REF B 97-120 217-240

ITEM	QTY.	MATERIAL-DESCRIPTION	MAT'L-PART NO.	MAT'L-DWG. NO.	MAT'L-SPEC.
121-216					
217-240					

DO NOT SCALE THIS DRAWING
UNLESS OTHERWISE SPECIFIED.
DIMENSIONS ARE IN INCHES.
TOLERANCES .XX ± .02 .XXX ± .005

DRAWN BY: Bill Birdsell	DATE:
ENGINEER: Bill Birdsell	DATE: 9/30/74
RELEASE TO PROD.	
SUPERSEDES DWG.	

TITLE: Table 1 Call code VS. voltage

NEXT ASSEMBLY

FINISH

SCALE

HEWLETT hp PACKARD

PART NUMBER: A-ET9500-97002-1