

# 9825 CE Handbook



# 9825 CE Handbook

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# Chapter 1

## 9825A/B Product Information

### 9825A/B Common Specifications

The following specifications are common to both the 9825A and 9825B desktop computers:

#### Tape Cartridge

Memory capacity	250 000 bytes
Read/write speed	559 mm/s (22 in./s)
Search speed (bidirectional)	2 286 mm/s (90 in./s)
Transfer rate	2 750 bytes/s
Typical rewind time	19 s (end-to-end)
Typical erase time	40 s (one track)
Tape length	42.67 m (140 ft)
Size	63.5 x 82.5 x 12.7 mm (2.5 x 3.25 x 0.5 in.)
Verification	automatic on recording

Tape cartridges are intended for nominal program or data storage; the typical life cycle is 50-100 hours, depending on the application. Environmental conditions of 25°C (77°F) and 20 to 50% relative humidity are most favorable for a long tape life. Tape life is decreased by a high duty cycle (percent of time the tape is accessed during the total time the 9825 is in use), high turning resistance and continuous use for long periods of time (longer than one-half hour). It is suggested that tape transports be regularly cleaned and cartridges removed from drives after use.

For heavy usage of mass storage files, such as in consecutive file sorts or data base management applications, flexible disc drives are recommended for optimum performance and reliability.

#### Printer

Paper width	57.15 mm (2.25 in.)
Speed	180 lines/min
Font	5 x 7 dot matrix; prints all the following characters in upper- and lowercase; up to 16 characters/line

#### Character Set

```
# 1 2 3 4 5 6 7 8 9 0 :
! " # $ % & ' ( ) * + , - . / : ;
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^ _ `
a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ `
_ + = < > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
[ \ ] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z
{ | } ~ ` _ + = < > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
[ \ ] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z
{ | } ~ `
```

Maximum (max)	variable
Minimum (min)	variable
Modulus (mod)	3.1 ms
log	8.6 ms
ln	6.7 ms
e <sup>x</sup>	5.5 ms
10 <sup>x</sup>	7.6 ms
Raise to power	15 ms
Random number (rnd)	1.8 ms
Sign (sgn)	0.20 ms
√	2.5 ms
Sine (sin)	18 ms
Cosine (cos)	18 ms
Tangent (tan)	13 ms
Arcsine (asn)	22 ms
Arccosine (acs)	22 ms
Arctangent (atn)	15 ms
+	0.32 ms
-	0.37 ms
*	0.88 ms
/	2.5 ms
Power of ten round (pmd)	0.74 ms
Digit round	0.53 ms

Logic operators  
 AND, NOT, OR, XOR (exclusive or)

Relational operators  
 = equal to  
 >= or => greater than or equal to  
 > greater than  
 <= or < less than or equal to  
 < less than  
 # or <> or << not equal to

#### Built-In Functions

Mathematical and trigonometric functions and operations are included in the following with average execution times.

Absolute (abs)	0.19 ms
Fraction (frt)	0.37 ms
Integer (int)	0.47 ms



# Chapter 2

## 9825A/B Environmental/Installation

All values stated here are typical for a 9825 Desktop Computer, except where noted. These values are not meant as specifications and do not represent final approved values. Actual values will vary with individual machines depending on their memory configuration. The 9825 Technical Data Sheet is the only official specification of expected performance.

### Environmental Range

Operating temperatures . . . 5°C to 40°C ambient  
 Storage temperature . . . . . -40°C to 65°C  
 Ambient humidity . . . . . <80%

### Size/Weight

Height . . . . . 129.5 mm (5.1 in.)  
 Width . . . . . 383.5 mm (15.1 in.)  
 Depth . . . . . 495.3 mm (19.5 in.)  
 Weight:  
   Net . . . . . 12.3 kg (27 lb)  
   Shipping . . . . . 24.5 kg (54 lb)  
 Cube . . . . . 0.12 m<sup>3</sup> (4 ft<sup>3</sup>)

### Power Requirements

Source . . . . . 110 V +5%, -10%  
                   120 V +5%, -10%  
                   220 V +5%, -10%  
                   240 V +5%, -10%

Note: Voltage is switch-selectable.

Line frequency . . . . . 48 to 66 Hz  
 Consumption . . . . . 1.7 A @ 100V  
                           1.5 A @ 120V  
                           0.8 A @ 220V  
                           0.75 A @ 240V

### Maximum Power Consumption

Voltage Setting	Line Voltage	Current (Amps)	Voltamps	True RMS Watts	BTU/hr
100	105	1.74	182	142	482
120	126	1.54	194	146	500
220	231	0.83	190	144	490
240	250	0.78	193	145	494



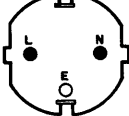


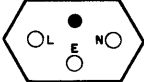
### Power Line Susceptability

The 9825A/B is type tested to withstand a transient of the following parameters:

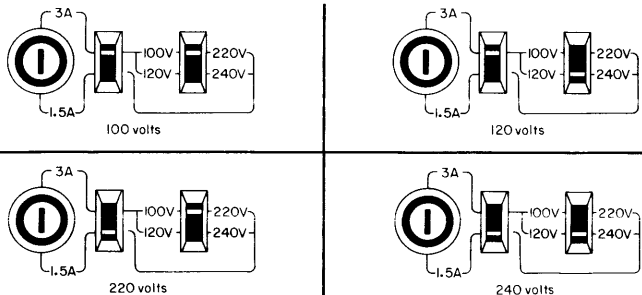
- 10 microsecond pulse width.
- 0.5 microsecond rise time.
- Amplitude is twice line voltage.

## 9825A/B Installation

### Power Cords

Country of Use	Connector End View	Voltage Rating	Current Rating	Option Number	HP Part Number
Great Britain, Cyprus, Nigeria, Rhodesia, and Singapore	<p><b>BS 1363 A</b></p> 	250	13A	900	8120-1351
Australia, New Zealand	<p><b>AS C112</b></p> 	250	10A	901	8120-1369
Europe, Egypt, Saudi Arabia	<p><b>CEE 7-VII</b></p> 	250	10	902	8120-1689
United States, Canada, Japan, Mexico, Taiwan, Philippines	<p><b>NEMA 5-15P</b></p> 	125	15A	903	8120-1378
United States	<p><b>NEMA 6-15P</b></p> 	250	15A	904	8120-0698
Switzerland	<p><b>SEV 1011</b></p> 	250	10A	906	8120-2104

### Voltage Selector Switches





# Chapter 3


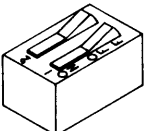

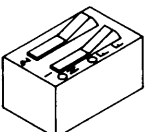


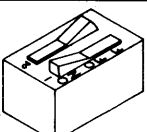
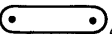

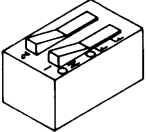
## 9825A/B Configuration

### 9825 Mainframe Configurations

The following table lists the various configurations of the 9825 family of desktop computers. Memory and option ROMs shown for each refer to what the product consisted of at time of sale.

Product/Option	RWM Size	Plug-In Option ROMs
9825A	8K Bytes	98210A and 98214A or 98216A
9825A, Opt. 001	16K Bytes	
9825A, Opt. 002	24K Bytes	
9825A, Opt. 003	32K Bytes	
9825S	24K Bytes	
9825B	24/32K Bytes	
9825T	64K Bytes	

### 9825A/S Memory Switch Settings

OPTION	8K BYTE BOARDS A22		16K BYTE BOARDS A23		PROCESSOR A11 RWM SWITCHES
	BOARDS	CLIP POSITION	BOARDS	CLIP POSITION	
STANDARD	1	70  •50	0		
001	0		1	60  70 •40 50	
002	1	70  •50	1	60  70 •40 50	
003	0		2	60  70 •60 70  •40 50	

## 9825 Software Compatibility

Listed below are HP applications packs and the equipment required to use them.

Part No.	Description	Recommended Equipment #†
<b>ENGINEERING</b>		
09825-12500	<b>AC Circuit Analysis</b> Calculates the frequency response of linear circuits, including the effects of component tolerances.	Required: 72 or 7225 Optional: 66B or 71
09825-12510	<b>6800 Microprocessor Assembler</b> Provides means for developing 6800 Microprocessor assembly language programs; includes Editor, Assembler and routines for transferring source program and object code.	Req: 66B or 71 Opt: 83, 84
09825-12520	<b>Waveform Analysis</b> Provides capability to process digital signal data to achieve frequency domain and time domain measurements. Contains routines for single and double waveform analysis and Fourier series coefficients for equally or unequally spaced data.	Req: 72 or 7225
<b>MATHEMATICS</b>		
09825-10000	<b>General Utility Routines</b> Contains a collection of math sort, 9871 plot and 9866B plot routines and a self-teaching tape; included with each 9825 Desktop Computer.	Req: M Opt: 7225, 66B or 71
09825-13750	<b>Linear Programming Package</b> Determines an alternative among a large number of possibilities; e.g., mixing products/raw material, optimizing time/profit in manufacturing, flow analysis/optimization.	Opt: 66B or 71, 85M and MS
<b>MISCELLANEOUS</b>		
09825-10020	<b>Documentation Package</b> Has programs for annotated listings, indented listings, extended cross referencing, program comparison and calculating check sums without listing.	Req: 66B or 71
09825-10040	<b>Terminal Emulator Package</b> Provides a program to closely emulate a teletype-like terminal and a program to allow entry of an entire line into the display, to edit the line and then send the entire edited line to the computer.	Req: 9825B with SP or 9825T, 98036A Opt. 001 Serial Interface Opt: 66B
09876-10010	<b>9876/9825 Utility Routines</b> Allows the 9825 to produce specialized outputs on the 9876 Thermal Graphics Printer: function plots, scatter plots, bar charts, user-defined characters, title pages with 1.5-inch characters and banners with 6-inch characters.	Req: 76
09825-10200	<b>Model 9030 System Exerciser</b> Verifies proper functioning of Model 9030 Measurement and Control System including self tests, analog input calibration tests, and testing of all I/O channels.	Req: 2240 Opt. 001 with 98034
<b>STATISTICS</b>		
09825-15000	<b>Stat. Vol. 1 General Statistics</b> Provides 19 separate basic statistical analysis routines.	Opt: 72
09825-15010	<b>Stat. Vol. 2 Analysis of Variance and Regression Analysis</b> Provides five different analysis of variance programs, three regression analysis programs and three distribution functions.	Opt: 72
09825-15020	<b>Stat. Vol. 3 Nonparametric</b> Contains ten nonparametric programs for single and paired samples.	Req: Nothing besides 9825B/T
09825-15030	<b>Statistical Library 1</b> Contains Volumes 1, 2 and 3, complete with program cartridges and overlays.	Opt: 72
09825-15040	<b>Stepwise Regression</b> Performs complete regression analysis using one of four methods for selecting variables: stepwise, forward, backward or manual; transformations and residual analysis are included.	Req: 71 Opt: 69

**EQUIPMENT CODE KEY**

66B = 9866B Thermal Line Printer  
69 = 9869A Card Reader  
71 = 9871A Character Impact Printer  
72 = 9872 Plotter  
76 = 9876 Printer  
725 = 7225 Plotter w/1700A Opt. 003 Personality Module  
(9862 Plotter will work but is out of production)

2240 = 2240 Measurement and Control Processor  
83 = 9883A/2748B Tape Reader-Subsystem  
84 = 9884A Tape Punch  
85M = 9885M Flexible Disc Drive Master  
M = Matrix ROM  
MS = 9885M Flexible Disc ROM  
SP = Systems Programming ROM

**REMARKS**

A complete package includes all printed material and recorded tapes and discs associated with the software.

**ORDERING INFORMATION**

All software orders and further information requests should be placed through your local HP Sales Office.

# Chapter 4

## 9825A/B Troubleshooting

### Troubleshooting Checklist

Here's a list of checkpoints to be verified when a 9825 doesn't seem to work correctly. Several items are identified and their respective page number in the 9825 CE Handbook are shown for reference.

Checkpoint	Page
Power Source	
Correct Voltage	2-1
Correct Frequency	2-1
Proper Receptacle Contact	
Proper Grounding	2-2
Noise/Interference Free	2-1
Power Cord	
Correct Connector Polarity	2-2
Wiring Continuity	
Plugged in (Both ends)	
Mainframe Configuration	
Power Selector Switches	
Voltage Select Correct	2-2
Power Switch On	
Fuse, correct size, rating and type	8-5
Power Supply	
Output Voltages within Specifications	6-1
Power Harnesses connected to all assemblies	
Processor	
Clock Frequency within Specifications	6-2
All Memory Switches set correct (9825A/S only)	3-1
Memory and peripheral busses connected	
Memory	
9825A/S	
Correct Jumper Positions on A22 and A23	3-1
Correct Option ROM for Application	
9825B/T	
A24 RWM Size Switch Set Correct for Application	9-2
A24 9862-9872 Plotter Switch Set Correct for Application	9-2
Correct Option ROM for Application	
Keyboard, Ribbon Cables Connected	
Tape	
Good Fuse on A61	
Ribbon Cables Connected	
Data Cartridge Not Damaged	
Clean Read-Write Head	
Sense Lamps On	
Printer	
Proper Paper Installed Correctly	
Print Head Correctly Aligned	6-2
Paper Advance Set Correct	6-3
Correct Wire Connections	
Display	
Connected to KDP board	
Interfacing-Good fuses on A71	

<b>Checkpoint</b>	<b>Page</b>
General Situations	
Wiring,	
Ground Wires Properly Connected	
Ribbon Cables Correctly Installed	
Insulation Intact	
Tight Connections on PC Boards and Wiring	
PC Assemblies	
Clean Edge Connectors	
Cooling	
Air Filter Clean	
Proper Fan Operation	
Cleanliness-all areas clean, no contamination	
Software-program compatible with configuration	3-2

## 9825A/B Flow Charts

By using these flow charts, a given set of symptoms, and valid test results you should be able to list probable causes. Lists are shown in the flow charts; the top item in each list is the most likely cause. These flow charts cannot diagnose all possible problems. Use of the System Test Tape is indicated where necessary.

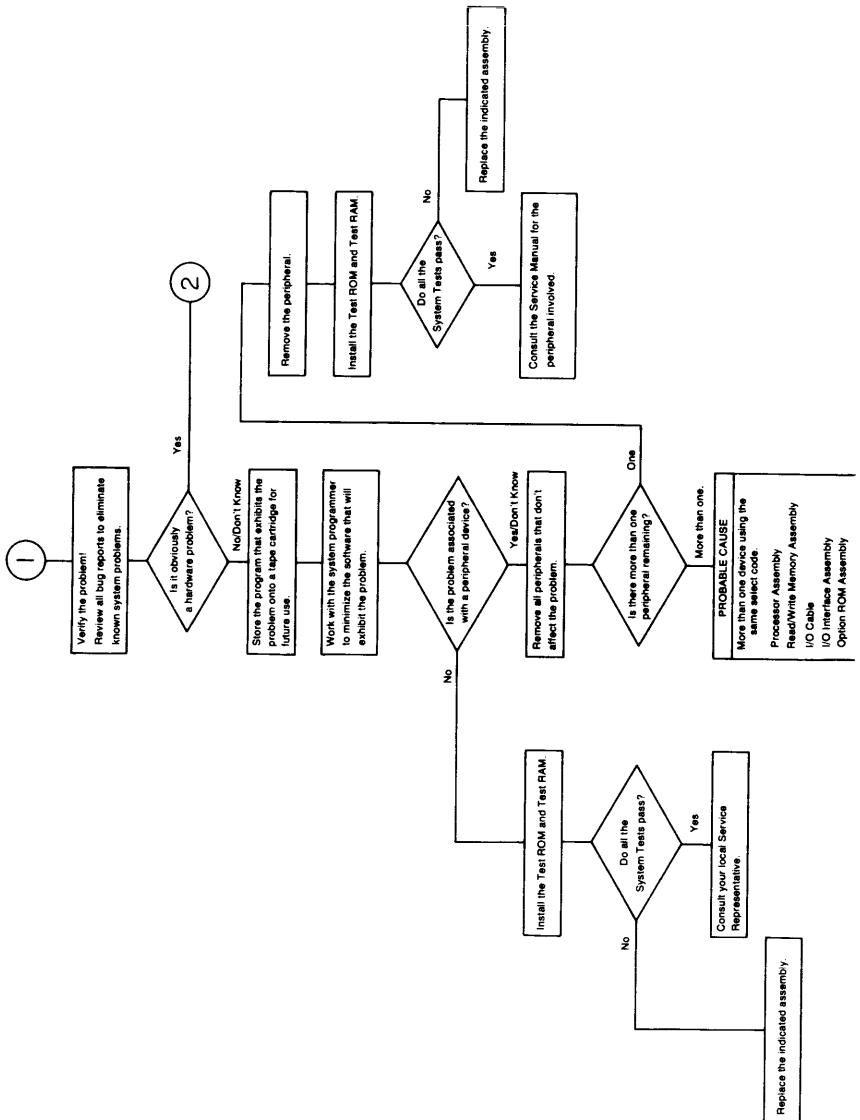


Figure 4-1. Flow Chart 1

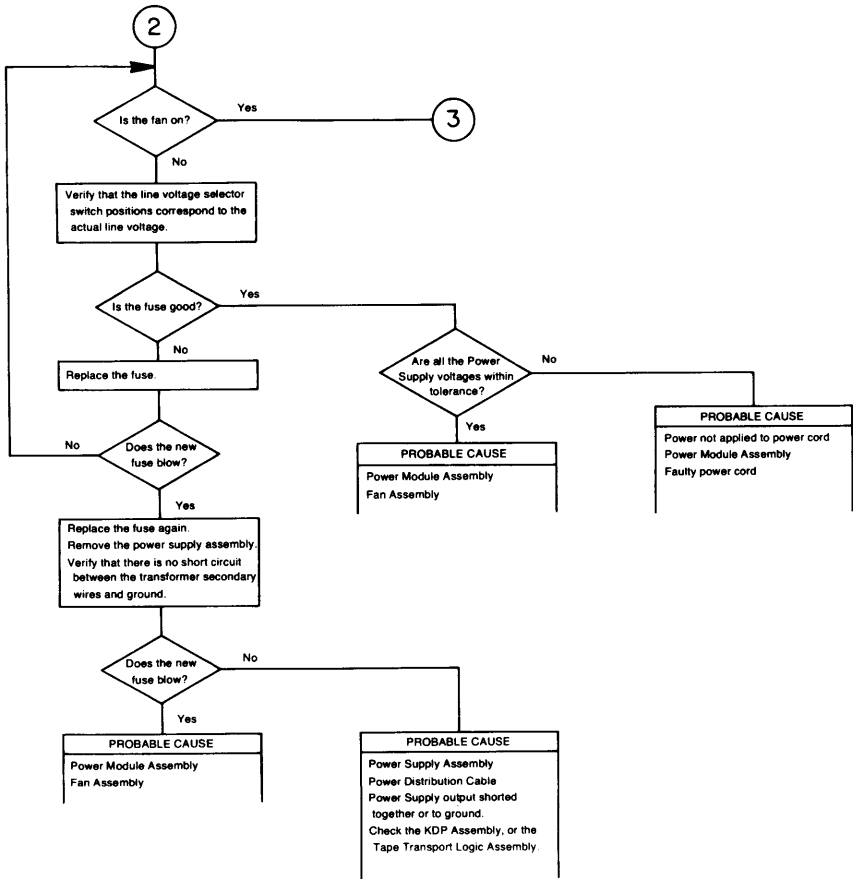


Figure 4-2. Flow Chart 2

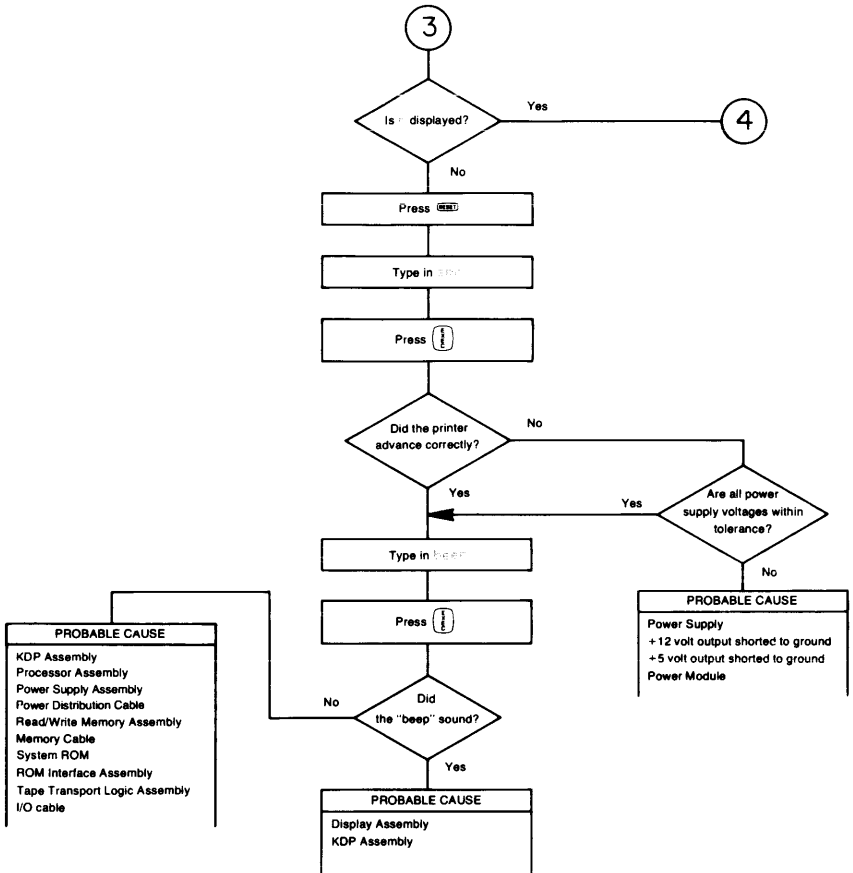


Figure 4-3. Flow Chart 3

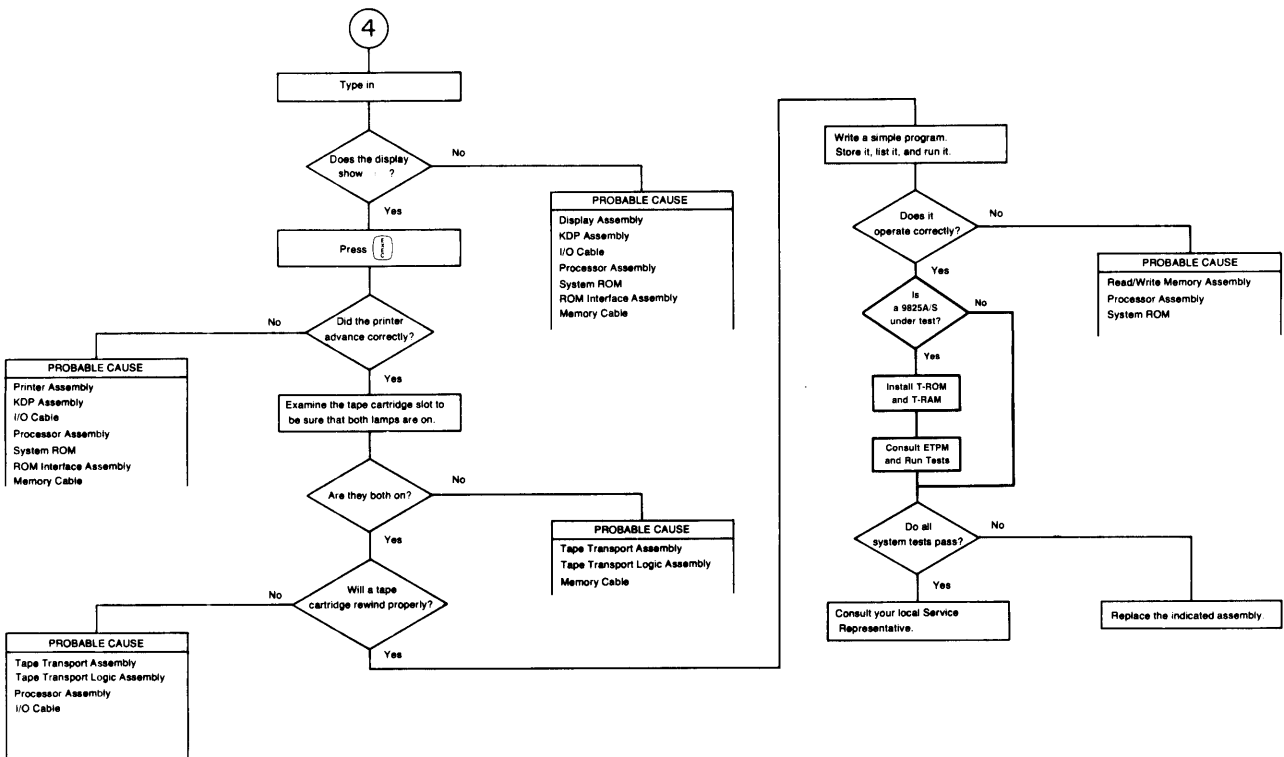


Figure 4-4. Flow Chart 4



# Chapter 5

## 9825A/B Diagnostics

### 9825A/B System Test

This covers the use of the 9825A/B System Test Tape in testing the operation of the 9825A/B without interfaces or peripheral products connected. For interface or peripheral tests, refer to their product section of the handbook.

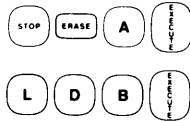
### Procedure

#### To Test the Calculator

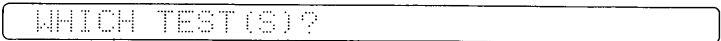
1. Turn the calculator ON.
2. The following display should be seen.




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.



The symbol  is used in this booklet to indicate that the shift key should be held down while the next key is pressed. Example:

$$\text{A} = a$$

$$\text{S} \text{ A} = A$$

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** \* **RETURN**

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 9825 Operating and Programming Reference.

\*rtb = return to binary

## 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
```

Memory Location	9825A	9825S	9825B	9825T
70k	Std.	Std.	Std.	Std.
60k	Opt. 001	Std.	Std.	Std.
50k	Opt. 002	Std.	Std.	Std.
40k	Opt. 003	Std.*	Std.*	Std.
30k	n/a	n/a	n/a	Std.
20k	n/a	n/a	n/a	Std.
10k	n/a	n/a	n/a	Std.
02k	n/a	n/a	n/a	Std.

\* This memory location is enabled by jumper.

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

## 2 ROM Test

The following display and printout should be seen.

```
ROM TEST
```

5 seconds

```
ROM TEST
```

```
ROMS ON SYSTEM:
```

```
MAINFRAME
```

```
32 K
```

```
34 K
```

} This information will vary depending on the ROM(s) installed (see table below).

```
ROMS IN ERROR:
```

```
NONE
```

} Errors will be printed here. If NONE is printed for errors, the ROM(s) are operating properly.

```
ROM TEST
```

```
COMPLETE
```

ROM Numbers and Titles

ROM Address	9825A/S	9825B	9825T
Flex. Disc 30K	Opt. <sup>1</sup>	Opt. <sup>1</sup>	Opt. <sup>1</sup>
Gen'l. I/O 32K	Opt.	Std.	Std.
Plotter(62 or 72) 34K	Opt.	Std.	Std.
Matrix or Sys. Prg. 36K	Opt. <sup>2</sup>	Opt. <sup>2</sup>	Opt. <sup>3</sup>
Adv. Prg. 40K	Opt.	Std.	Std.
Ext. I/O 42K	Opt.	Std.	Std.
Ext. I/O 44K	Opt.	Std.	Std.
Strings 46K	Opt.	Std.	Std.
Sys. Prg. 50K	n/a	n/a	Std.
Flex. Disc 56K	n/a	n/a	Opt. <sup>1</sup>

<sup>1</sup> Only the 98217A ROM can be installed in the 9825A, S, and B. However, either the 98217A or the 98228A Flexible Disc ROMs may be installed in the 9825T. If the 98228A is installed in the 9825T, it resides at both the 30K and 56K locations.

<sup>2</sup> Either the matrix or the Systems Programming ROM may be installed in the 9825A, S, or B computers, but **never both** ROMs.

<sup>3</sup> In the 9825T, the Systems Programming ROM is standard and resides at 50K; the matrix ROM may, also be installed, if so, it resides at 36K.

### 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.

5 Printer Test

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

PRINTER TEST

5 seconds

PRINTER TEST

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

!@#%&'()\*+,-./  
0123456789:;<=>?  
@ABCDEFGHIJKLMNO  
PQRSTUVWXYZ [r]t\_  
'abcdefghijklmnop  
qrstuvwxyz!@#%&

PRINTER TEST  
COMPLETE

The printout should duplicate the above sample.

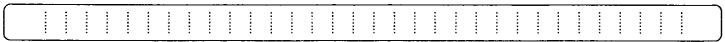
## 6 Display Test

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

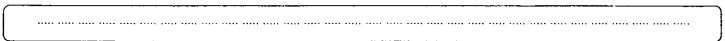
### DISPLAY TEST



5 seconds, this display may flicker



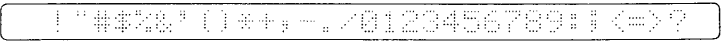
3 seconds



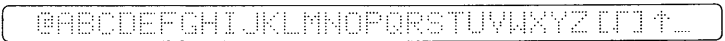
3 seconds



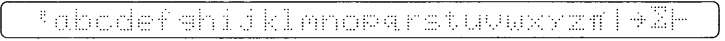
20 seconds



20 seconds



20 seconds



20 seconds

DISPLAY TEST  
COMPLETE

Pressing:

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

- again, will continue the display test.

- will abort the display test.

7 Key Switch Test

The following display and printout should be seen.

PRESS PRT ALL

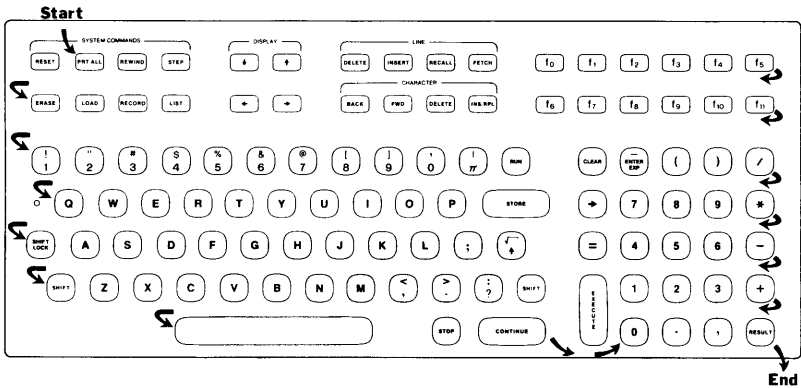
KEYBOARD TEST

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**. Leave shift key locked until display reads

PRESS Z

Press **SHIFT** (to unlock shift) before pressing **Z**.

The key sequence called for by the display is 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.





If a key completely fails to operate, press any other key four times to continue the test.


After the last key (RESULT) is pressed the following printout should be seen.

```
KEYBOARD TEST
COMPLETE
```

 Abort


Pressing   will abort the Calculator Test and return the calculator to normal operation.

## Test Modifications

A group of tests can be run in succession by typing-in more than one test number before pressing . The tests will run in numerical order regardless of the order in which they are typed.

Examples:

  
runs tests: 1, 2, 3, and 4

  
runs tests: 1, 2, 3, 6, and 7

## 9825A/S Extended Test Package

These tests work only on the 9825A/S. They do not work on the 9825B/T.

- Setup:
1. Turn off power to the 9825A/S.
  2. Remove Plug-In Option ROMs.
  3. Remove Interface cables.
  4. Insert Test ROM and Test RAM.
  5. Tab on Extended Test Cartridge should be in RECORD.

Mode One Tests: Automatic Test sequence;

ROM TEST	is printed and displayed.
R/W TEST	is printed and displayed.
REMOVE CART	is displayed if E/T cartridge is in. Remove cartridge and press <b>CONTINUE</b> .
INSERT CART	is displayed if E/T cartridge is out. Insert E/T cartridge and press <b>CONTINUE</b> .
CART PASSED	is printed. Cartridge in/out switch test passed. Cartridge test information is displayed and test results are printed.
PRINTER TEST	is displayed. Print out is 10 groups of =====
DISPLAY TEST	is printed. Display shows the following: //////////////////// 32 block cursors for six seconds. 32 vertical bars for 2 seconds. 32 horizontal bars for 2 seconds. 4 thirty-two character groups, 20 sec. ea.
END OF MODE 1 TEST	is displayed when finished.

Programmed Tests: Test programs should be entered after completion of Mode 1. They are entered by typing and storing program lines as shown in this example:

```
0: cancel      (Clears previous test program.)
1: (Test Syntax) (See below for test syntax)
2: cycle      (Optional, will test continuous.)
3: test       (Must be the last line.)
```

After storing the program lines, press **RUN**.

Test syntax for programmable tests:

Area to Test	Test Syntax, Parameters	Error Displays/Printouts	
RWM	r/w No. of times, Blk. designator Number of times must be 1 if more than 1 block is tested. Blk. designators: 4 (40K) 5 (50K) 6 (60K) 7 (70K)	ASE blk. add. – Address short DBE blk. add. – Data bus short BE blk. add. – Byte operation R/W add. bit – Read/Write (Max. of 5) Execute rwres to list errors. rwres cannot be programmed.	
Sys. ROM	rmt No. of times, chip designator ROM Chip designators 0-11.	ERROR chip – Chip designator with error is printed.	
Display	dsply No. of times [,“B”] If ,“B” used, test runs once. (No. of times) times 2 is the display time in seconds.	Look for missing dots in LED display. Press <b>CONTINUE</b> to hold current display. Press <b>CONTINUE</b> again to continue.	
Printer	print number of times	Look for missing dots in printout.	
Tape Uses the Extend. Test Ctg.	tape file number, No. of times or ctape file number, No. of times  The ctape test checks the cartridge in/out switch on the first pass.  File 1 is a short test. File 13 is a long detail test.	ERROR FAULT 1 U12-9 2 IRG Signal 3 MVG Line 4 RW Protect 5 Servo Fail 6 CIN Switch 7 Ctg Protect 8 Status Line 9 Hole Detect 10 Direction 11 Tach Pulse 12 Gap Detect	ERROR FAULT 13 Hole Sense 14 Clear Flag 15 Tape Drive 16 Flag Clear 17 Tach Pulse 18 IRG Bit 19 Status Line 20 Flag Stuck 21 Flag Clear 22 Tach Fast 23 IRG Detect 24 GAP Status
Test ROM Return	trr Allows any program to return control back to Test ROM. Must be next to last line.		

Special Tests: Tests should be performed after completion of Mode 1. They are performed by typing and executing the statements shown below:

Test syntax for Special Tests.

These require the Test ROM, Test RAM, and Extended Test Cartridge.

Area to Test	Test Syntax to Execute, and Parameters	Error Displays/Printouts
Proc. & Sys. ROM Test	trk1:ldp6 <b>EXECUTE</b> Follow printed directions.	Error types are output to printer.
Key B/D	trk1:ldb3 <b>EXECUTE</b> kbt <b>EXECUTE</b> Display shows key to press.	Printout if keyswitch fails, or wrong key pressed 4 times in succession. Press any other key 4 times to continue with test.
Option RWM	trk1:ldb4 <b>EXECUTE</b> rwt Option number <b>EXECUTE</b>	First 16 errors printed. Failed address and bit numbers are shown.
Option ROM	trk1:ldb10 <b>EXECUTE</b> After test program loads, then execute this statement: rmvfy [ID number[,ID number]] Instructions are given. Without ID numbers, all ROMs are tested.  ROM ID# ROM ID# 9885 M/S 12 Ext. I/O 17,18 Gen. I/O 13 String 19 9862 Plot 14 9872 Plot 20 Matrix 15 Sys. Pgm. 21 Adv. Pgm. 16 Test ROM 22,23	Printout lists addresses of words that do not verify.
Option ROM Update	update ID number [,ID number] Must include at least 1 ID. Use ID numbers above.	This is used to store correct bit patterns from new, revised Option ROMs on the ETP tape. It is then used to test the Option ROM.
Add-on ROM Test	trk1:ldp8 <b>EXECUTE</b> Follow displayed instructions.	Error printout lists name of ROM; P/Ns printed out should not be ordered.
General Test A	trk1:ldp11 <b>EXECUTE</b> Follow displayed instructions.	Errors are output to printer and are the same for all other tests.
General Test B	trk1:ldp12 <b>EXECUTE</b> Follow displayed instructions.	Errors are output to printer and are the same for all other tests.

## Control Keys Test

1. Turn on calculator, insert extended test cartridge.
2. Type `trk 1`, press `PRINT`.
3. Press `LOAD` `5`; the display should be `ldf 5`.
4. Press `PRINT`; the test program should load.
5. Press `RECORD`; the display should be `rcf`.
6. Press `REWIND`; the cartridge should rewind.
7. Check the operations of the user-definable keys by performing the key strokes shown below:

`FETCH` `f1` `*` `1` `→` `PRINT` `R` `STORE`

`FETCH` `f2` `/` `2` `STORE`










`FETCH` `f3` `3` `STORE`

8. Press `LEFT` `K` (lower case) `PRINT`; the printout should be:

```
f1: *1→R
f2: /2
f3: 3
```


9. Press `SHIFT LOCK` `FETCH` `PRINT`; the display should be `0: "CONTROL HMY TEST & 2nd rcl"`, and the shift-lock LED should be on.
10. Press `FW` until the cursor is over the letter H.
11. Press character `DELETE`.
12. Press `K` `DELETE` `E`.
13. Press `FW` until the cursor disappears, then press `BACK` until the cursor is in the space to the left of the word TEST.
14. Press `DELETE` `S` `STORE`; display should be `0F`.
15. Press `*`; display should be `0: "CONTROL KEYS TEST & 2nd rcl"`.
16. Press `*`; the display should be `1: "DELETE THIS LINE & 1st rcl"`.
17. Use the `FW` or `BACK` key to move the cursor over the letter D.
18. Press `I` `N` `S` `E` `R` `T` `DELETE`; display should be `1F`.
19. Press `*`; the display should be `2: "DELETE THIS LINE & 1st rcl"`.
20. Press line `DELETE`; the line should delete.
21. Press `*`; display should be `2: "DISPLAY ARROW CHECK - POS1"`.

## 5-14 9825A/B Diagnostics

22. Press the display key  five times. The first four presses should cause the display to shift left, revealing POS2, POS3, POS4, and POS4 ----- " :F at the right hand side. The fifth press should not change the display.
23. Press the display key  five times. The first four presses should shift the display back through POS4, POS3, and POS2 to its original position. The fifth press should not change the display.
24. Press ; display should be "INSERT THIS LINE & 1st rcl":.
25. Press ; display should be "CONTROL KEYS TEST & 2nd rcl".
26. Press either  key; the shift-lock LED should go out.
27. Press ; follow the instructions given on the printer and display. There will be four groups of instructions listed by the printer.
28. After doing all the steps in all four groups, type run 36.
29. Press ; printer will start printing rows of brackets.
30. Press ; printer should stop immediately.
31. Repeat steps 29 and 30 to verify the program will start again after a reset.
32. Type cont 35, press ; display should be end of test.

## Mainframe Statements Test

This is a short test of some processor actions which are not checked by the Control Keys Test and a bit-for-bit check of the mainfram ROMs. To run the test, follow this procedure:

1. Type trk 1 ; ldp 6
2. Press 
3. After the calculator makes the ROM checks, follow the instructions given by the printer.
4. Many "beeps" should be audible when the display shows check of beep statement.

## Add-On ROM Test

This test checks for the proper functioning of the Extended I/O ROM, General I/O ROM, String ROM, and Advanced Programming ROM. Instructions for running the test will appear on the display and printer. The tests can be completed in less than 30 seconds, and the printer will log any errors. To run the test, follow this procedure:

1. With power off, insert the ROMs to be checked.
2. Turn power on and insert test cartridge.
3. Type trk 1 ; ldp 8

# Chapter 6

## 9825A/B Adjustments

### 9825A/B Sequence of Adjustments

Adjustments for the 9825A/B desktop computer should be performed in the following order:

1. Power Supply Voltages;
  - + 12 Supply first, then
  - + 7 Supply.
2. Processor Clock Frequency.
3. Printer print head alignment.
4. Printer paper advance.
5. Printer Intensity.

### 9825A/B Power Supply Adjustments

The following tools are needed to adjust the power supplies:

- 1 Digital Multimeter (DMM)
  - 1 1/8 inch flat tip screwdriver
1. Turn off the 9825A/B and remove the following:
    - a. Interface Cards.
    - b. Plug-In Option ROMs.
  2. Turn on the 9825A/B and let it warm up for 10 minutes. No programs should be running, only the lazy "T" should be displayed.
  3. Refer to the diagram below, locate the + 12 and + 7 volt test points and adjustments.
  4. Ground DMM on the power supply heat sink or power module sheet metal.
  5. Use the DMM and adjust the + 12 then the + 7 volt supplies as follows:
    - + 12 Volt, adjust R11,..... + 11.95 to + 12.05 VDC
    - + 7 Volt, adjust R16,..... + 6.9 to + 7.1 VDC

---

**Note**

Only the + 12 Adjustment is on Rev. A and B power supplies.

---

## 9825A/B System Clock Frequency Adjustment

---

### CAUTION

THE CLOCK IS SET AT THE FACTORY; IT IS NOT NORMALLY ADJUSTED IN THE FIELD. IT IS NOT TO BE ADJUSTED INDISCRIMINATELY. IF THE CLOCK FREQUENCY EXCEEDS ITS TOLERANCE, ERRATIC OPERATION PRODUCING RANDOM ERRORS COULD RESULT.

---

The following tools are needed for adjusting the system clock:

Alignment tool.  
Frequency counter.

1. Measure the clock frequency at the "01" test point using the counter.
2. Adjust the clock frequency to 6.0 MHZ plus or minus 0.1 MHZ.

---

### Note

If a counter is not available, key in and run this program:

---

```
0:  dsp I; wait 107B0; beep; jmp (I+10->I)=60
1:  beep; wait 100; beep; dsp "DONE" / end
```

This program will beep every 10 seconds if clock frequency is 6.0 MHZ. The double beep should occur at 60 seconds, plus or minus 1 second.

## 9825A/B Printer Adjustments

The following tools are needed for printer adjustments:

- |   |                               |             |
|---|-------------------------------|-------------|
| 1 | Printhead Alignment Fixture   | 98240-67901 |
| 2 | Printhead Alignment Tool      | 8710-0693   |
| 1 | 1/16 inch hex wrench          |             |
| 1 | Adjustment Gage, "GO"         | 8750-0350   |
| 1 | Adjustment Gage, "NO-GO"      | 8750-0351   |
| 1 | Small bottle of enamel paint  |             |
| 1 | 1/8 inch flat tip screwdriver |             |

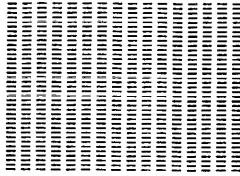
9825A/B Print Head Alignment:

1. Install printer on alignment fixture. load paper in printer.
2. Loosen set screws with 1/16" hex wrench.
3. Turn on 9825 and fixture, insert alignment tools in holes.
4. Adjust print head until print across paper is darkest and even.
5. Turn off fixture and tighten set screws, don't overtighten.
6. Turn on fixture and verify print quality.



## 9825A/B Paper Advance Adjustment:

1. Install printer on alignment fixture, load about 6 feet of paper.
2. Turn on 9825 and fixture and verify the printout looks like this:



3. If not, adjust the paper advance until the above pattern is printed.
4. Lift printer off fixture and insert the white "GO" and yellow "NO-GO" gages between the lower foam pad and solenoid, holding them in place while printer is running, until the following printout occurs;
  - With "GO" gage inserted, normal printout.
  - With "NO-GO" gage inserted, compressed printout.
5. Turn fixture and 9825 off and seal paper advance with paint.

## 9825A/B Printer Intensity Adjustment:

1. Reassemble the 9825. Turn it on, store, and run this test program

```
0: prt "ZZZZZZZZZZZZZZZZZZ"; jmp 0
```

2. Observe the print intensity and adjust the potentiometer by the speaker on the KDP (A33) board until the print does not get darker as the adjustment is increased.
3. Back the adjustment off about 1/8 turn.
4. Return the 9825 to normal operation.

## 6-4 9825A/B Adjustments

# Chapter 7

## 9825A/B Supported Peripherals

Peripherals	Interface Card	Configurations			
		9825A/S Plug-In ROM	Other	9825B/T Plug-In ROM	Other
<b>Printers</b>					
2631A, Opt. 825	98034A/B	Gen. I/O			
2631B, Opt. 825	98034A/B	Gen. I/O			
9866A/B Opt. 025	98036A, Opt. 066	Gen. I/O			
9871A, Opt. 025	98032A, Opt. 071	Gen. I/O			
9871A, Opt. 001	98034A/B				
9876A, Opt. 025	98034A/B				
<b>Plotters</b>					
7225A w/17600A, Opt. 025	98032A, Opt. 62	9862A			Int. Switch 9872
7225A w/17601A, Opt. 025	98034A/B				
7245B, Opt. 025	98034A/B				
9862A, Opt. 025	98032A, Opt. 064	9862A			Int. Switch 9862
9872B/S, Opt. 025	98034A/B				
<b>Mass Storage</b>					
9875A, Opt. 025	98034A/B				
9877A, Opt. 025	N/A				
9885M, Opt. 025	98032A, Opt. 025				
9885S	09885-61607				
9895A, Opt. 025	98034A/B				
<b>Miscellaneous</b>					
2748B, Opt. 002	98032A, Opt. 083				
9863A					
9869A, Opt. 025	98032A, Opt. 069				
9874A Digitizer, Opt. 025	98034A/B				
9878A I/O Expander	9878A				
9883A, Opt. 025	98032A, Opt. 083				
9884A, Opt. 025	98032A, Opt. 084				
Real Time Clock	98035A				
Data Terminals	98036A				
BCD Input	98033A				
Serial I/O Interface	98036A				
Parallel I/O	98032A				

## 7-2 9825A/B Supported Peripherals

# Chapter 8

## 9825A/B Replaceable Parts

### Field Repair Philosophy

The 9825 mainframe assemblies are divided into three repair categories:

X = Exchange

C = Component Repair

R = Replace

Assembly	Description	XCR	Comments
Case Parts	Covers, wire harnesses, ribbon cable assemblies not part of PC boards, air filter, fasteners, fan, power switch, and other mechanical items	R	
Power	Power Module	R	Should be replaced as an assembly. Component repair is not recommended.
A51	Power Supply	X	Without large metal heat sink.
Processor			
A11	9825A/S Processor Assembly	X	With hinges/spacers.
A12	9825B/T Processor Assembly	X	With hinges/spacers.
Memory			
A05	9825A/S System ROM Assembly	X	
A12	ROM Interface Assembly	R	
A22	9825A/S 8K Byte RWM Assembly	X	Without hinges/spacers
A23	9825A/S 16K Byte RWM Assembly	X	Without hinges/spacers
A24	9825B/T 24/32K Byte RWM/ROM Assembly	X	Without hinges/spacers
A25	9825T 32K Byte RWM Assembly	X	Without hinges/spacers
98210A	9825A Option ROM Strings-Adv. Prog.	R	
98211A	9825A/B Option ROM Matrix	R	
98212A	9825A Opt. ROM 9862 Plotter-Gen. I/O	R	
98213A	9825A Opt. ROM Gen. I/O Ext. I/O	R	
98214A	9825A Opt. ROM 9862-Gen. I/O-Ext. I/O	R	
98215A	9825A Opt. ROM 9872 Plotter-Gen. I/O	R	
98216A	9825A Opt. ROM 9872-Gen. I/O-Ext. I/O	R	
98217A	9825A/B Opt. ROM 9885 Flex Disc Dr.	R	
98224A	9825A/B Opt. ROM Systems Programming	R	
98228A	9825T Opt. ROM 9885/9895 Flex Disc	R	
Internal Peripherals			
A33	KDP Assembly	X	KDP Chips and speaker may be component level repaired.
A41	Single Line Display Assembly	X	
A61	Tape Control Logic Assembly	X	With hinges/spacers. Fuse may be replaced.
A71	I/O Interface Assembly	R	
Printer	Thermal Printer Assembly	C	
Transport	Tape Transport Assembly	X	Without sheet metal. EOT/BOT Lamp may be replaced with kit.
Keyboard	Keyswitch Assembly (New style)	C	Keyswitches and Shift Lock LED.
Keyboard	Keyswitch Assembly (Old style)	R	Replace with new style

## 9825B/T Service Kits

Four Service Kits are used in support of the 9825B/T:

“A” FSI, 94 – 99%, 09825-67199

“B” FSI, 81 – 93%, 09825-67198

“C” FSI, 0 – 80%, 09825-67197

“D” PSP, Tools, 09825-67100

The following is a sequential list of parts and tools in the 9825B/T Service Kits. The right hand column shows the kit the part/tool is in.

Qty.	C/D	Part Number	Description	Kit
1	7	1813-0051	Print Head	C
1	5	2110-0545	Fuse Holder Cap	C
1	2	3100-3364	Power Switch	C
2	4	3101-0469	Keypad (Spacebar)	C
5	4	3104-2390	Keypad (All other keys)	C
1	4	3160-0209	Fan	A
1	9	4208-0110	Air filter	C
1	8	5040-7433	Keypad Removal Tool	D
1	3	5061-0751	Platen Assembly	C
1	4	5061-0752	Paper Sensor Assy.	C
1	4	8120-2725	Cable Assy. (A33 to A41)	C
1	7	8120-3130	Cable Assy., Monitor Bus (9825T only)	C
1	2	8500-1251	Tape Head Cleaner (4 oz.)	D
1	9	8520-0023	Cotton Swab (pkg. of 10)	D
1	6	8710-0580	Connector Extractor	D
1	8	8710-0693	Alignment Tool (Print head)	D
1		8750-0350	Paper Advance Gage, YELLOW, "GO"	D
1		8750-0351	Paper Advance Gage, WHITE, "NO-GO"	D
1	5	9100-4096	Transformer-Stator (Printer solenoid)	A
1	1	9222-0662	Conductive Bag, 8" x 10"	D
1	5	9222-0682	Conductive Bag, 10" x 14"	D
1	9	09815-20602	Paper Spindle (PC tool)	D
1	4	09815-69902	(RSTRD-67902) Tape Xport Assy. (without sheet metal)	C
1	6	09825-61601	Cable Assy., I/O Bus	B
1	7	09825-61602	Cable Assy., Memory Bus	A
1	8	09825-61603	Cable Assy., Power (Module to A51)	A
1	9	09825-61604	Cable Assy., Tape Logic to Analog	C
1	7	09825-61610	Cable Assy., A12 to A11/A17 ground wire	C
1	8	09825-61611	Cable Assy., Thermistor (Printer)	C
1	8	09825-66512	ROM Interface Assembly	A
1	6	98240-67901	Printer Alignment Fixture	D
1	9	09825-69517	(RSTRD-66517) 9825B Processor Assembly	C
1	8	09825-69524	(RSTRD-66524) 9825B 24/32K Byte RWM/ROM Assembly	B
1	9	09825-69525	(RSTRD-66525) 9825T 30K Byte RWM Assembly	B

Qty.	C/D	Part Number	Description	Kit
1	9	09825-69533	(RSTRD-66533) KDP Assembly	C
1	3	09825-69541	(RSTRD-66541) Single Line Display	A
1	1	09825-69551	(RSTRD-66551) Power Supply (with heat sink)	B
1	3	09825-69561	(RSTRD-66561) Tape Cont. Logic Assembly	C
1	2	09825-90036	9825A/B System Exerciser Tape	D
1	3	09825-90037	9825A/B Systems Test Booklet	D
1	2	09825-90200	9825A/B Operating & Programming Manual	D
1	6	09825-91030	9825A/B Service Manual	D
1	6	98240-67901	Printer Alignment Fixture	D

For support and repair of the 9825A/S computers, the following assemblies should be obtained and carried in kits as indicated:

Qty.	C/D	Part Number	Description	Kit
1		09825-69511	(RSTRD-66511) 9825A/S Processor	B
1		09825-69905	(RSTRD-67905) 9825A/S System ROM	B
1		09825-69522	(RSTRD-69522) 9825A 8K Byte RWM Assembly	B
1		09825-69523	(RSTRD-66523) 9825A 16K Byte RWM Assembly	B
1		98219-67900	9825A/S Extended Test Package	D

## 9825A/B Replacement Parts

Parts lists show new part numbers. Total Quantity (TQ) column shows number of parts per 9825. A "V" in the TQ column indicates quantity varies with options installed or application.

Assembly Level	Reference Designator	CD	HP Part No.	TQ	Description
1	A05	5	09825-67905	1	9825A System ROM Drawer
.2		9	09825-66514	1	9825A System ROM Assembly
.2		4	5040-8156	1	Plastic Case, Top Piece
.2		5	5040-8157	1	Plastic Case, Bottom Piece
.2		0	0624-0311	6	#4-20 82 Flat Head Tapping Screw
.2		0	7120-5875	1	System ROM Drawer Label
1	A11	7	09825-66511	1	9825A Processor Assembly
.2		6	09825-66510	1	9825A Processor Assembly (without hybrid microprocessor)
.2		7	09825-67907	1	9825A/B Hybrid Microprocessor
1	A12	8	09825-66512	1	ROM Interface Assembly
1		2	09835-04704	1	ROM Interface Assy. Insulator
1		7	09825-61610	1	Ground Cable, ROM Interface Assy.
					<b>Plug-In Option ROMs</b>
1		6	98210-67902	V	98210A, Strings-Adv. Programming
1		7	98211-67902	V	98211A, Matrix
1		8	98212-67902	V	98212A, 9862 Plotter-General I/O
1		9	98213-67902	V	98213A, General I/O-Extended I/O
1		0	98214-67902	V	98214A, 9862 Plot.-Gen I/O-Ext I/O
1		1	98215-67902	V	98215A, 9872 Plotter-General I/O
1		2	98216-67902	V	98216A, 9872 Plot.-Gen I/O-Ext I/O
1		3	98217-67902	V	98217A, 9885 Flex Disk Drive
1		2	98224-67902	V	98224A, Systems Programming
1		6	98228-67902	V	98228A, 9885-9895 Flex Disk Drive
1	A14	6	09825-67914	1	Power Module/Transformer Assembly
1	A17	3	09825-66517	1	9825B Processor Assembly
.2		2	09825-66516	1	9825B Processor Assembly (without hybrid microprocessor)
1	A22	0	09825-66522	V	9825A 8K-Byte RWM Assembly
.2		4	5020-8330	V	9825A 8K/16K Assy. Shorting Clip
1		7	5040-7721	V	Full Hinge for A22.23.24.25.61
1		8	0380-0630	V	0.75 inch Nylon Snap-In Spacer
.2		4	2360-0115	V	#6-32 Pan Head Mach. Screw 0.312"
1		6	09825-67906	V	Dummy RWM Assembly
.2		5	5040-7787	V	Half Hinge
1	A23	1	09825-66523	V	9825A 16K-Byte RWM Assembly
1	A24	2	09825-66524	1	9825B 24/32K-Byte RWM/ROM Assy.
1	A25	3	09825-66525	1	9825T 32K-Byte RWM Assembly
1		7	09825-61602	1	Memory Cable Assembly (IDA Bus)
1		6	09825-61601	1	I/O Cable Assembly (IOD Bus)
1		7	8120-3130	1	9825T Monitor Bus Cable Assy.
1	A33	3	09825-66533	1	KDP Assembly (with KDP Chip)
.2		3	1818-2508	1	KDP Chip
.2		3	1818-2513	V	KDP Chip, Katakana
.2		5	7100-0240	1	Speaker
1		1	09835-04703	1	KDP Assembly Insulator
1		4	2200-0521	9	#4-40 Pan Head Mach. Screw. 250"
1	A41	3	09825-66541	1	Single Line Display Assembly
.2		8	1990-0553	8	Four Character LED Display IC
1		8	09825-21102	1	SLD Heat Sink
1		1	0340-0835	1	Display Assembly Insulator
1		6	2200-0769	4	#4-40 Pan Head Mach. Screw. 375"
1		3	2200-0521	3	#4-40 Pan Head Mach. Screw. 250"



Assembly Level	Reference Designator	CD	HP Part No.	TQ	Description	
1	A51	5	09825-66551	1	Power Supply Assembly	
1		6	09825-01102	1	Power Supply Heat Sink	
			6040-0265			Silicone Heat Sink Compound
1		4	2360-0115	V		#6-32 Pan Head Mach. Screw .312"
1		7	2360-0316	3		#6-32 Flat Hd. Mach. Screw .250"
1		6	09825-67914	1		Transformer Enclosure Assy. (Power)
2		8	09825-61603	1		Power Distribution Cable Assembly
.3		7	1251-0334	1		PC Edge Connector Assembly 2 x 18
.3		4	1251-2262	1		PC Edge Connector Assembly 2 x 10
.3		3	1251-2500	1		PC Edge Connector Assembly 2 x 6
.3		4	0360-1610	3		Solder Lug
.3		0	2110-0003	V		Fuse. 3 Amps NB (100-120 Volt)
.3			2110-0043	V		Fuse. 1.5 Amps NB (220-240 Volt)
.3		3	2110-0543	1		Fuse Holder
.3		5	2110-0545	1		Fuse Holder Cap
2		1	3101-2298	2		Slide Switch. Voltage Selection
2		4	5040-8289	1		EMI Filter Housing
2		3	09825-67911	1		Power Switch. Off-On
1		1	09825-67200	1		Fan. with connector
1		A61	7	09825-66561	1	Tape Transport Logic Assembly
2			9	09825-61604	1	Tape Transport Control Cable
2			9	2110-0002	1	Fuse. 2.0 amps. NB
1			1	09815-67902	1	Tape Transport Drive PC Assembly
1			1	09825-01214	1	Tape Transport Mounting Bracket

Assembly Level	Fig. 8-x Reference	CD	HP Part No.	TQ	Description
					<b>Case Parts</b>
	1	3	5040-8155	4	Plug-In Option ROM Door
	2	5	1460-1626	4	Option ROM Door Spring
	3	6	1600-0514	4	Option ROM Door Clip
	4	2	09825-68025	1	9825B Keyswitch Assembly ASCII
	4		09825-68026	1	9825B Keyswitch Assembly Katakana
			3101-2390		Keyswitch, except Space Bar Switch
			3101-0469		Spacebar Keyswitch
	5	6	09825-64415	1	9825A Display Insert (Includes Transport door)
	5	7	09825-64416	1	9825B Display Insert (Includes Transport door)
	6	1	5040-8187	1	Eject Button
	7	8	5040-7813	1	Display Window
	8	5	09825-67913	1	Shell Assembly
	9	9	09815-20602	1	Printer Paper Spindle
	10	9	2360-0368	2	#6-32 Pan Head Mach. Screw .375"
	11	2	5041-1403	3	I/O Slot Door
	12	4	5040-8362	1	Fan Bracket
	13	9	4208-0110	1	Foam Dust Filter
	14	9	7120-6450	1	Filter Housing Label
	15	4	5040-8289	1	EMI Filter Housing
	16	2	5040-8287	1	Power Switch Bezel
	17	3	5040-7727	1	Printer Tear Bar
	18		4040-1697	V	9825B/T ROM Drawer Plug
	19	3	09825-64412	V	9825A Bezel
	19	7	09825-64432	V	9825B Bezel
	20	9	09825-64434	1	Base
	21	3	0403-0106	5	Rubber Foot
	22	4	2360-0115	5	#6-32 Pan Head Mach. Screw .312"

## 9825A/B Upgrade and Miscellaneous Kits

Product Number	Reference Designator	CD	HP Part No.	TQ/Kit	Description			
98251F	A24 A25		09825-66524	1	9825A/S to 9825T Upgrade Kit			
			09825-66525	1	24-32K-Byte RWM ROM Assembly			
	4040-1697		1	30K-Byte RWM Assembly				
	8120-3130		1	Plug for Language ROM Slot				
	5040-7787		2	Monitor Bus Cable Assembly				
							Half Hinge, for A25	
				5040-7721	2		Full Hinge, for A24	
				0380-0630	3		Nylon PC Board Spacer	
				2360-0332	3		Screw	
				7121-0464	1		Label, 62K-Bytes	
				7121-0463	1		Label, 9862A Plotter	
				7121-0256	1		Label, Display Insert	
				7121-0257	1		Label, Processor Board	
				7120-8568	1		Label, Caution	
				8755-0053	1		File, Flat	
				98251-90000	1		Instructions, Upgrade Kit	
				09825-90036	1		Cartridge, System Test	
				09825-90037	1		Manual, System Test	
				09825-90035	1		Cartridge, 9885M Bootstrap	
				09825-87901	1		9825B Manual Kit	
98252F	A25		09825-66525	1	9825B to 9825T Upgrade Kit			
			8120-3130	1	30K-Byte RWM Assembly			
			5040-7787	2	Monitor Bus Cable Assembly			
			0380-0630	3	Half-Hinge, for A25			
			2360-0332	3	Nylon PC Board Spacer			
								Screw
					7121-0464	1		Label, 62K-Bytes
					7121-0463	1		Label, 9862A Plotter
					7120-8568	1		Label, Caution
					98252-90000	1		Instructions, Upgrade Kit
09825-67960			0624-0314	4	Keyboard Upgrade (ASCII)			
			0624-0324	15	Self-Tapping Screw			
			09825-64433	1	Screw, Tapping, #4-20			
			09825-68025	1	Bezel, Keyboard S/S			
			09825-90034	1	Keyswitch Assembly-9825 Std.			
			1600-0859	1	Installation Note			
			7120-8568	1	Plug-In ROM Guide Spring			
					Label, Caution Notice			
09825-67962			0624-0314	4	Keyboard Upgrade (Katakana)			
			0624-0324	15	Self-Tapping Screw			
			09825-64433	1	Screw, Tapping, #4-20			
			09825-68026	1	Bezel, Keyboard S/S			
			09825-90034	1	Keyswitch Assembly-9825 Katakana			
			1600-0859	1	Installation Note			
								Plug-In ROM Guide Spring
98221F Obsolete	A22		09825-66522	1	9825A 8K-Byte Memory Upgrade			
			5040-7787	2	8K-Byte RWM Assembly			
			5040-7721	2	Half Hinge			
			0380-0630	1	Full Hinge			
			2360-0332	1	Board Support			
			7120-4927	1	Screw			
			7120-5162	1	Label, 9825 Opt. 001			
					Label, 9825 Opt. 002			
98222F Obsolete	A23		09825-66523	1	9825A 16K-Byte Memory Upgrade			
			5040-7787	2	16K-Byte RWM Assembly			
			5040-7721	2	Half Hinge			
			0380-0630	1	Full Hinge			
			2360-0332	1	Board Support			
			7120-4927	1	Screw			
			7120-5162	1	Label, 9825 Opt. 001			
			7120-5163	1	Label, 9825 Opt. 002			
					Label, 9825 Opt. 003			

# Chapter 9

## 9825A/B Diagrams

### 9825A Memory Map

Address	9825A/Std	9825A/Opt. 1	9825A/Opt. 2	9825A/Opt. 3
77777 76550			Stolen RWM Base Page RWM	
70000	A22   RWM	A23   RWM	A22   RWM	A23   RWM
60000 56000 54000 52000 50000			A23   RWM	A23   RWM
46000 44000 42000 40000		Strings-Adv. Prgm. Option ROM Extended I/O Option ROM Extended I/O Option ROM Advanced Programming Option ROM		
36000 34000 32000 30000		Matrix Option ROM 9862 or 9872 Plotter Option ROM General I/O Option ROM 9885 Flex. Disc Drive Option ROM		
20000	System ROM	System ROM	System ROM	System ROM
04000 02000 00000		Compiler ROM Tables Processor Registers/Basepage ROM		

**Note:** Option ROMs in addresses 40000-46000 cannot be used in the 9825A Opt. 003.

## 9825B Memory Map

## 9825T Memory Map

Address	9825B/24K	9825B/32K
77777	Stolen	
76550	Base Page RWM	
70000	A24 RWM	
60000	A24 RWM	
56000 <sup>1</sup>	A24 RWM	
54000	A24 RWM	
52000	A24 RWM	
50000 <sup>2</sup>	A24 RWM	
46000	A24 RWM	
44000	A24 RWM	
42000	A24 RWM	
40000	A24 RWM	
36000 <sup>3</sup>	A24 RWM	
34000 <sup>4</sup>	A24 RWM	
32000 <sup>5</sup>	A24 RWM	
30000 <sup>6</sup>	A24 RWM	
20000	System ROM	
10000	System ROM	
04000	System ROM	
02000	System ROM	
00000	System ROM	
	Compiler ROM Tables Proc. Reg./Basepage ROM	

Sys./Opt. ROM <sup>7</sup>	RWM
Stolen	
Base Page RWM	
A24	
9895 Op. ROM	
A24	
Sys. Pgm. ROM	
Strings ROM	
Ext. I/O ROM	
Ext. I/O ROM	
Ext. I/O ROM	
Adv. Pgm. ROM	
Matrix ROM	
9862/72	
Gen. I/O ROM	
9885 Op. ROM	
A25	
System ROM	
A25	
System ROM	
Compiler ROM Tables Proc. Reg./Basepage ROM	

**Notes:**

- 1 9895 Opt. ROM is in the 98228A Plug-In Option ROM. It functions only with the 9825T configuration with a Rev. B or higher A12 assembly.
- 2 Systems Prog. ROM is on the A24 board in a 9825T configuration. Enabled by the A25 board; addresses differ from the 98224A Option ROM.
- 3 Matrix ROM is in the 98211A Plug-In Option ROM for both B and T's. The 98224A Plug-In Option ROM must be used in a 9825B for Sys. Prog. Either the 98211A or 98224A Plug-In may be used in a 9825B, but not at the same time; they use the same address space.
- 4 A switch on the A24 board selects 9872 or 9862 plotter ROM.
- 5 General I/O ROM is on the A24 board.
- 6 9885 Option ROM is in the 98217A and 98228A Plug-In Option ROM.
- 7 System ROM is on the A24 board.

# Chapter 10

## 9825A/B References

### 9825 Documentation References

Product Number	Name	HP Part Number
9825A/B	Operating & Programming Ref. (replaces 09825-90000)	09825-90200
	I/O Control Reference	09825-90210
	Quick Reference	09825-90012
	The above 3 are available in a 9825B Manual Kit	09825-87901
	System Test Booklet	09825-90037
	Error Codes Booklet	09825-90015
	Service Manual	09825-91030
	CE Handbook	09825-90039
	Self-Study Maintenance Training Course (HP use only)	5955-6117
9825A	Extended Test Manual (for use with 9825A/S only)	09825-90032
98210A <sup>1</sup>	Strings-Adv. Programming ROM (replaces 09825-90020/21)	09825-90200
98211A	Matrix ROM	09825-90022
98212A <sup>1</sup>	9862 Plotter-General I/O ROM (replaces 09825-90023/24)	09825-90210
98213A <sup>1</sup>	General I/O-Extended I/O ROM (replaces 09825-90024/25)	09825-90200
98214A <sup>1</sup>	Extended I/O ROM (replaces 09825-90025)	09825-90200
98215A <sup>1</sup>	9872 Plotter-General I/O ROM (replaces 09825-90022/26)	09825-90210
98216A <sup>1</sup>	9872 Plotter-Gen./Ext. I/O ROM (replaces 09825-90026)	09825-90210
98217A	9885 Flex. Disc Drive ROM (replaces 09885-90000)	09825-90220
98224A <sup>2</sup>	Systems Programming ROM (replaces 09825-90027)	09825-90210
98228A	9885/9895 Flex. Disc Drive ROM	09825-90220
98251F	9825A to 9825T Memory Upgrade Installation Note	98251-90000
98252F	9825B to 9825T Memory Upgrade Installation Note	98252-90000
	98034B Ground Connection Upgrade Installation Note	09825-90098
	Documentation Binder	9882-0885

<sup>1</sup> These Option ROMs are built into the 9825B/T calculators. They are plug-in Option ROMs for the 9825A/S.

<sup>2</sup> This Option ROM is built into the 9825T but must be a plug-in for the 9825A/S and B.

## 9825A/B Customer Training Courses

Name of Course	Where Conducted	HP Part Number
9825A/B Service Training	at Customer Site	09825-30100
9825A/B Operating & Programming	Various Field Offices	98524A
9825A/B I/O Programming	Various Field Offices	98525A

## Error Codes

An error in a program sets the program line counter to line 0. Press the continue key to continue the program from line 0. Execute the continue command with a line number to continue at any desired line (such as: cont 50).

- 00 System error.
  - 01 Unexpected peripheral interrupt.
  - 02<sup>1</sup> Unterminated text.
  - 03<sup>1</sup> Mnemonic is unknown.  
Mnemonic not found because disc may be down. (9825 only)
  - 04 System is secured.
  - 05 Operation not allowed: line cannot be stored or executed with line number.
  - 06<sup>1</sup> Syntax error in number.
  - 07<sup>1</sup> Syntax error in input line.
  - 08 Internal representation of the line is too long (gives cursor sometimes).
  - 09 gto, gsb, or end statement not allowed in present context.  
Attempt to execute a next statement either from keyboard while for/next loop using same variable is executed in program or from program while for/next loop using same variable is executed from keyboard. Attempt to call function or subroutine from keyboard.
  - 10<sup>1</sup> gto or gsb statement requires an integer.
  - 11 Integer out of range or integer required; must be from -32768 thru +32767.
  - 12<sup>1</sup> Line cannot be stored; can only be executed.
  - 13 ent statement not allowed in present context.
  - 14 Program structure destroyed.
  - 15 Printer out of paper or printer failure.
- <sup>1</sup> Press the **RECALL** key to position the cursor at the location of the error.
- 16 String Variables ROM not present for the string comparison. Argument in relational comparison not allowed.
  - 17 Parameter out of range.
  - 18 Incorrect parameter.
  - 19 Bad line number.

- 20 Missing ROM or binary program. The second number indicates the missing ROM. In the program mode, the line number is given instead of the ROM number. Displayed number and missing item:
- 1 Binary Program
  - 4 Systems Programming ROM
  - 5 9826 HPL Extension
  - 6 Strings ROM
  - 8 Extended I/O ROM
  - 9 Advanced Programming ROM
  - 10 Matrix ROM
  - 11 Plotter ROM
  - 12 General I/O ROM
  - 17 Disc ROM
- 21 Line is too long to store.
- 22 Improper dimension specification.
- 23 Simple variable already allocated.
- 24 Array already dimensioned.
- 25 Dimensions of array disagree with number of subscripts.
- 26 Subscript of array element out of bounds.  
P-number reference is negative.
- 27 Undefined array.
- 28 ret statement has no matching gsb statement.
- 29 Cannot execute line because a ROM or binary program is missing.
- 30 Special function key not defined.
- 31 Non-existent program line.
- 32 Improper data type.  
Non-numeric value in for statement or in fts or fti function.
- 33 Data types do not match in an assignment statement.
- 34 Display overflow due to pressing a special function key.
- 35 Improper flag reference (no such flag).
- 36 Attempt to delete destination of a gto or gsb statement.
- 37 Display buffer overflow caused by dsp statement.
- 38 Insufficient memory for subroutine return pointer. Memory overflow during function or subroutine call.
- 39 Insufficient memory for variable allocation or binary program.
- 40 Insufficient memory for operation.  
Memory overflow while using for statement or while allocating local p-numbers.
- 41 No cartridge in tape transport.
- 42 Tape cartridge is write protected. (Slide record tab to other position for recording.)
- 43 Unexpected Beginning-Of-Tape (BOT) or End-Of-Tape (EOT) marker encountered.  
Tape transport failure.
- 44 Verify has failed.
- 45 Attempted execution of idf statement without parameters or mrk statement when tape position is unknown.
- 46 Read error in file body.
- 47 Read error in file head.

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- 48** End-Of-Tape (EOT) encountered before specified number of files were marked.
- 49** File too small.
- 50** ldf statement for a program file must be last statement in the line. get or chain statement should be the last statement in a line.
- 51 or 52** Memory configuration error for attempted ldm statement. For example, a ROM present when memory was recorded is now not present (see error 20), or attempting to load a memory file recorded on a 9825A into a 9825B.
- Memory files are not compatible between the 9825A and 9825B. Only the program portion can be recovered by loading the memory file into the original machine and doing a rcf. This program file can then be loaded into any 9825 with the ldf statement.
- 53** Negative parameter in cartridge statement.
- 54** Binary program to be loaded is larger than present binary program and variables have been allocated.
- 55** Illegal or missing parameter in a cartridge statement.
- 56** Data list is contiguous in memory for a cartridge statement.
- 57** Improper file type.
- 58** Invalid parameter in rcf statement; “SE” or “DB” expected.
- 59** Attempt to record a program or special function keys which do not exist.
- 60** Attempt to load an empty file or the null file (type = 0).
- 61** The line referenced in an ldf or ldp statement does not exist. If the line containing the ldf or ldp statement has been overlaid by the load operation, the line number in the display may be incorrect.
- 62** Specified memory space is smaller than cartridge file size.
- 63** Cartridge load operation would overlay subroutine return address in program; load not executed.
- Disc load operation would overlay gsb return address: load not executed.
- 64** Attempt to execute ldk, ldf (program file), or ldp during live keyboard statement.
- get, chain or getk not allowed from live keyboard mode or during an ent statement.
- 65** File not found.  
File specified in the previous fdf statement does not exist.

Default values associated with errors 66 thru 77 when flag 14 is set are explained in the programming chapter of the operating and programming manual

- 66** Division by zero.  
A mod B, with B equal to zero.
- 67** Square root of negative number.
- 68** Tan ( $n * \pi/2$  radians).  
Tan ( $n * 90$  degrees).  
Tan ( $n * 100$  grads).  
where n is an odd integer.
- 69** In or log of a negative number.
- 70** In or log of zero.
- 71** asn or acs of number less than - 1 or greater than + 1.



- 72** Negative base to non-integer power.
- 73** Zero to the zero power ( $0 \uparrow 0$ ).
- 74** Storage range overflow.
- 75** Storage range underflow.
- 76** Calculation range overflow.
- 77** Calculation range underflow.
- A0** Relational operator in for statement not allowed. No closing apostrophe.
- A1** A for statement has no matching next statement.
- A2** A next statement encountered without a previous for statement.
- A3** Non-numeric parameter passed as a p-number.
- A4** No return parameter for a function call.
- A5** No functions or subroutines running.  
Improper p-number.
- A6** Attempt to allocate local p-numbers from the keyboard.
- A7** Wrong number of parameters in fts, stf, fti, or itf function. stf or itf parameter must be a string (not a numeric). stf or itf parameter contains too few characters.
- A8** Overflow or underflow in fts function.  
Overflow in fti function.
- A9** String Variables ROM missing for stf or itf functions.
- Errors B0 thru B8 may result during the binary disc initialization and disc error recovery routines.
- B0** Wrong syntax, argument out of range or variable not properly dimensioned.
- B1** Are than six defective tracks on the disc.
- B2** Verify error. Boots on the disc not identical to boots on the cartridge.
- B3** dtrk or tinit not allowed because error information lost or error not d5, d6, d7 or d9.
- B4** Attempt to access record for error correction which isn't part of data file.
- B5** Improper string length (inconsistent with length given in header).
- B6** Not enough space in computer buffer for data item. Item can't be placed in this part of buffer.
- B7** Missing Disc or String ROM.
- B8** Track still bad after tinit.
- C0** Missing General I/O or Extended I/O ROM.
- C1** Incorrect number of parameters.
- C2** Improper parameter specified.
- C3** Wrong parameter type.
- C4** Illegal buffer type for bred statement.
- C5** Key buffer overflow.
- C6** Too large or wrong sign of parameter.
- C7** Improper execution of store statement.
- C8** Illegal use of kret.
- C9** Missing 98036A Interface card.
- D0** Improper argument in disc statement.
- D1** Disc argument out of range.

<b>D2</b>	Improper file size (must be from 1 thru 32767). No lines to store for save or savek.
<b>D3</b>	Invalid file name.
<b>D4</b>	File not found.
<b>D5</b>	Duplicate file name. Attempting to copy a non-data file to an existing file.
<b>D6</b>	Wrong file type.
<b>D7</b>	Directory overflow.
<b>D8</b>	Insufficient storage space on disc.
<b>D9</b>	Verify error due to cable, computer or drive problem. Bad data (reprint data).
<b>DISC IS DOWN (98217A ROM)</b>	
<b>UNABLE TO ACCESS DISC CONTROLLER (98228A ROM)</b>	
	Computer cannot access the disc controller.
<b>d0</b>	Firmware/driver out of synchronization. More than six defective tracks in a row (Press <b>RESET</b> ) or too many defective tracks with 98228A init.
<b>d1</b>	All drives in system not powered on.
<b>d2</b>	Door opened while disc being accessed.
<b>d3</b>	Disc not in drive or drive not present.
<b>d4</b>	Write not allowed to protected disc.
<b>d5</b>	Record header error (error recovery routine.)
<b>d6</b>	Track not found (use error recovery routine.)
<b>d7</b>	Data checkword error. (use error recovery routine.)
<b>d8</b>	Hardware failure (Press <b>RESET</b> ).
<b>d9</b>	Verify error. Data not readable under reduced margins (reprint data).
<b>E0</b>	General I/O ROM missing. HP-IB error under interrupt.
<b>E1</b>	Wrong number of parameters.
<b>E2</b>	Improper buffer device or equate table usage. Multiple-listeners error. Buffer busy.
<b>E3</b>	Wrong parameter type.
<b>E4</b>	Timeout error.
<b>E5</b>	Buffer underflow or overflow.
<b>E6</b>	Parameter value out of range.
<b>E7</b>	Parity failure.
<b>E8</b>	Improper use of irect statement. Attempt to DMA with HP-IB. Buffer or select code is busy.
<b>E9</b>	Illegal HP-IB operation.
<b>F0</b>	File overflow when read or print executed.
<b>F1</b>	98217A bootstraps not found (reload bootstraps). Wrong memory configuration for 98228A ROM.
<b>F2</b>	String read but wrong data type encountered.
<b>F3</b>	Attempt to read data item but type doesn't match.
<b>F4</b>	Availability table overflow (repack).
<b>F5</b>	Attempt on end branch from other than running program.
<b>F6</b>	Unassigned data file pointer.

F7	Disc is down; line cannot be reconstructed. (98217A ROM only).
F8	Disc is down and <b>STOP</b> pressed.
F9	System error (save files individually and reinitialize).
G1	Incorrect format numbers.
G2	Referenced format statement has an error.
G3	Incorrect I/O parameters.
G4	Incorrect select code.
G5	Incorrect read parameter.
G6	Improper conv statement parameters.
G7	Unacceptable input data.
G8	Peripheral device down.
G9	Interface hardware problem.
M1 <sup>1</sup>	Syntax error.
M2	Improper dimensions. Array dimensions incompatible with each other or incompatible with the stated operation.
M3	Improper redimension specification. New number of dimensions must equal original number; new size cannot exceed original size.
M4 <sup>1</sup>	Operation not allowed. An array which appears to the left of → cannot also appear on the right.
M5	Matrix cannot be inverted. Computed determinant = 0.

### 9862A Plotter ROM Error Codes

P1	Wrong state. Statements executed out of order.
P2	Wrong number of parameters.
P3	Wrong type of parameters. Parameters for a label statement must be expressions, text, or string variables.
P4	Scale out of range. Maximum value is less than or equal to the minimum value.
P5	Integer out of range. Pen control parameter is out of the range - 32768 thru - 32767 or the select code is not 0 or in the range 2 thru 15.
P6	Character size out of range. Width or height in letter statement is zero or there is an integer overflow in csiz calculations or results.
P7	Not used.
P8	Axes origin off-scale. X, Y specified for axis statement doesn't fall on plotter surface.
PLT DOWN	Check interface connection and select code setting; be sure LINE and CHART HOLD are on.

<sup>1</sup> Press the **RECALL** key to position the cursor at the location of the error.

<sup>1</sup> Press the **RECALL** key to position the cursor at the location of the error.

### Graphics/Plotter ROM (HP-GL) Error Codes

P1	Attempt to store into constant. Occurs when one or more parameters in a dig statement are constants rather than variables.
P2	Wrong number of parameters. Occurs on instructions with numeric-only parameter lists (scl, ofs, plt, iptl, cplt, xax, yax, lim, dig, csiz, line, pen#, and psc). In certain unusual cases where a parameter list contains user-level function calls, an instruction having an incorrect number of parameters may be executed.

- P3 Wrong type of parameter or illegal parameter value.
- P4 No HP-IB device number specified. Occurs when psc parameter is from 0 thru 14 and an HP-IB card is at the corresponding select code.
- P5 Pen control value not from -32768 thru 32767. Hardware transmission error occurs between plotter and computer.
- P6 No HP-IB card at specified select code.
- P7 axe or ltr statement encountered: these are 9862 Plotter commands only.
- P8 Computer (STOP) key cancelled operation. Occurs when the plotter fails to respond for three seconds after the (STOP) key has been pressed.
- p0 Transmission error. The calculator has received an illegal ASCII input from the plotter.
- p1 Instruction not recognized. The plotter has received an illegal character sequence.
- p2 Wrong number of parameters. Too many or too few parameters have been sent with an instruction.
- p3 Bad parameter. The parameters sent to the plotter with an instruction are out of range for that instruction.

Errors generated by write (wrt) and read (red) statements to an external plotter will typically be displayed in the next executed plotter ROM statement. This can be avoided by using an output error command (wrt select code, "OE"): followed by a read statement (red select code, variable) to check for errors after read or write statements that address the plotter.

- S0 Invalid set of strings in data list of ldf statement.
  - S1 Improper argument for string function or string variable.
  - S2 More parameters than expected for string function or string variable.
  - S3 Accessing or assigning to non-contiguous string, num function of null string.
  - S4 Trying to find the value of non-numeric string or null string.  
Exponent too large.  
Exponent format invalid (e.g., 1e+ +).
  - S5 Invalid destination type for string assignment.
  - S6 Parameter is zero, or negative, exceeded dimensioned size.  
Invalid sequence of parameters for string variable.
  - S7 String not yet allocated.
  - S8 String previously allocated.
  - S9 Maximum string length exceeded: additional string length must be specified in dim statement.
- SPARE DIR.** Printed when the spare disc directory (backup track) automatically replaces the main directory.

## Option ROM Syntax and Errors

The following syntax and error messages require the appropriate option ROM be plugged into your Desktop Computer. See the alphabetical listing for syntax and error descriptions.

### Advanced Programming ROM

Syntax: cll, for, fti, fts, itf, next, stf, xref.

Errors: A0 through A9.

### 98217A Disc ROM

Syntax: asng, boot, cat, chain, copy, dirc, drive, dtrk, dump, files, get, getb, getk, getm, itit, kill, killall, load, ltrk, on end, open, renm, repk, resave, rprr, rread, save, savek, savem, sprt, sread, tinit, type, vfyb, voff, von.

Errors: B0 through B8, D0 through D9, F0 through F9, d0 through d9.

### 98228A Disc ROM

Syntax: asgn, cat, chain, copy, drive, dtype dump, files, get, getb, getk, getm, init, kill, killall, load, on end, open, renm, repk, resave, rprr, rread, save, savek, savem, sprt, sread, type, von, voff.

Errors: D0 thru D9, d0 thru d9, F0 thru F9.

### Extended I/O ROM

Syntax: add, band, bit, buf, cli, clr, cmd, cmp, ctbl, dev, dto, eir, eor, equ, iof, ior, ios, iret, lcl, llo, mdec, moct, on err, oni, otd, par, pct, pol, polc, polu, rdi, rds, rem, rot, rqs, shf, tfr, time trg, wti.

Errors: E0 through E9.

### General I/O ROM

Syntax: conv, fmt, list#, rdb, rds, red, wrt, wtb, wtc.

Errors: G1 through G9

### Matrix ROM

Syntax: aprt, ara, dim, idn, ina, inv, ldf, mat, rcf, rdm, smpy, trn

Errors: M1 through M5



# Chapter 11

## 9825A/B Service Notes

