



# Hewlett-Packard 9825A Calculator System Test Booklet

HEWLETT  PACKARD



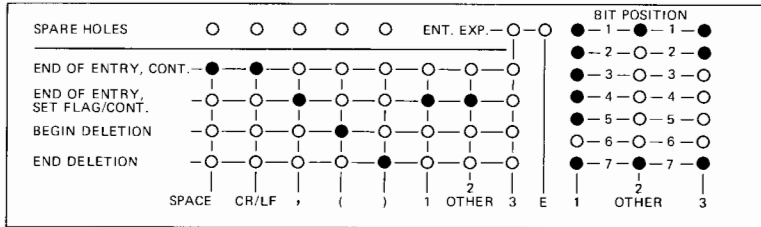
PART NUMBER 09825-90031  
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MAR. 1, 1976

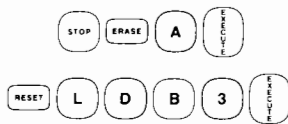
# 9863A Tape Reader

## To Test the Tape Reader

1. Make sure that the calculator and tape reader are properly connected.
2. Switch the calculator and the tape reader ON.
3. Set the program board on the tape reader as shown:



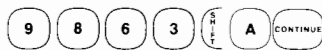
4. Set the Mode Switch to Data, and set the Selector switch to STOP.
5. Load the last section of the diagnostic tape (09863-90002) supplied with the tape reader and set the Selector switch to START.
6. With the test cartridge in your calculator, press:



7. When the display returns with:

ENTER MODEL # TO BE TESTED

press



8. When the display returns with:

ENTER SELECT CODE

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

9. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

enter the number of times you want the test to run and press **CONTINUE**.

10. When the display returns with:

LOAD TAPE; PRESS CONTINUE

ensure that the punched tape is loaded in the tape reader, and then press **CONTINUE**.

11. The tape reader should read the entire tape and then print:

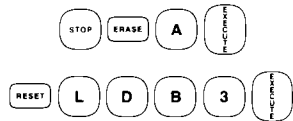
TEST COMPLETE

12. If the tape reader stops and the calculator prints an error, carefully repeat the entire procedure. If the exercise still cannot be successfully run, the tape reader may be defective. For assistance, contact the nearest HP Sales and Service Office; locations are listed at the back of the 9825A Operating and Programming Manual.

## 9864A Digitizer

### To Test the Digitizer

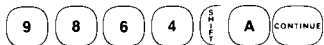
1. Make sure that the calculator and digitizer are properly connected.
2. Switch the calculator and digitizer ON. You should hear a beep from the digitizer and the LINE switch should light.
3. With the test cartridge in your calculator, press:



4. When the display returns with:

ENTER MODEL # TO BE TESTED

press



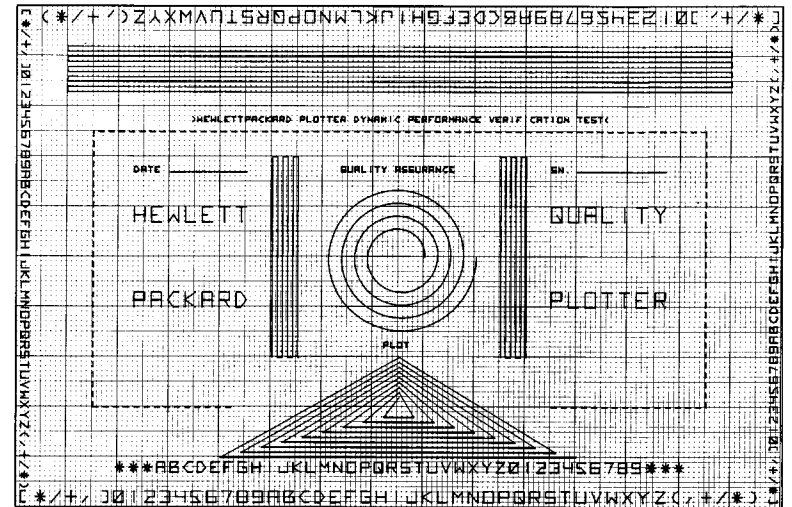
5. When the display returns with:

ENTER SELECT CODE

enter the select code and press CONTINUE. To specify the factory set select code just press CONTINUE.

### Dynamic Plot

11. The dynamic plot should duplicate the sample plot shown in this figure.



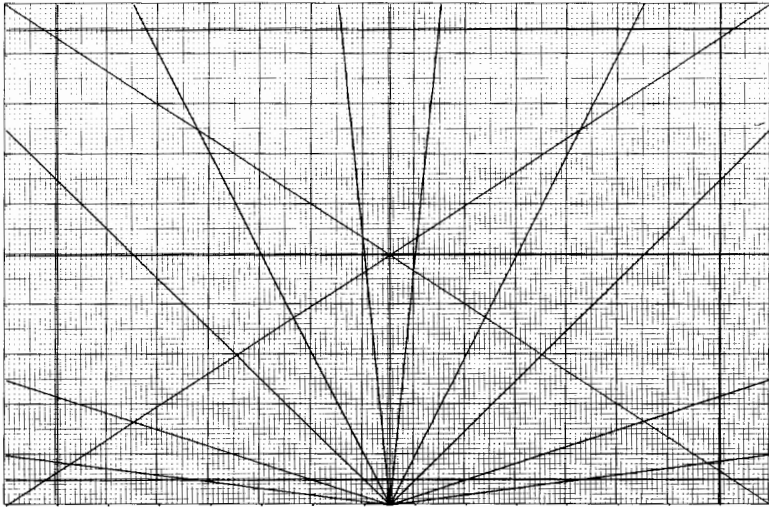
12. If the plotter fails to duplicate the sample plots, verify that the paper is properly positioned and that the lower-left and upper-right corners are properly aligned; then repeat the procedure. If the sample plot cannot be duplicated, contact the nearest HP Sales and Service Office for assistance; office locations are listed at the back of the 9825A Operating and Programming Manual.

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## Retrace Plot

10. The retrace plot should duplicate the sample plot shown in this figure.



Plotter alignment can be verified by comparing the plot with the following specifications:

- a. Alignment Verification - all vertical and horizontal lines (6) align within 0.010 inch of preprinted grid.
- b. Retrace Verification - all retraced lines (11) radiating from bottom center) are open less than 0.015 inch.
- c. Servo Matching Verification - the single horizontal trace (at bottom of Plot) has inflections less than 0.015 inch in amplitude.
- d. All angular lines bow no more than 0.040 inch from the true straight line between end points.

## NOTE

From this point until the end of this procedure, move the cursor only as directed. When directed to move the cursor from one point to another, do so by sliding the cursor; do not lift the cursor from the digitizing surface unless specifically instructed to do so. Also, do not slide the cursor outside the digitizing area unless instructed to do so.

6. When the display returns with:

TURN 9864A OFF AND THEN ON

place the cursor near the middle of the platen and then turn the digitizer OFF and then ON. The digitizer should beep each time it is turned OFF or ON. Press .

7. When the display returns with:

LIFT CURSOR FROM 9864A PLATEN

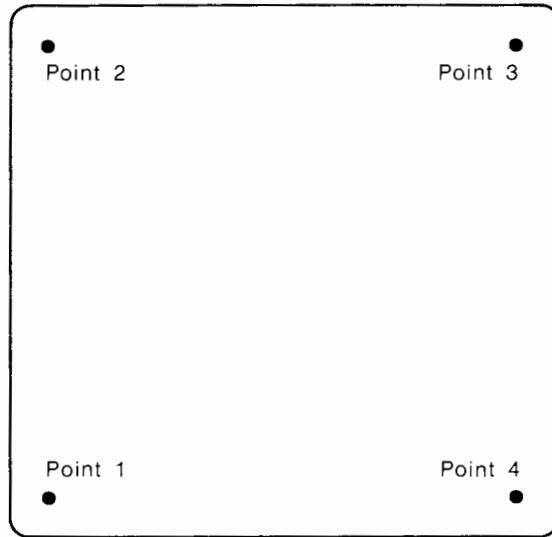
lift the cursor from the platen, a beep should be heard. Return the cursor to the platen and press .

## XY Test

8. The following display should be seen.

```
SET ORIGIN&TAKE SAMPLE AT POINT 1
```

Place the cursor over point 1 (refer the following figure) and press **O** (origin) and **S** (single sample) on the cursor.



Platen

9. Press **S** at each of the other points as called for by the display.
10. If XY TEST COMPLETE is printed continue to the Hold Test. If ERROR is printed the XY TEST will be restarted, carefully repeat the procedure starting at step 8. If the XY Test continues to fail, refer to step 16.

6. When the display returns with:

```
ENTER SELECT CODE
```

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

7. When the display returns with:

```
WHICH TEST? RETRACE=0 DYNAMIC=1
```

enter either 0 or 1 depending on the test you want to run (refer to steps 10 and 11).

8. When the display returns with:

```
ENTER NUMBER OF TIMES TO TEST
```

enter the number of times you want the test to run and press **CONTINUE**.

9. When the display returns with:

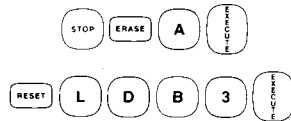
```
LOAD PAPER, PRESS CONTINUE
```

ensure that the plotter is loaded with paper as described in step 3 and that the pen is ready. Press **CONTINUE**.

## 9862A Plotter

### To Test the Plotter

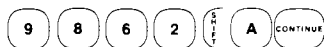
1. Install the Plotter ROM in the calculator if the plotter dynamic test is to be used (refer to step 11), otherwise all plug-in ROMs should be removed.
2. Switch the plotter and calculator ON. The LINE indicator on the plotter should light.
3. On the Plotter:
  - a. Place a sheet of plotter paper (P/N 9270-1004 supplied with the plotter) on the platen and align the paper against the bottom and left-edge paper guides. Press CHART HOLD and smooth the paper on the platen.
  - b. Adjust the LOWER LEFT Graph Limit controls to align the pen exactly over the lower left corner of the grid on the paper. Then adjust the UPPER RIGHT Graph Limit controls to align the pen over the upper-right corner of the grid.\*
4. With the test cartridge in your calculator, press:



5. When the display returns with:

ENTER MODEL # TO BE TESTED

press



\*This procedure must be completed very carefully, as the accuracy of the plot depends on it.

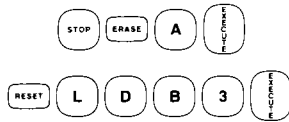
### Hold Test

11. Place the cursor over the lower-left dot (point 1), press **□** and **□** (continuous sample) on the cursor.
12. Move the cursor to the upper-right dot (point 3) and press **H** (hold) on the cursor, once. Note the values of X and Y as they are displayed by the calculator.
13. Move the cursor to the lower-left dot and press **H**, once.
14. Repeat (about 5 more times) steps 12 and 13 until the displayed values for X and Y "roll over" from 99.99 to 0.00; it is not necessary to see the actual change.
15. When the X and Y values have rolled over the tests are complete. If there have been no failures the digitizer is operating properly. If there have been failures carefully repeat the tests.
16. If there are still failures contact the nearest HP Sales and Service Office; locations are listed at the back of the 9825A Operating and Programming Manual.

## 9866A/B Thermal Printer

### To Test the Printer

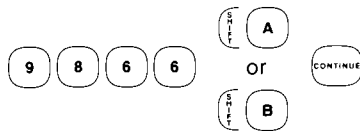
1. Make sure that the calculator and printer are properly connected.
2. Turn the printer and calculator ON. The white light above the LINE switch indicates that the printer is ON. If the amber light below the Paper Advance switch lights, you do not have any paper. Start the test with a fresh roll.
3. With the test cartridge in your calculator, press:



4. When the display returns with:

ENTER MODEL # TO BE TESTED

press



# Chapter **3** Peripheral Tests

## General

Tests for the following 9800 Series peripherals are available on the test cartridge.

9862A	Plotter
9863A	Tape Reader
9864A	Digitizer
9866A/B	Thermal Printer
9869A	Hopper Card Reader
9871A	Impact Line Printer
9883A	Paper Tape Photo Reader
9884A	Paper Tape Punch
98032A	16-Bit Interface
98033A	BCD Interface

The plug-in ROMs are not required to run the peripheral tests, with one exception. The Plotter ROM has to be installed to run the 9862A Plotter Dynamic Test.

Refer to the section dedicated to your peripheral for the test procedure. These sections follow.

If errors are printed or if the results are not as described for the test, ensure that the Test Cartridge is installed and then press . Repeat the test. If there are still errors, contact the nearest HP Sales and Service Office for assistance; office locations are listed at the back of the 9825A Operating and Programming Manual.



A test or a group of tests can be repeated continuously by typing **r** in conjunction with the test number(s).

Examples:

3r  
repeats test 3

r3  
repeats test 3

65r  
repeats test 5 and 6

Tests 1, 2, and 3 will be run if **CONTINUE** is pressed without a test number specified.

5. When the display returns with:

ENTER SELECT CODE

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

6. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

enter the number of times you want the test to run and press **CONTINUE**.

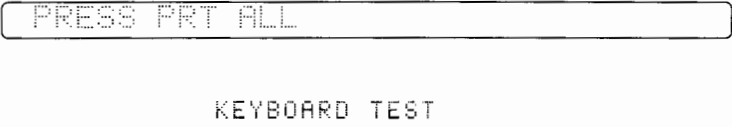
7. The printout should appear as shown for the appropriate model (see next page).

8. Compare the printout with the sample shown. If the printout differs from the sample, carefully repeat the entire procedure. Should the printout still fail to duplicate the sample, carefully compare each line of the sample with the finished printout. Note any characters which are missing or incompletely printed. If the same errors are repeated line-after-line in your printout, the printer is probably defective.



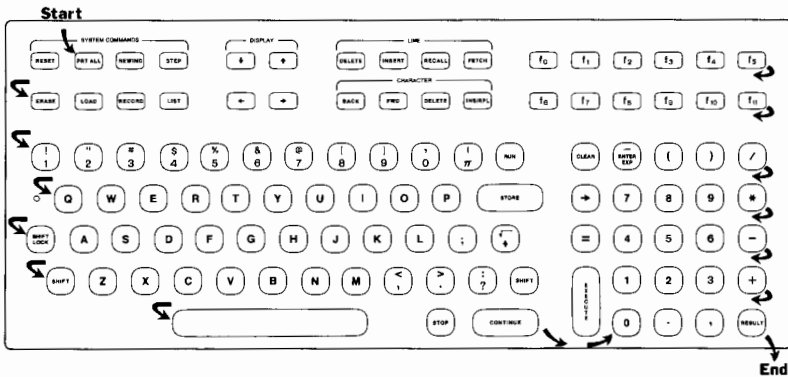
7 Key Switch Test

The following display and printout should be seen.



Check the keys for proper operation by pressing each key as it is called for by the display. Remember to press (SHIFT LOCK) before pressing (A), press (SHIFT) (to unlock shift) before pressing (Z).

The key sequence called for by the display will be as shown below.

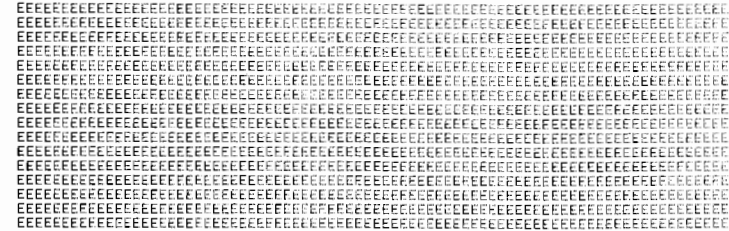


An error message will be printed if:

- the wrong keys are pressed four times in succession.
- the correct key fails to operate properly.

9866B Printout

9866B THERMAL PRINTER TEST



ABCDEFGHIJKLMNPOQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz  
 ABCDEFGHIJKLMNPOQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz  
 ABCDEFGHIJKLMNPOQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz

0123456789 !"#%&'()\*+,-./:;<=>?@ [ \ ] ^ \_ ` { | } ~  
 0123456789 !"#%&'()\*+,-./:;<=>?@ [ \ ] ^ \_ ` { | } ~  
 0123456789 !"#%&'()\*+,-./:;<=>?@ [ \ ] ^ \_ ` { | } ~

PLOT CHARACTER TEST.



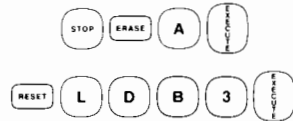
EXERCISER COMPLETE

9. If your printer appears defective, contact the nearest HP Sales and Service Office for assistance; office locations are listed at the back of the 9825A Operating and Programming Manual.

## 9869A Hopper Card Reader

### To Test the Card Reader

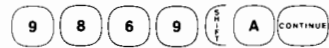
1. Make sure that the calculator and card reader are properly connected.
2. Turn the calculator and the card reader ON.
3. With the test cartridge in your calculator, press:



4. When the display returns with:

ENTER MODEL # TO BE TESTED

press



5. When the display returns with:

ENTER SELECT CODE

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

6. When the display returns with:

CARD DECK # =

enter the test deck number (1, 2, 3, or 4) and then press **CONTINUE**.

The test deck number is to be used depends on the Card Selector switch position. This switch is located on the back panel of the card reader.

### 6 Display Test

The following printouts and displays should be seen. Each display should be checked for missing or extra display dots.

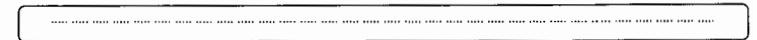
#### DISPLAY TEST



5 seconds, this display may flicker



3 seconds



3 seconds



20 seconds



20 seconds



20 seconds



20 seconds

#### DISPLAY TEST COMPLETE

Pressing:

**CONTINUE** - will stop the display test, to allow more viewing time.

**CONTINUE** - again, will continue the display test.

**STOP** - will abort the display test.

5 Printer Test

The following display and printout should be seen during the printer test.

```

PRINTER TEST
                    5 seconds

PRINTER TEST

=====
=====
=====

40XNαβΓδσ↓λυ†‡
0Q8AαAα00800Ew²E
!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[r]↑_
'abcdefghijklmnop
parstuvwxyzñ!→Σ†

PRINTER TEST
COMPLETE
    
```

The printout should duplicate the above sample.

Switch position	Use test deck Number
80 Column no. clock	1
40 Column no. clock	2
Clock on Data	3
Clock after Data	4

Depending on the options your card reader has, not all of these positions may be available. If 0 is entered, instead of a test deck number, the card reader test will be terminated.

7. When the display returns with:

```
LOAD CARDS, SET SWITCH, PRESS CONT
```

ensure the Card Selector switch is set as required, load the test card, and press **CONTINUE**.

8. The calculator will read 18 cards while displaying the following test titles:

```

DEMAND-NORMAL TEST           3 seconds
DEMAND-IMAGE TEST           3 seconds
CONTINUOUS-NORMAL TEST      3 seconds
CONTINUOUS-IMAGE TEST      3 seconds
    
```

9. The display should return with:

```
9869A TEST PASSED
```

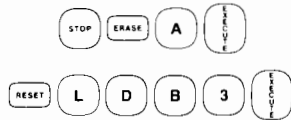
10. Press **CONTINUE** and repeat the procedure, starting at step 6, to test the other positions of the Card Selector switch using the appropriate test cards.

11. If the card reader or calculator fail to respond as indicated repeat the procedure carefully. If there are still failures contact the nearest HP Sales and Service Office; locations are listed in the back of the 9825A Operating and Programming Manual.

## 9871A Impact Line Printer

### To Test the Printer

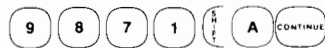
1. Make sure that the calculator and printer are properly connected .
2. Switch the calculator and the printer ON.
3. Load the printer with a sheet of 8 1/2" × 14" paper (insert the long edge first).
4. With the test cartridge in your calculator, press:



5. When the display returns with:

ENTER MODEL # TO BE TESTED

press



6. When the display returns with:

ENTER SELECT CODE

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

### 3 Processor Test

The following printout should be seen.

```
PROCESSOR TEST
PROCESSOR PASSED
```

If there are no errors printed the processor is operating properly.

### 4 Tape Cartridge Test

The following display and printout should be seen.

INSERT SCRATCH CARTRIDGE

CARTRIDGE TEST

Remove the Test Cartridge and insert a scratch cartridge\*, then press **CONTINUE**.

After about 45 seconds the following display and printout should be seen.

REPLACE TEST CARTRIDGE

CARTRIDGE TEST  
COMPLETE

Remove the scratch cartridge, re-insert the Test Cartridge, and then press **CONTINUE**.

\*The scratch cartridge must be a known-good, unprotected tape cartridge which does not contain wanted information.

2 ROM Test

The following display and printout should be seen.

ROM TEST 5 seconds

ROM TEST

ROMS ON SYSTEM:

MAINFRAME

32 K	} This information will vary depending on the ROM(s) installed (see table below).
34 K	
40 K	
46 K	

ROMS IN ERROR:

NONE	} Errors will be printed here.
------	--------------------------------

ROM TEST COMPLETE

**ROM Numbers and Titles**

- 32K General I/O
- 34K Plotter
- 36K Matrix
- 40K Advanced Programming
- 42K Extended I/O (Part 1)
- 44K Extended I/O (Part 2)
- 46K Strings

If NONE is printed for errors the ROM(s) are operating properly.

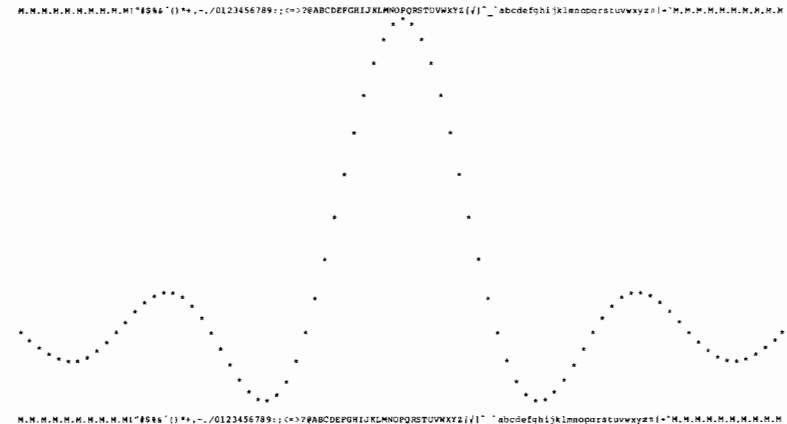
7. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

press **CONTINUE**.

8. The printout should appear as shown below.

**9871A Printout**

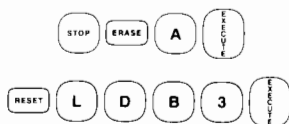


If the printout differs from the sample, carefully repeat the entire procedure. Should the printout still fail to duplicate the sample, contact the nearest HP Sales and Service Office for assistance; office locations are listed at the back of the 9825A Operating and Programming Manual.

## 9883A Paper Tape Photo Reader

### To Test the Tape Reader

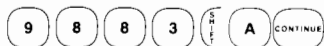
1. Make sure that the calculator and tape reader are properly connected.
2. Switch the calculator and tape reader ON.
3. Load the diagnostic tape (09883-90030) supplied with the tape reader and then press READ on the front of the tape reader.
4. With the test cartridge in your calculator, press:



5. When the display returns with:

ENTER MODEL # TO BE TESTED

press



6. When the display returns with:

ENTER SELECT CODE

enter the select code and press CONTINUE. To specify the factory set select code just press CONTINUE.

## Test Descriptions

### 1 R/W Memory Test

The following display and printout should be seen.

R/W MEMORY TEST

20 to 80 seconds

R/W MEMORY TEST

60K BOARD PASSED } This information will vary  
70K BOARD PASSED } depending on the memory  
50K BOARD PASSED } options installed (see table below).

R/W MEMORY TEST  
COMPLETE

#### Board and Option Number

70K	Standard
60K	Opt. 001
50K	Opt. 002
40K	Opt. 003

If there are no errors printed the R/W Memory is operating properly.



6. The following tests are available on the Test Cartridge:

- 1 R/W Memory Test
- 2 ROM Test
- 3 Processor Test
- 4 Tape Cartridge Test
- 5 Printer Test
- 6 Display Test
- 7 Key Switch Test
- 0 Abort (clears the calculator)

Run each of these tests by typing-in the test number followed by **CONTINUE**. Refer to the next sections of this booklet for detailed information about each test.

At the end of each test the following display will be seen:

WHICH TEST(S)?

type-in the next test number followed by **CONTINUE**.

If the wrong key is pressed while typing the test number press **STOP** **CONTINUE** and then type the correct test number.

If errors are printed or if the results are not as described for the tests, press:

**RESET** **R** **T** **B** \* **CONTINUE**

and then repeat the test. If there are still errors, contact the nearest HP Sales and Service Office for assistance; office locations are listed at the back of the 9825A Operating and Programming Manual.

\*rtb = return to binary

7. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

press **CONTINUE**.

8. When the display returns with:

LOAD TAPE, PRESS CONTINUE

ensure that the punched tape is loaded in the tape reader, and then press **CONTINUE**.

9. The tape reader should read the entire tape, the calculator will print the errors if they occur.

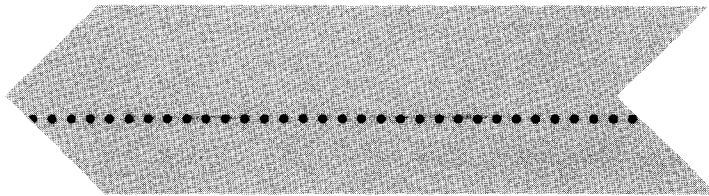
10. If no errors are printed the tape reader is operating properly.

11. If errors are printed, carefully repeat the procedure. If there are still errors contact your nearest HP Sales and Service Office; locations are listed in the back of the 9825A Operating and Programming Manual.

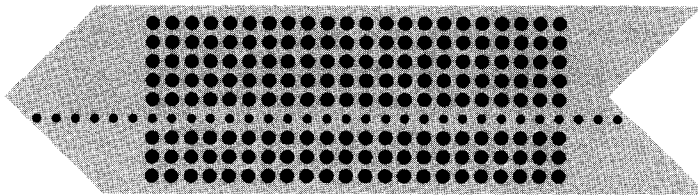
## 9884A Paper Tape Punch

### To Test the Tape Punch

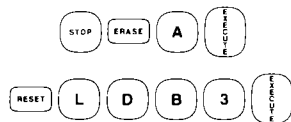
1. Make sure that the calculator and punch are properly connected.
2. Turn the calculator and the punch ON.
3. Ensure that the punch is loaded with paper tape.
4. Press the FEED HOLES switch on the punch, the following holes should be punched.



5. Press the CODE HOLES switch on the punch, the following holes should be punched.



6. With the test cartridge in your calculator, press:



# Chapter 2 Calculator Tests

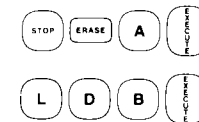
## Procedure

### To Test the Calculator

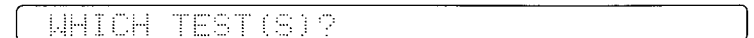
1. Turn the calculator ON.
2. The following display should be seen.



3. Insert the Test Cartridge so that the label on the cartridge faces the back of the calculator.
4. Press:



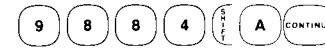
5. The following display should be seen.



7. When the display returns with:

ENTER MODEL # TO BE TESTED

press:



8. When the display returns with:

ENTER SELECT CODE

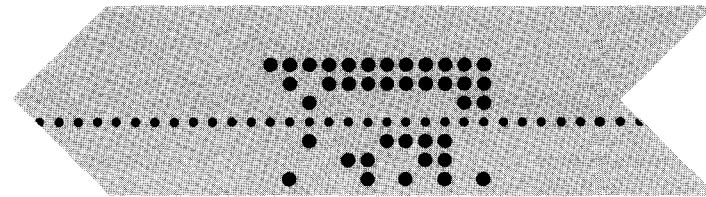
enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

9. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

enter the number of times you want the test to run and press **CONTINUE**.

10. The resulting punched tape should be the same as example shown below.

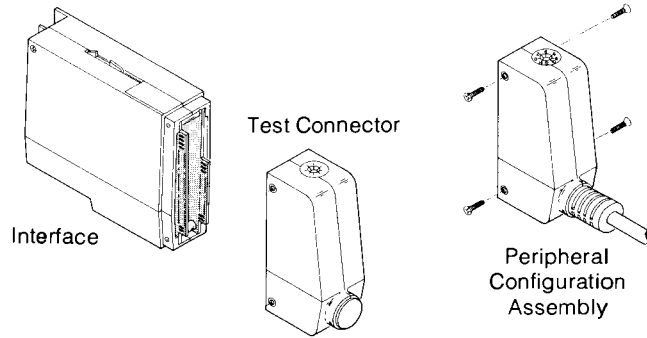


11. If the punched tape is the same, the punch is operating properly.
12. If there are missing holes or if there are extra punched holes, carefully repeat the procedure. If there are still missing or extra holes contact the nearest HP Sales and Service Office; locations are listed in the back of the 9825A Operating and Programming Manual.

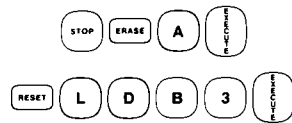
## 98032A 16-Bit Interface

### To Test the Interface

1. Remove the Peripheral Configuration Assembly and install the Test Connector (P/N 98241-67932).



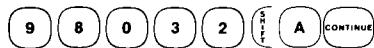
2. Turn the calculator OFF.
3. Plug the interface into the back of the calculator and turn the calculator ON.
4. With the test cartridge in your calculator, press:



5. When the display returns with:

ENTER MODEL # TO BE TESTED

press



# Chapter 1

## General Information

### Introduction

This booklet contains test procedures to verify the performance of the HP 9825A Calculator System. The System Test Cartridge (Part No. 09825-90035) contains the necessary programs to implement these tests.

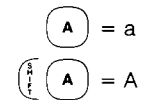
The tests are divided into two groups;

1. Calculator Tests
2. Peripheral Tests

The calculator should be thoroughly tested before attempting to test any of the peripherals.

This booklet assumes that the calculator will turn-on and display  $\frac{1}{1}$ . If not, refer to the Operating and Programming Manual for installation procedures, fuse requirements, and if necessary, the Sales and Service Offices locations.

The symbol  $\left(\frac{\text{A}}{\text{f}}$  is used in this booklet to indicate that the shift key should be held down while the next key is pressed. Example:



6. When the display returns with:

ENTER SELECT CODE

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

7. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

enter the number of times you want the test to run and press **CONTINUE**.

8. The following displays should be seen while the test is in progress.

Doing 98032 DATA PATTERNS TEST

60 seconds

Doing I/O line TEST

15 seconds

Doing EXTENDED CTRL and STATUS

30 seconds

Test of 98032 COMPLETE!

2 seconds

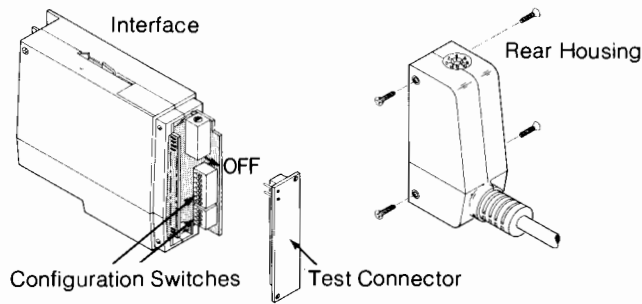
During the test the calculator will beep periodically to indicate that the test is still in progress. The printer will print any errors that occur during the test.

9. If no errors are printed the interface is operating properly.
10. If errors are printed, carefully repeat the procedure. If there are still errors, contact the nearest HP Sales and Service Office; locations are listed in the back of the 9825A Operating and Programming Manual.

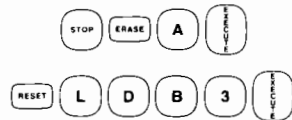
## 98033A BCD Interface

### To Test the Interface

1. Remove the rear housing and install the Test Connector (P/N 98241-67933) and set all of the configuration switches to OFF (refer to the 98033A BCD Interface Installation and Service Manual).



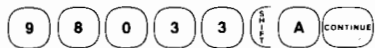
2. Turn the calculator OFF.
3. Plug the interface into the back of the calculator and turn the calculator ON.
4. With the test cartridge in your calculator, press:



5. When the display returns with:

ENTER MODEL # TO BE TESTED

press



## Table of Contents

### General Information

Introduction	1
--------------	---

### Calculator Tests

Procedure	3
Test Modifications	11

### Peripheral Tests

General	13
9862A Plotter	14
9863A Tape Reader	18
9864A Digitizer	20
9866A/B Thermal Printer	24
9869A Hopper Card Reader	28
9871A Impact Line Printer	30
9883A Paper Tape Photo Reader	32
9884A Paper Tape Punch	34
98032A 16-Bit Interface	36
98033A BCD Interface	38

**CAUTION**

The HP 9825A Calculator can be severely damaged if it has not been set to the correct voltage; if in doubt, please refer to the Operating and Programming Manual.

6. When the display returns with:

ENTER SELECT CODE

enter the select code and press **CONTINUE**. To specify the factory set select code just press **CONTINUE**.

7. When the display returns with:

ENTER NUMBER OF TIMES TO TEST

enter the number of times you want the test to run and press **CONTINUE**.

8. The following display should be seen while the test is in progress.

98033A BCD Interface Test

70 seconds

During the test the calculator will beep periodically to indicate that the test is still in progress. The calculator will print any errors that occur during the test.

9. If no errors are printed the interface is operating properly.
10. If errors are printed, carefully repeat the procedure. If there are still errors, contact the nearest HP Sales and Service Office; locations are listed in the back of the 9825A Operating and Programming Manual.

## System Test Booklet



The HP 9825A Calculator

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