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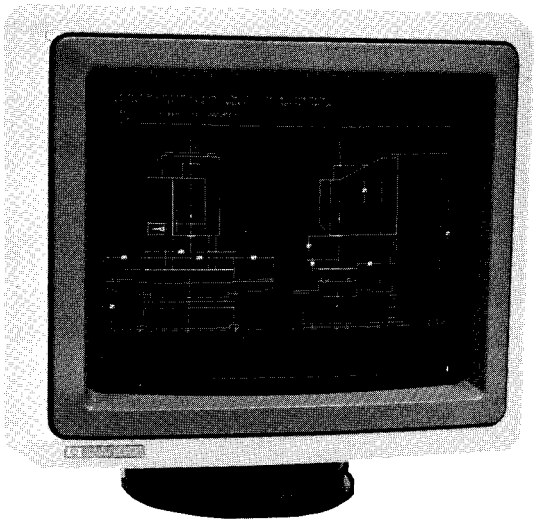
HP 98781A CE Handbook



98781

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

June 1984...First Edition

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Product Information

Chapter 1

Introduction

The HP 98781A Monitor is a 17 inch, high resolution monochrome monitor developed for use with the HP 9000 Model 237 computer. The term "high resolution" is used to indicate that the monitor presents information in a 1024 by 768 display.

WARNING

HAZARDOUS VOLTAGES EXIST IN THIS MONITOR. POWER MUST BE REMOVED FROM INSTRUMENT BEFORE SERVICING. THE MONITOR HAS NO POWER SWITCH, THEREFORE THE POWER CORD MUST BE DISCONNECTED TO REMOVE POWER.

This manual should be used in conjunction with the Hardware Support Documentation for the HP 9837/9920 Computer and the HP 98781A Monitor.

98781A Specifications

Power Requirements

Switch selected line voltage:	95 thru 125 Vac 195 thru 250 Vac
Line fuse: 95 thru 125 Vac 195 thru 250 Vac	3 Amperes/250 V 3 Amperes/250 V
Line frequency:	48 thru 66 Hertz
Power consumption:	100 Watts maximum
Heat dissipation:	314 BTU/Hour

Environmental

Operating temperature:	0°C to +55°C (32°F thru 131°F)
Storage temperature:	−40°C to +75°C (−40°F thru +167°F)
Ambient humidity:	5 thru 95% relative humidity, non-condensing
Maximum altitude:	4 572 metres (15 000 feet)

Physical

Height:	37.5 cm (14.75 inches)
Width:	44.2 cm (17.4 inches)
Depth:	38.1 cm (15.0 inches)
Net Weight:	24.95 Kg (55 pounds)

Display Features

Cathode ray tube:	43.2 cm (17 inch) diagonal
Scan:	Non-interlaced.
Frame rate:	60 Hz
Raster:	1024 X 768 Pixels Horizontal Scan
Frequency:	47.7 KHz

Additional Features

Interface I/O:	Cable management HP-HIL, Human Interface Link Repeater
Audio:	Built-in speaker

Environmental/Installation/PM

Chapter 2

Environmental Range

Operating temperature:	0°C to +55°C (32°F thru 131°F)
Storage temperature:	−40°C to +75°C (−40°F thru +167°F)
Ambient humidity:	5 thru 95% relative humidity, non-condensing
Maximum altitude:	4 572 metres (15 000 feet)

Monitor Installation

WARNING

THE HP 98781A MONITOR DOES NOT HAVE A POWER SWITCH. TO REMOVE POWER FROM THE MONITOR IN CASE OF EMERGENCY, THE POWER CORD MUST BE REMOVED FROM THE POWER OUTLET OR THE COMPUTER MUST BE TURNED OFF. WHEN INSTALLING THE MONITOR, BE SURE THAT THE POWER OUTLET IS CLOSE TO THE MONITOR AND EASILY ACCESSIBLE.

The HP 98781A Monitor requires little in the way of installation, other than locating the CRT in such a way as to minimize glare and keeping it out of direct sunlight.

Cooling air for the monitor is drawn in through the bottom of the monitor and exhausted out the top. Care must be taken to assure that the air flow is not restricted.

The cable (09920-61602) that connects the monitor to the Model 237 computer is made up of cables from the high resolution display controller and the keyboard/HP-IB interface. The cable is terminated on the monitor end with a 9-pin D-subminiature connector and on the computer end with a 9-pin D-subminiature connector, a Keyboard connector, and a miniature audio plug connector. A seperate coaxial cable is used to transmit the video signal. It is terminated with a BNC connector on each end.

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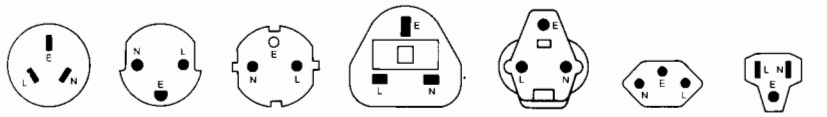
Power Cord Options



Country	Part Number	Opt.	Voltage
Australia	8120-1369	901	250V, 6A
Denmark	8120-2956	912	250V, 6A
Europe	8120-1689	902	250V, 6A
Great Britain	8120-1351	900	250V, 6A
South Africa	8120-4211	917	250V, 10A
Switzerland	8120-2104	906	250V, 6A
United States	8120-1378	903	120V, 10A

Power cords supplied by HP have polarities matched to the power-input socket on the computer:

- L = Line or Active Conductor (also called "live" or "hot")
- N = Neutral or Identified Conductor
- E = Earth or Safety Ground

NOTE:

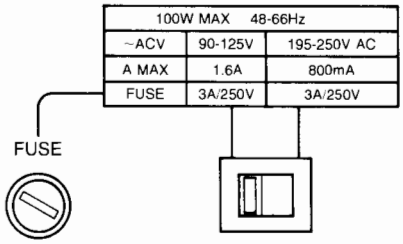
Plugs are viewed from connector end. Shape of molded plug may vary within country.

Available Power Cord Options

Line Voltage and Fuse Selection

CAUTION

BE SURE THE LINE VOLTAGE SELECT SWITCH IS SET CORRECTLY BEFORE CONNECTING THE POWER CORD. IF THE SWITCH IS SET FOR 95-125 VOLTS AND THE POWER SOURCE IS 195-250 VOLTS, SERIOUS EQUIPMENT DAMAGE COULD RESULT.



Line Voltage Selector Switch Settings

Fuse Replacement

Check the fuse and be sure the correct value is installed.

WARNING

BEFORE REMOVING THE FUSE HOLDER CAP TO CHECK OR CHANGE THE FUSE, BE SURE THAT ALL POWER IS DISCONNECTED FROM THE MONITOR.

THE HP 98781A MONITOR DOES NOT HAVE A POWER SWITCH. TO REMOVE POWER FROM THE MONITOR IN CASE OF EMERGENCY, THE POWER CORD MUST BE REMOVED FROM THE POWER OUTLET OR THE COMPUTER MUST BE TURNED OFF. WHEN INSTALLING THE MONITOR, BE SURE THAT THE POWER OUTLET IS CLOSE TO THE MONITOR AND EASILY ACCESSIBLE.

CAUTION

REPLACEMENT FUSES MUST BE RATED FOR 250 VOLTS, AND MUST NOT EXCEED THE CURRENT RATING INDICATED ON THE REAR PANEL. OTHERWISE, EQUIPMENT DAMAGE OR FIRE MAY RESULT.

Line Voltage	Fuse Rating
95-125 V	3 A/250 V
195-250 V	3 A/250 V

Preventive Maintenance

Cleaning

The HP 98781A Monitor has been painted with a durable, long lasting, non-toxic paint. It will preserve the appearance of the monitor for many years. To clean the case, follow the instructions below.

CAUTION

CHEMICAL SPRAY-ON CLEANERS USED FOR APPLIANCES AND OTHER HOUSEHOLD APPLICATIONS MAY DAMAGE THE FINISH. THESE AND OTHER CHEMICAL CLEANERS SHOULD NOT BE USED. THE CRT DISPLAY SHOULD BE CLEANED ONLY WITH CLEAN WATER.

Before cleaning the monitor, unplug the power cord and remove any interconnecting cables. Dampen a clean, soft, lint free cloth with a solution of clean water and mild soap. Wipe the soiled areas, ensuring that no cleaning solution gets inside. For cleaning more heavily soiled areas, a 50% solution of clean water and isopropyl alcohol may be used. Then dry with a clean, soft, lint-free, dry cloth.

Configuration

Chapter 3

Introduction

The HP 98781A Monitor has been developed for use with the HP Series 200 Model 237 (HP 9837H) Computer. See the following block diagram.

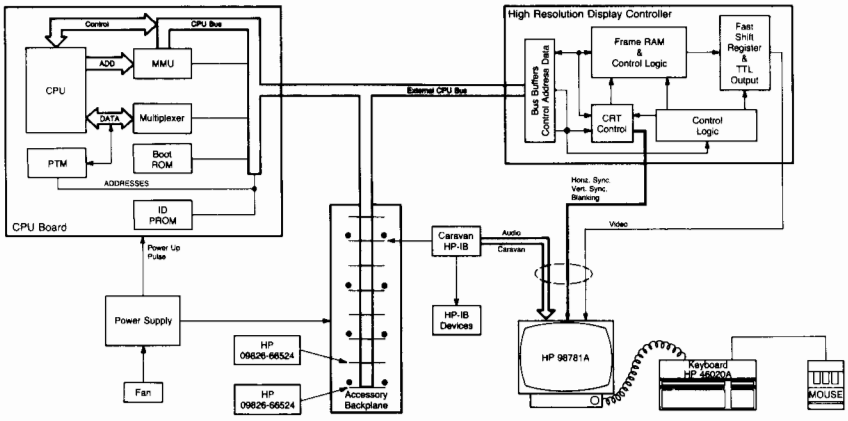


Figure 3-1. HP 9837H System Block Diagram

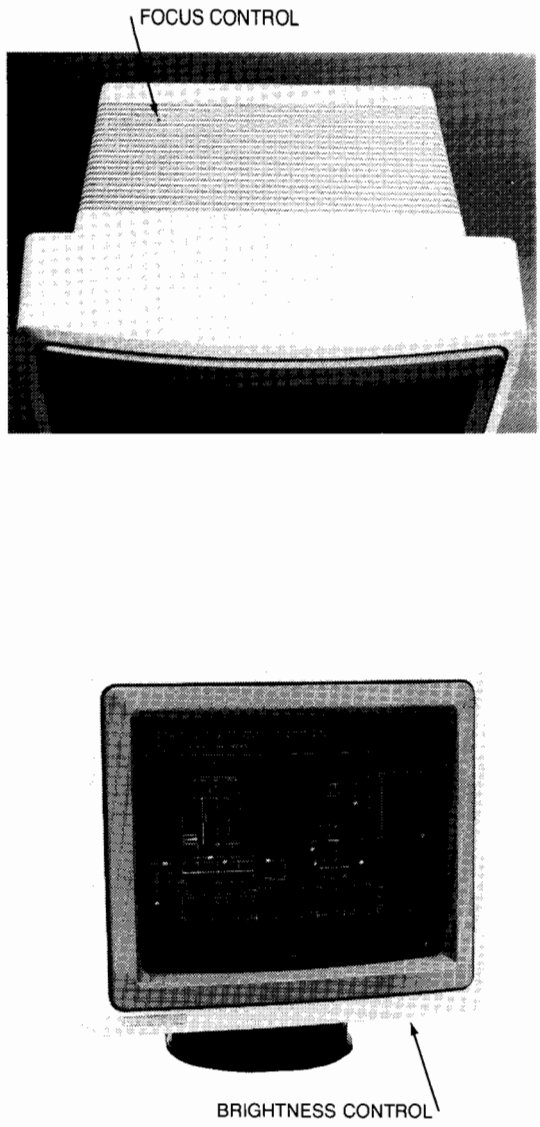


Figure 3-2. Operator Controls

Troubleshooting

Chapter 4

Troubleshooting the monitor consists of observing the symptoms on the CRT and diagnosing the problem from the visual information presented. Then replace the inoperative assembly. Always reinstall any assembly that does not affect the condition or problem.

Note

Hewlett-Packard supports repair only to the assembly level. The trouble is diagnosed to the assembly that is causing the problem. The assembly is then replaced with a new or rebuilt one.

Tools Required

- Number 1 POZIDRIV screwdriver, 3 inches long.
- Number 2 POZIDRIV screwdriver, 4 inches long.
- Standard 0.250 inch flat-tip screwdriver, 4 inches long.
- VOM, HP 3435A or equivalent.
- Tuning tool, non-metallic, non-magnetic.

Troubleshooting Techniques

Flowcharts are presented in this chapter for these symptons:

- Inoperative Unit
- Live unit without display.
- Live unit with display problems.

Troubleshooting the HP-HIL

An unexpected trouble that can occur is a dead keyboard. If the computer fails to enter data from the keyboard, substitute a new keyboard and try again. If the computer still fails to enter data, the problem is in the HP-HIL loop. Replace the HP-HIL interface card in the computer and try again. If the trouble still persists, suspect the HP-HIL circuit on the video board in the monitor, the control board in the monitor base, or the interconnect cable. Replace the cable first.

LED Voltage Indicators

There are some aids to assist you in your search for truth here. The Video board has a set of LEDs mounted on it. These LEDs indicate the absence or presence of the voltages needed by the monitor to perform its functions. The LEDs can be seen through the top of the monitor without removing the cover. If a voltage is present the LED is ON. See the figure below for location and identification.

WARNING

LETHAL VOLTAGES EXIST IN THIS MONITOR. REMOVE POWER FROM MONITOR BEFORE REMOVING PROTECTIVE COVERS.

As viewed from the front of the monitor, the left most LED indicates if the external +12 volts (+12E) from the computer is present. Without this voltage the monitor will not turn ON.

The next LED indicates if the internal +12 volt supply (+12I) is present. This voltage is needed for the horizontal circuits and high voltage supply to operate.

The next LED will indicate the presence of the +5 volt logic supply voltage from the 5 volt regulator on the video circuit board. This voltage is for the logic devices used in the monitor.

The right most LED will indicate the presence of the +24 volt dc voltage from the low voltage supply.

The +12 volts from the computer, +12E, must be present for the monitor to turn ON. If the monitor fails to turn on, first check the +12E LED inside the monitor. If the +12E LED is dark, check the computer and/or the data cable. If the +12E LED is bright; look at the other LEDs.

If the +12I LED is bright, indicates the +24V is getting to the sweep section and the +12V regulator is operating.

If the +5V LED is bright, the +5V regulator on the video board is operating.

If the +24V LED is bright, the low voltage power supply is working.

If any LED is dark, investigate the section the LED represents. If all LEDs are dark, proceed with the Inoperative Unit Section. Suspect the low voltage power supply.

If all LEDs are lit, go to the Live Unit Section.

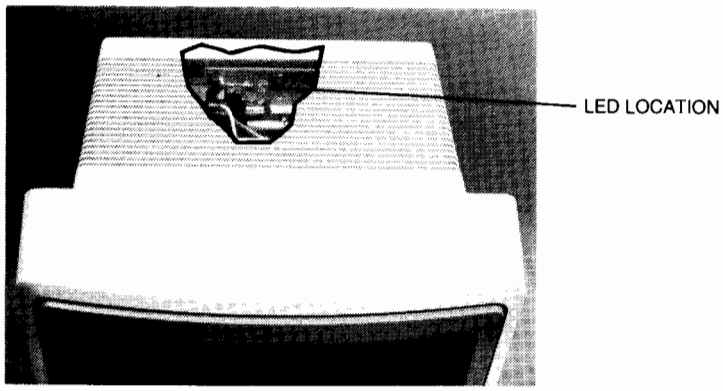
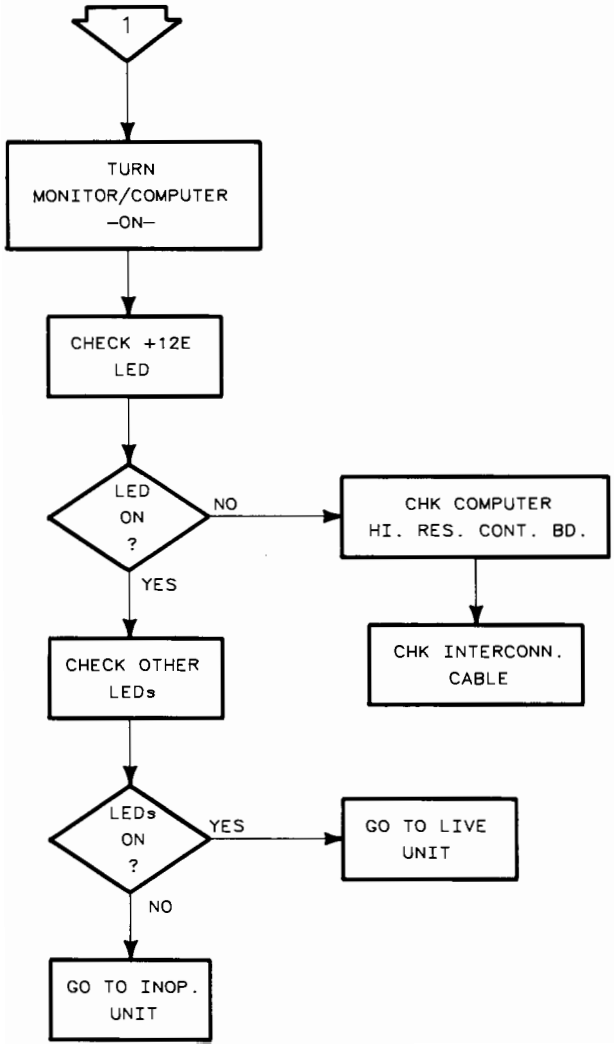
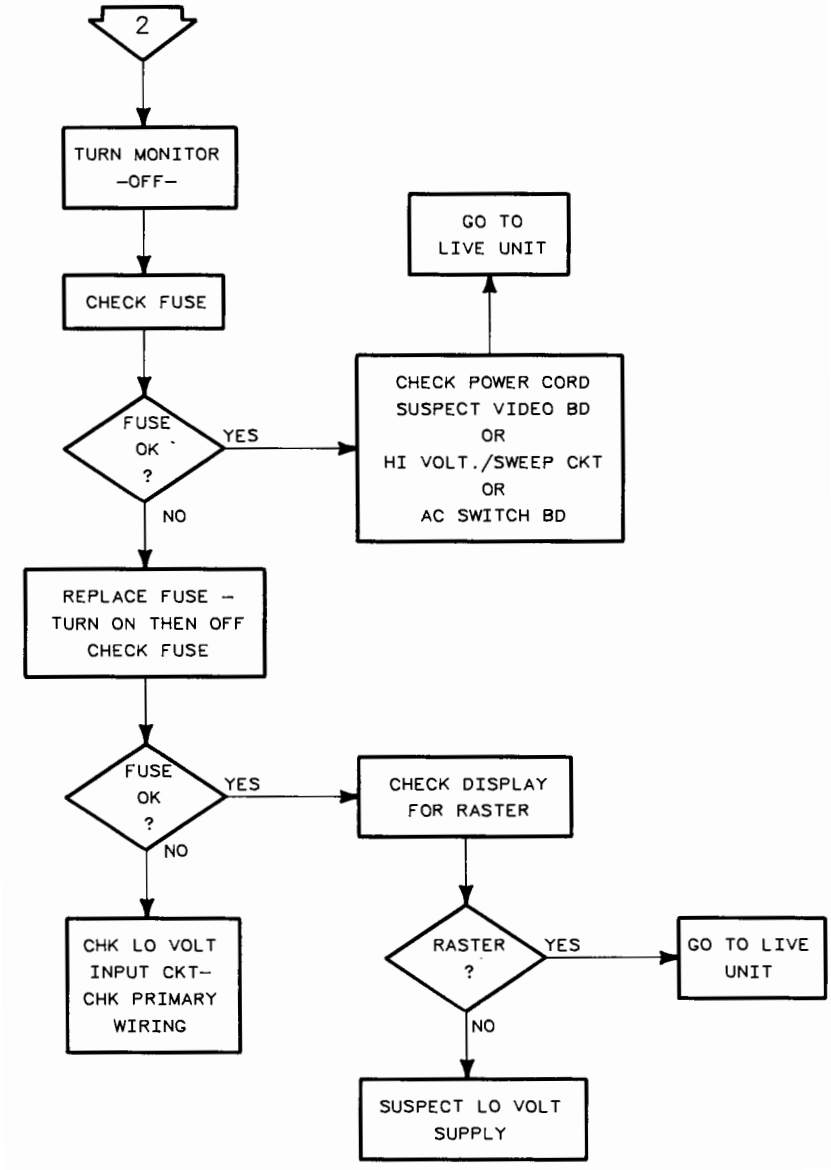


Figure 4-1. Power Supply LEDs

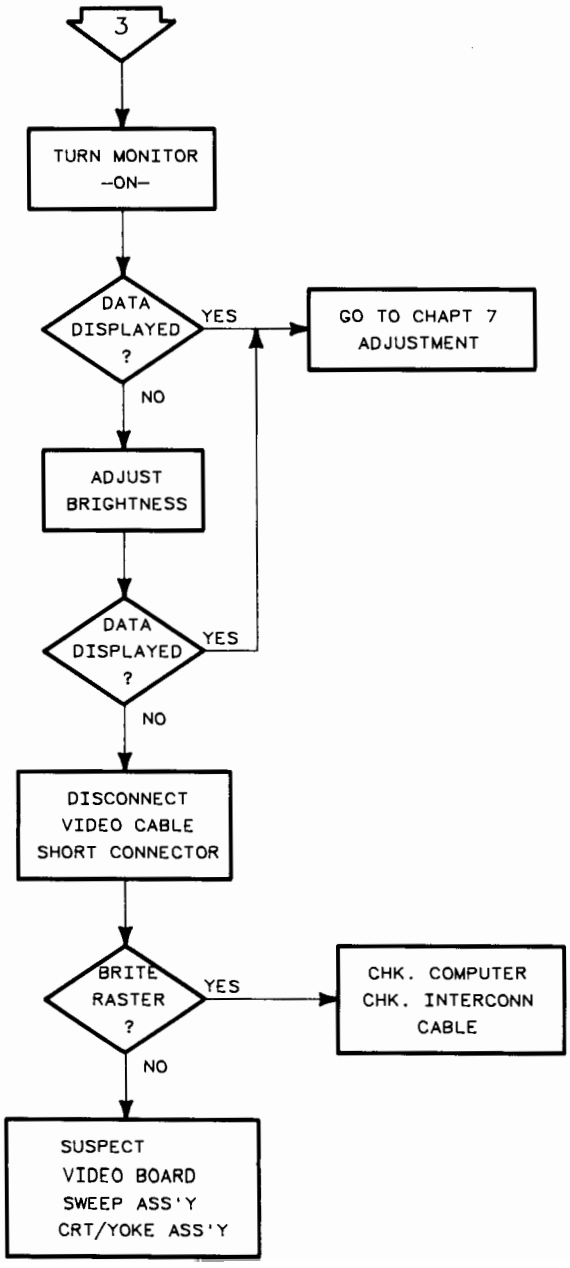
Preliminary Troubleshooting



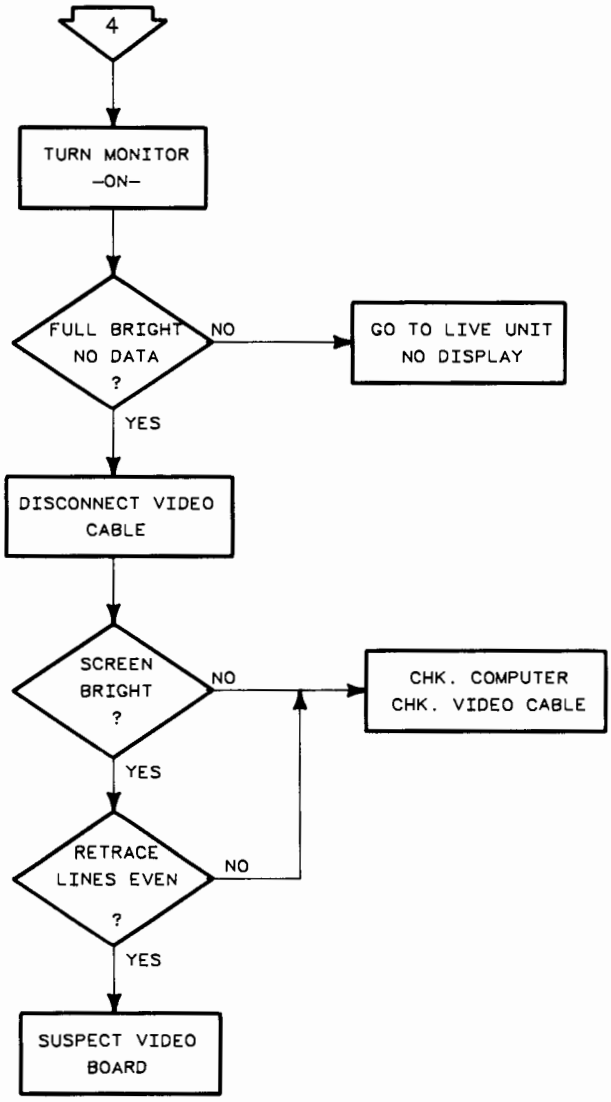
Dead Unit


2
TURN MONITOR -OFF-
CHECK FUSE
FUSE OK ?
YES
NO
GO TO LIVE UNIT
CHECK POWER CORD
SUSPECT VIDEO BD
OR
HI VOLT./SWEEP CKT
OR
AC SWITCH BD
REPLACE FUSE - TURN ON THEN OFF CHECK FUSE
FUSE OK ?
YES
NO
CHECK DISPLAY FOR RASTER
CHK LO VOLT INPUT CKT- CHK PRIMARY WIRING
RASTER ?
YES
NO
GO TO LIVE UNIT
SUSPECT LO VOLT SUPPLY

Live Unit, No Display



Live Unit, Has Raster, No Data



Diagnostics

Chapter 5

Diagnostics in this Handbook are a part of Chapter 4, Troubleshooting.

Adjustments

Chapter 6

Introduction

When you change assemblies or replace defective assemblies in the HP 98781 Monitor, you may have to make some adjustments. This section will lead you through a procedure using minimum equipment to make these adjustments.

There are some specifics that should be presented at this time. They are:

Raster Size: Horizontal 312 mm (12.28 inches)
Vertical 234 mm (9.21 inches)

Raster Shape: Rectangular, No bulges or dips, or Pincushioning.

Tools Needed

Although no special tools are needed to adjust the HP 98781A monitor, these tools will help.

- Tuning tool (8710-1300)
- Tuning tool (8710-1318)
- System Functional Test Package: 3.5-inch disc (09800-11330) or 5.25-inch disc (09800-11530).

Adjustment Hints

All adjustment locations refer to your right or left as you face the front of the monitor.

A useful hint for making the size and centering adjustments is to place pieces of cellophane tape, either clear or frosted, on the face of the CRT, with center cross-hairs and edge marks on them. One is located at the center of the CRT which is determined by measurement. Then four more are located around the edge to indicate the size of the raster. The final adjustment of the monitor will depend on how skillfuly the measurements are made.

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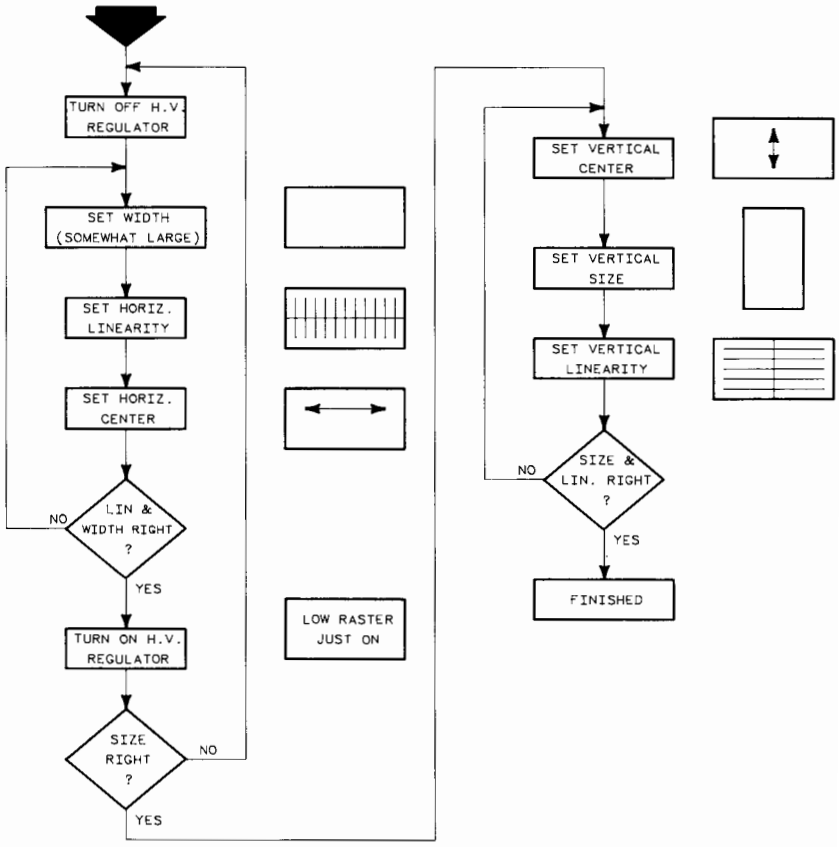

Adjustment Flowchart

Display the Alignment Grid

To display the CRT alignment grid:

1. Load System Functional Test Program.
2. Choose #6, Graphics Alignment patterns.
3. Select #2, Alignment Grid. The grid shown below is displayed.

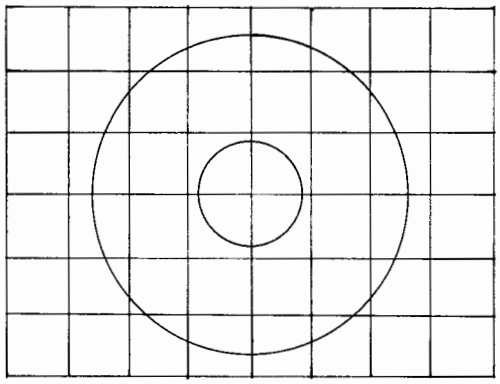

Figure 6-1. The Alignment Grid

Screen Adjustment

To set the CRT maximum brightness:

1. Turn the BRIGHTNESS control fully clockwise (cw).
2. Adjust the SCREEN control on the sweep section to just get rid of the lighted raster and retrace lines behind the Grid alignment pattern.
3. Turn the BRIGHTNESS control fully counterclockwise (ccw). The display should be dim but visable.

Focus Adjustment

Adjust the FOCUS control for best over-all focus.

Systems

Chapter 7

The HP 98781 Monitor is supported for use only with the HP 9837H Computer.

Replaceable Parts

Chapter 8

This chapter contains lists of replacement parts and exchange assemblies and hardware components included in the HP 98781A Monitor. Replacement parts and assemblies are available in North America from HP's Corporate Parts Center. The address is:

Corporate Parts Center
333 Logue Avenue
Mountain View, California 94042

Telephone (415) 968-9200

Part numbers in the form xxxxx-69xxx refer to rebuilt assemblies that are available on an exchange basis. Numbers in the form xxxxx-66xxx, -67xxx, or -68xxx refer to new assemblies. All PC assemblies listed are fully loaded boards. Empty PC boards are not available.

Table 8-1. HP 98781A Assemblies

HP Part No.	Qty Used	Description	Exchange or Non-Exchange
98781-66551	1	Switch Board	Non-Exch.
98781-66571	1	Sweep Section Assembly	Non-Exch.
98781-66581	1	Video Board	Non-Exch.
98781-66591	1	Control Board	Non-Exch.
98781-67902	1	Power Sup. Assembly	Non-Exch.
98781-67924	1	CRT Tube Assembly	Non-Exch.
09920-61602	1	Inter-connect Cable	Non-Exch.
8120-4483	1	Cable, Coax, Video	Non-Exch.

Hardware Parts List

Here is a list of part numbers for selected hardware items used in the HP 98781A Monitor. Hardware and cabinet parts listed in Table 8-2 are shown in Figure 8-1, HP 98781A Exploded View.

Table 8-2. Mechanical Hardware Part Numbers

Back Panel Assembly

HP Part No.	Qty Used	Description
98781-00201	1	Back panel
98781-66581	1	Video board assembly
2950-0054	1	Nut, Video input connector
2190-0054	1	Washer, Lock, Video input connector
0515-0411	2	Screw, m3 X 0.5, subminiature D connector
1251-7941	2	Locking blocks, subminiature D connector
0515-0825	5	Screw, M4 X 0.7 X 8 mm, Board mounting

Chassis Assembly

HP Part No.	Qty Used	Description
98781-60101	1	Chassis
98781-67924	1	CRT and Yoke Assembly
0515-0949	4	Screw, CRT Mounting
3050-0214	4	Washer, flat, CRT Mounting
2190-0028	4	Washer, lock, CRT Mounting
98781-62701	1	Line filter
98781-66551	1	Switch board
0515-0825	5	Screw, M4 X 0.7 X 8 mm, switch board mounting
3160-0449	1	Fan, cooling
0515-0906	4	Screw, M4 X 0.7 X 50 mm, Fan mounting
2190-0010	1	Washer, lock
1600-1313	1	Shield, magnetic, fan
98781-04101	1	Cover, top
0515-0825	6	Screw, M4 X 0.7 X 8 mm, top cover mounting

Power Supply Assembly

HP Part No.	Qty Used	Description
98781-66553	1	Power Supply
98781-61601	1	Cable, ac power
98781-61602	1	Cable, sweep power
98781-61603	1	Cable, line select
98781-61604	1	Cable, sw/video power
2510-0047	2	Screw, 8-32, power cables
2360-0113	2	Screw, 6-32, power cables
2360-0121	4	Screw, 6-32, power supply mounting
2190-0005	1	Washer, lock

Table 8-2. Mechanical Hardware Part Numbers (cont.)

Sweep Module Assembly

HP Part No.	Qty Used	Description
98781-66571	1	Sweep module
98781-61607	1	Cable, Video/sweep
2360-0121	4	Screw, 6-32, sweep module mounting

Tilt-Swivel Assembly

HP Part No.	Qty Used	Description
98781-64401	1	Tilt/swivel assembly
0515-0825	4	Screw, M4 X 0.7 X 8 mm, tilt/swivel mounting
98781-04102	1	Adapter plate
0515-0825	4	Screw, M4 X 0.7 X 8 mm, adapter plate mounting
98781-66591	1	Board, Control
0515-0825	2	Screw, M4 X 0.7 X 8 mm, control board mount
0515-0922	2	Screw, ITF connector
0535-0026	2	Nut, ITF connector
2190-0005	2	Washer, lock, ITF connector
9160-0273	1	Speaker
0515-0652	4	Screw, speaker mounting
98781-66591	1	Pot, intensity control
0370-3122	1	Knob, intensity control
98781-61605	1	Cable, intensity control

Case Assembly

HP Part No.	Qty Used	Description
98781-40801	1	Bezel
98781-01201	1	Bracket, right, bezel
98781-01202	1	Bracket, Left, bezel
0515-0982	4	Screw, Bracket mounting
0350-0071	4	Washer, Bracket mounting
0515-0825	4	Screw, M4 X 0.7 X 8 mm, bezel mounting
98781-40802	1	Basket, rear cover
0642-0458	4	Screw, 8-16, Self tapping, basket mounting

Misc. Assemblies

HP Part No.	Qty Used	Description
09920-61602	1	Inter-connect Cable
8120-4483	1	Cable, Coax, Video

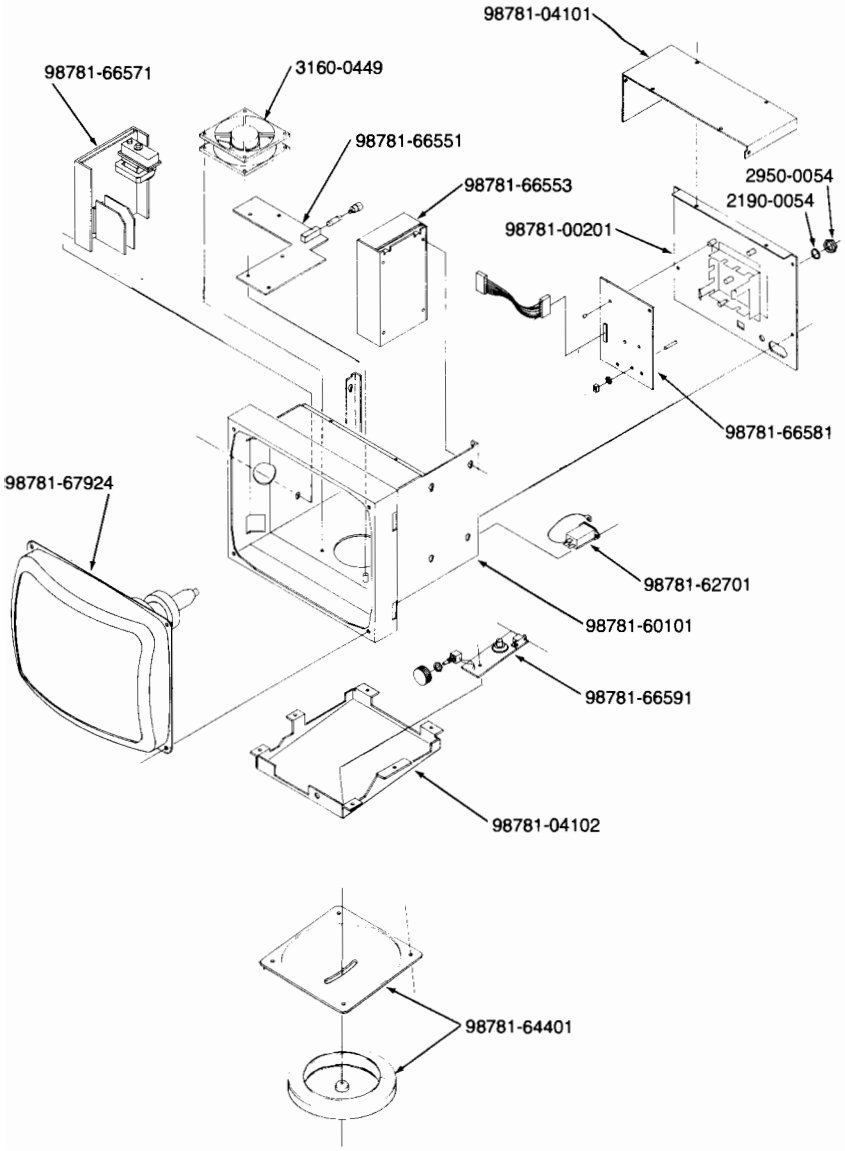

Figure 8-1. HP 98781A Exploded View

Diagrams

Chapter 9

No diagrams included in this section.

Reference

Chapter 10

Related Documentation

These manuals are available for the HP98781 Monitor:

- HP 98781A Hardware Support Documentation, 98781-90000
- Series 200 System Functional Tests Manual, 09800-11001
- HP 9837/9920 Self-Paced Hardware Training Guide, 09837-90099 or 09837 + 49A-90101

Service Notes

Chapter 11