

HEWLETT-PACKARD CO.



SELF LOGGING OF PERCENTAGE EMPIRIC

SLOPE is a data gathering program for the TODS system. It is designed as a primary data gathering routine in the test system. 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 user or application.

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SYSTEM INTERFACE

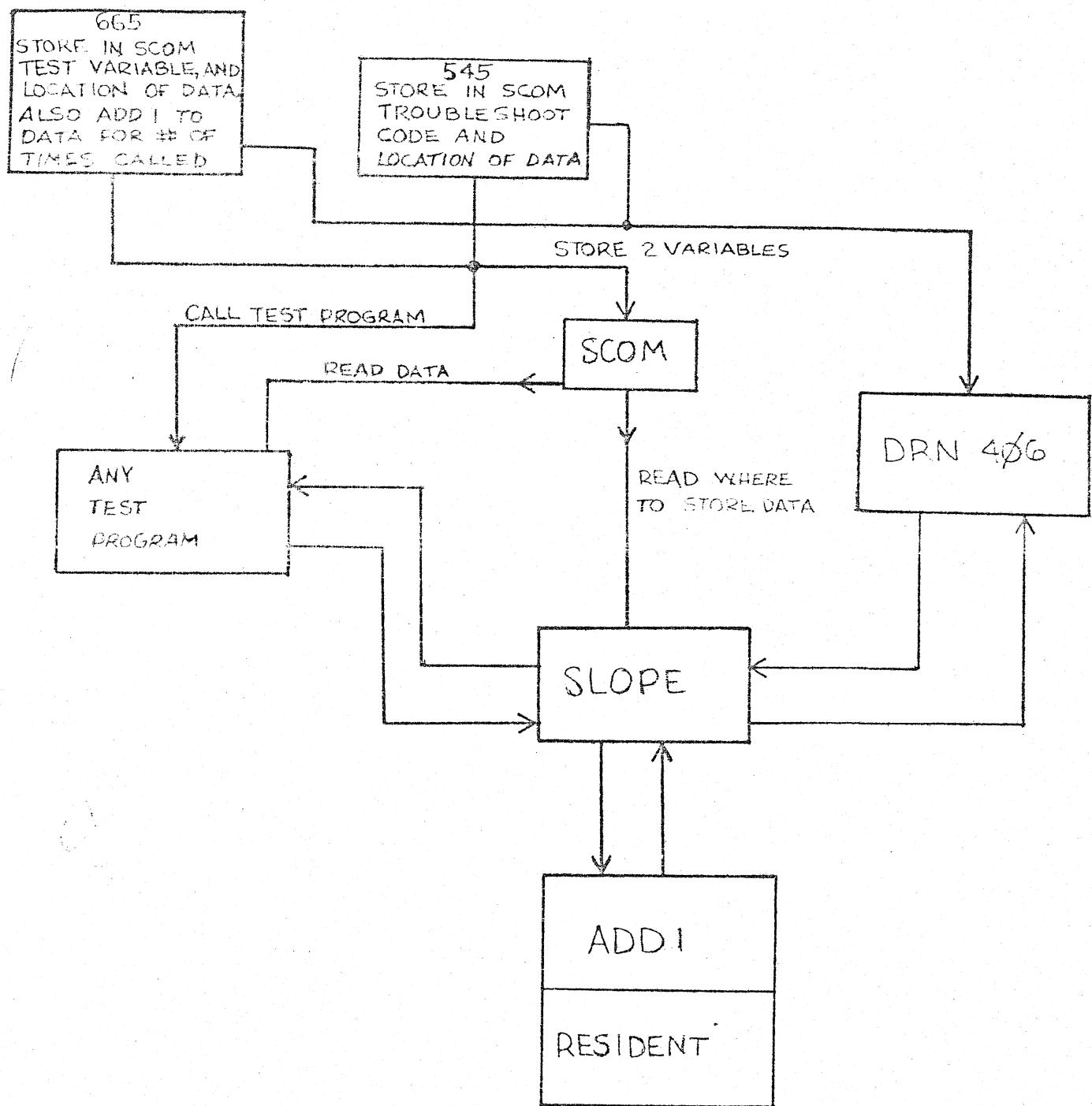
SLOPE requires external storage in the resident. The main body of SLOPE is an ASCII program called VACUM. VACUM uses other system subprograms and 2 new system programs that were added for SLOPE. The programs that were added are TIME and ADD 1. Time is a BASIC callable routine also. ADD 1 is a ASCII program 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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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 (1,1)	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 (1,0)	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	

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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.

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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  DISPLAY "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 DISPLAY "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.

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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 regardless 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 troubleshoot it is incremented if the test passes and the operator answers 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 (troubleshooting 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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