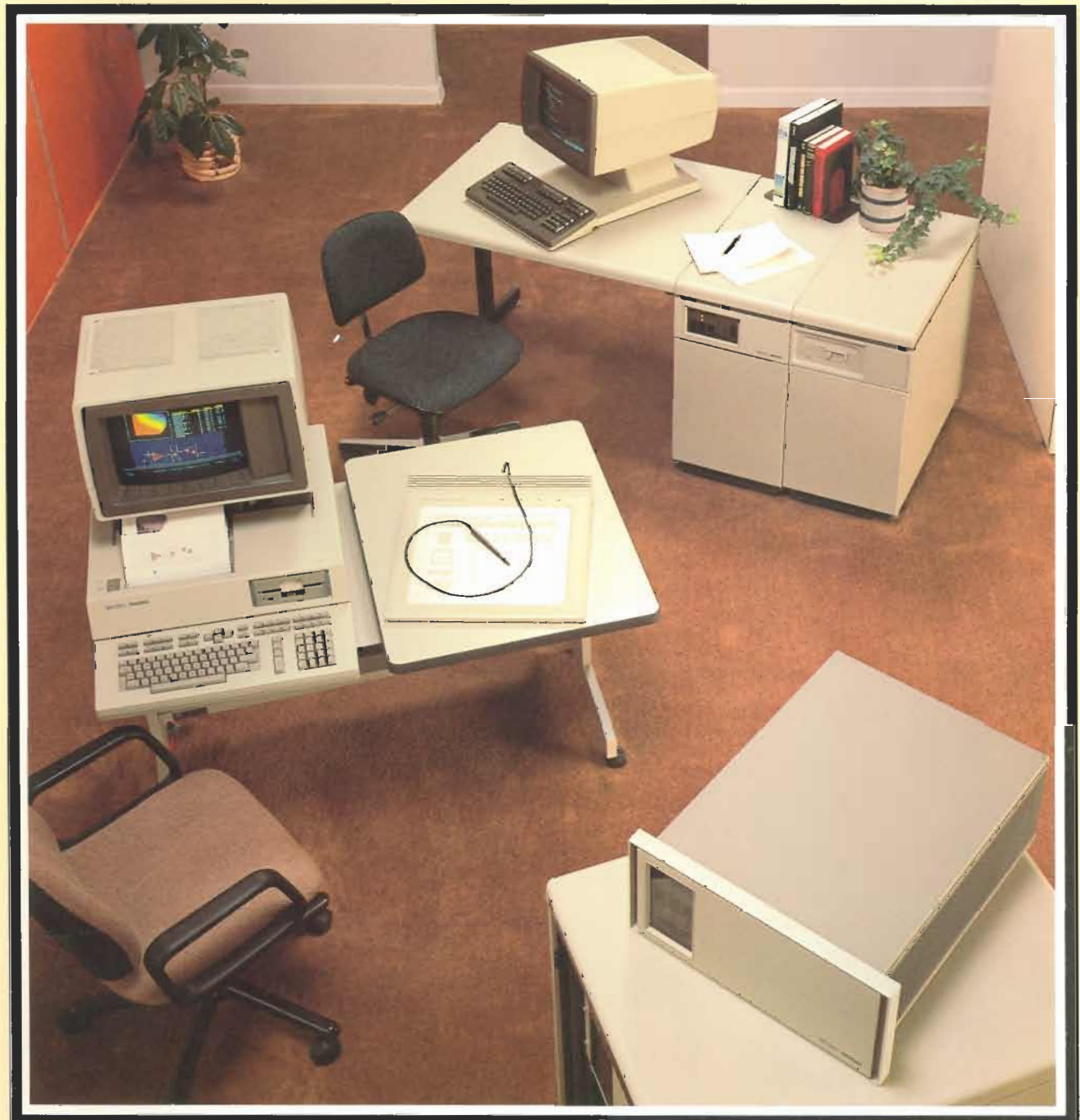


HP 9000 Series 500 Computers Model 520



Installation and Test



HP Computer Museum
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Installation and Test

*for the HP 9000 Series 500
Model 520 Computer*

Manual Part No. 09020-90011

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Chapter 1

Installing Your Computer

Note

Each HP 9000 Model 520 computer has a product number which is printed on a label affixed to the rear of the computer. The following product numbers distinguish the type of display on the computer and are used throughout this manual:

9020A - Standard Color Display
9020B - Monochromatic Display
9020C - High-Performance Color Display

CAUTION

MAKE SURE THAT THE COMPUTER'S POWER SWITCH IS IN THE OFF POSITION BEFORE INSTALLING THE DISPLAY'S POWER CORD (IF ANY) AND BEFORE PLUGGING THE POWER CORD(S) INTO THE POWER OUTLET(S).

1. Unpacking the Computer

Note

Before installing your computer, make sure that you have read the Site Preparation Manual for the HP 9000 Series 500 Computers and have selected a suitable site for your computer. The Site Preparation Manual describes power requirements and environmental requirements for your computer system.

Your HP computer was thoroughly tested and inspected before it was shipped. All equipment should be in good working order.

- a. Remove the computer from its carton. Carefully check it and the accessories for any damage that may have occurred in transit.
- b. Check the accessories you received against the those listed in the computer's data sheet. Notify your HP Sales and Support Office if any damage is found or if any items are missing.

2. Positioning the Computer

Place the base of your computer on any convenient work surface. Make sure that the surface is capable of supporting the combined weight of the computer base, the display and any peripherals placed there (refer to the product's data sheet to find its weight).

To ensure adequate cooling for you computer, leave about 15 cm (about 6 inches) of room between the back of the computer and any obstruction, such as a wall. Similarly, leave about 15 cm (about 6 inches) between the top of the display and an obstruction, such as a shelf. Do not block the air vents located under the keyboard.

3. Installing the Display

WARNING

THE COMPUTER'S DISPLAY IS VERY HEAVY. TO AVOID PERSONAL INJURY OR DAMAGE TO THE EQUIPMENT, THE DISPLAY SHOULD ALWAYS BE LIFTED BY TWO PEOPLE.

Install your computer's display by performing the following procedure.

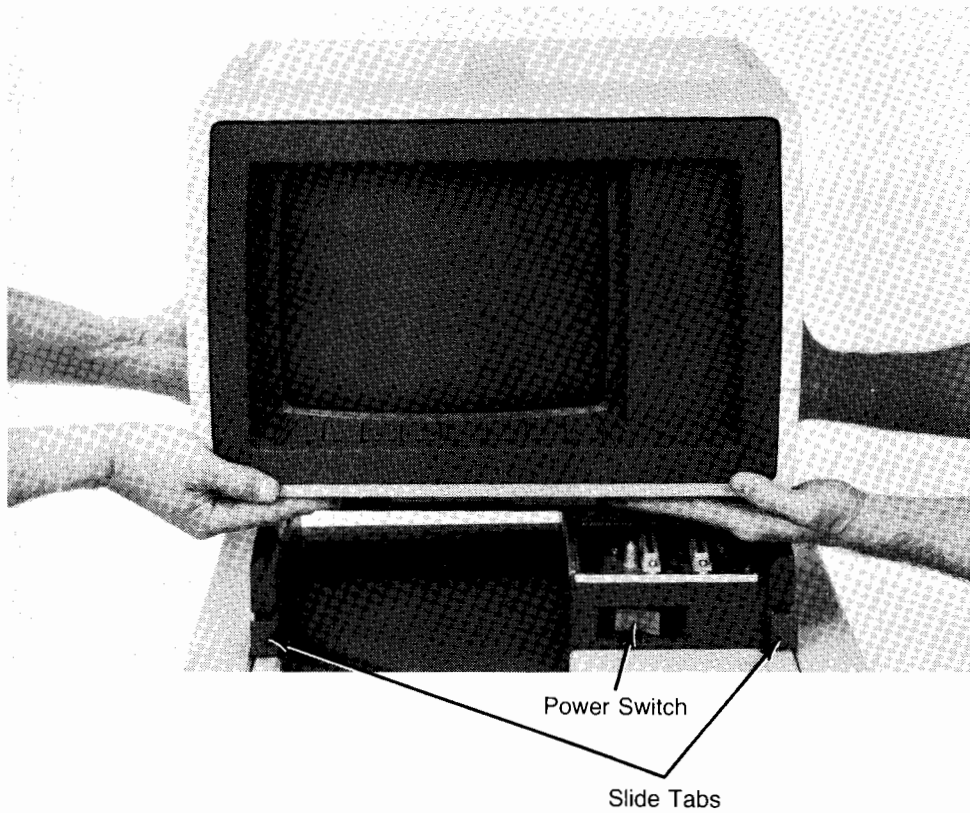
Note

If you are installing the display of a 9020A you should check the position of the 50/60 Hz CRT refresh rate switch. The switch is located below the display (see illustration on page 17). Move the switch to either the 50 Hz or 60 Hz position, depending on the input power line frequency.

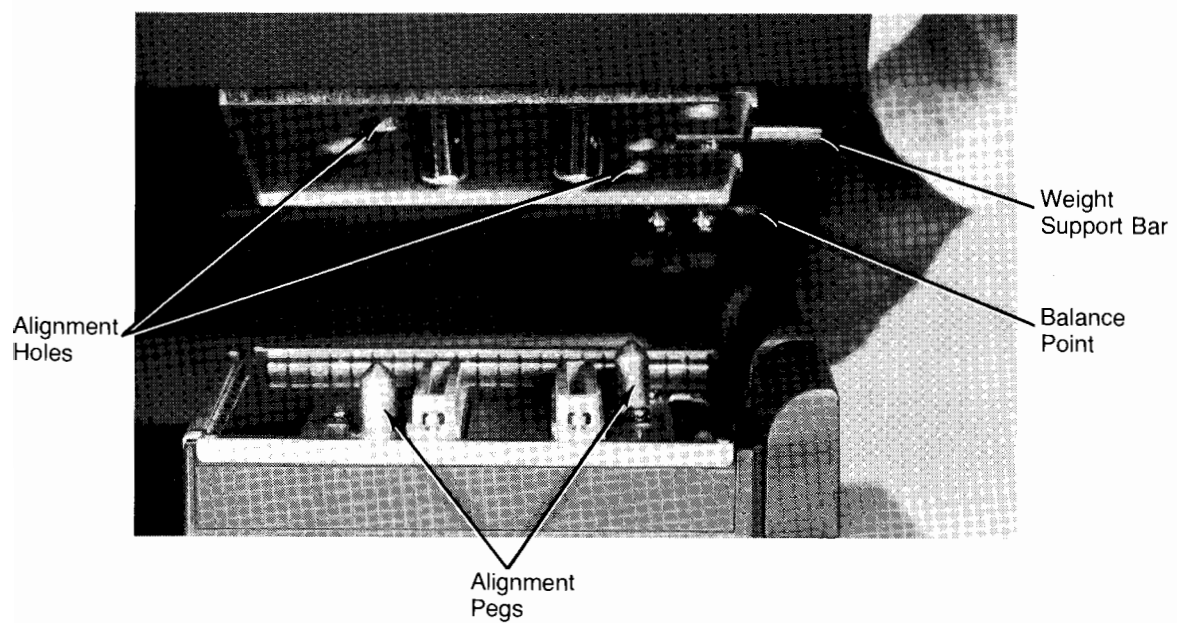
- a. Pull out each slide tab on the computer (see top photo on next page) until both are fully extended (about 2 cm or 3/4 inch).
- b. With one person on each side of the display, gently place the display on the computer such that the beveled support legs on the computer base fit into the grooves on the underside of the display. The two pegs on the top of the computer base fit into the alignment holes on the display (see bottom photo on next page) when the display is correctly positioned.
- c. The weight of the display is supported by the the two bars on the display and is centered about the balance points. Gently push down on the top of the display to ensure proper seating and electrical connection.
- d. Push the slide tabs until they are once again flush with the computer.

You may adjust the angle of display by tilting the display up or down. The brightness with which characters are displayed may be controlled by adjusting the display intensity dial. The intensity dial is located underneath the display, near the front left corner.

To remove the display, pull the slide tabs until they are fully extended. Next, lift the display from the base of the computer.



Installing the Display, View 1



Installing the Display, View 2

Attaching the Light Pen

CAUTION

TO PREVENT DAMAGE TO THE COMPUTER AND TO THE LIGHT PEN, DO NOT ATTACH THE LIGHT PEN TO THE GRAPHICS INPUT PLUG (LOCATED BELOW THE COMPUTER'S KEYBOARD).

The light pen is an input device available with your 9020B or 9020C computer. It is attached to the rear panel of the display via a 15-pin connector and safety clip. To install the light pen:

- a. Make sure that power to the computer is switched off.
- b. Hold the light pen connector cord such that the seven pins of the connector are on top. Position the safety clip so that the left screw of the jack (located on the back panel of the display) is centered directly beneath the hole in the clip.
- c. Plug in the connector and slide the clip to the left until it snaps into place.

4. Power Cords, Grounding, and Fuses

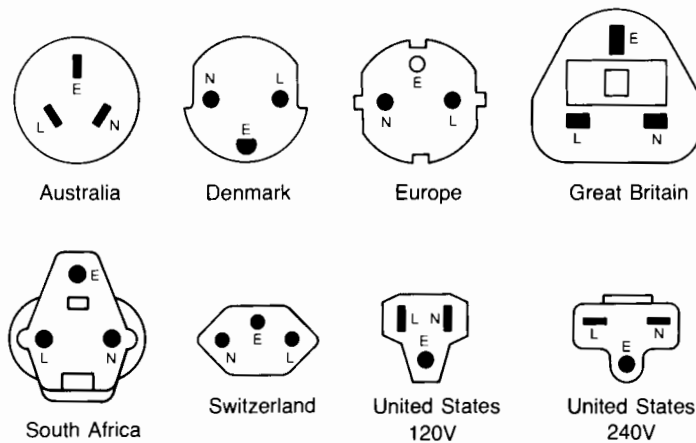
Power Cords

Power cords with different plugs are available for your computer. The cord(s) shipped with each computer is matched for the type of power and plug used in the geographical area where the computer is to be delivered. If your equipment has the wrong power cord(s) for your area, please contact your HP Sales and Support Office.

WARNING

IF IT IS NECESSARY TO REPLACE A POWER CORD, THE REPLACEMENT CORD MUST HAVE THE SAME POLARITY AS THE ORIGINAL. OTHERWISE A SAFETY HAZARD, WHICH COULD RESULT IN INJURY OR DEATH (FROM ELECTRICAL SHOCK), MIGHT EXIST. IN ADDITION, THE EQUIPMENT COULD BE SEVERELY DAMAGED IF EVEN A RELATIVELY MINOR INTERNAL FAILURE OCCURRED.

Power cords for your computer must be installed by an HP Customer Engineer. However, you may order and install power cords for the color display (9020A and 9020C) yourself.



Country	Display P/N	Mainframe P/N	Opt.	Voltage
Australia	8120-1369	8120-3539	901	250V, 6A
Denmark	8120-2956	8120-3746	912	250V, 6A
Europe	8120-1689	8120-3540	902	250V, 6A
Great Britain	8120-1351	8120-3745	900	250V, 6A
South Africa	8120-4211	8120-4210	917	250V, 10A
Switzerland	8120-2104	8120-3542	906	250V, 6A
United States	8120-1378	8120-3519	903	110V, 10A
United States	8120-0698	8120-3541	904	220V, 10A

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

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

Power Cords

Grounding Requirements

To protect operating personnel, the National Electrical Manufacturer's Association (NEMA) recommends that all equipment be properly grounded. Your system is equipped with three-conductor power cables which, when connected to an appropriate power receptacle, ground the computer. To preserve this protection feature, do not operate the computer from an ac power outlet which has no ground connection.

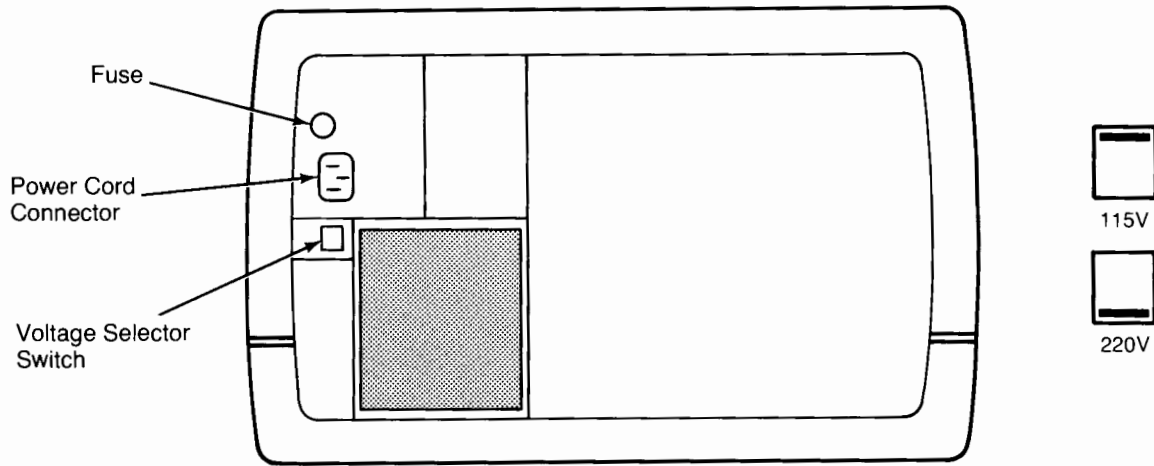
FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT (U.S.A. ONLY)

The Federal Communications commission (in Subpart J of Part 15, Docket 20780) has specified that the following notice be brought to the attention of the users of this product.

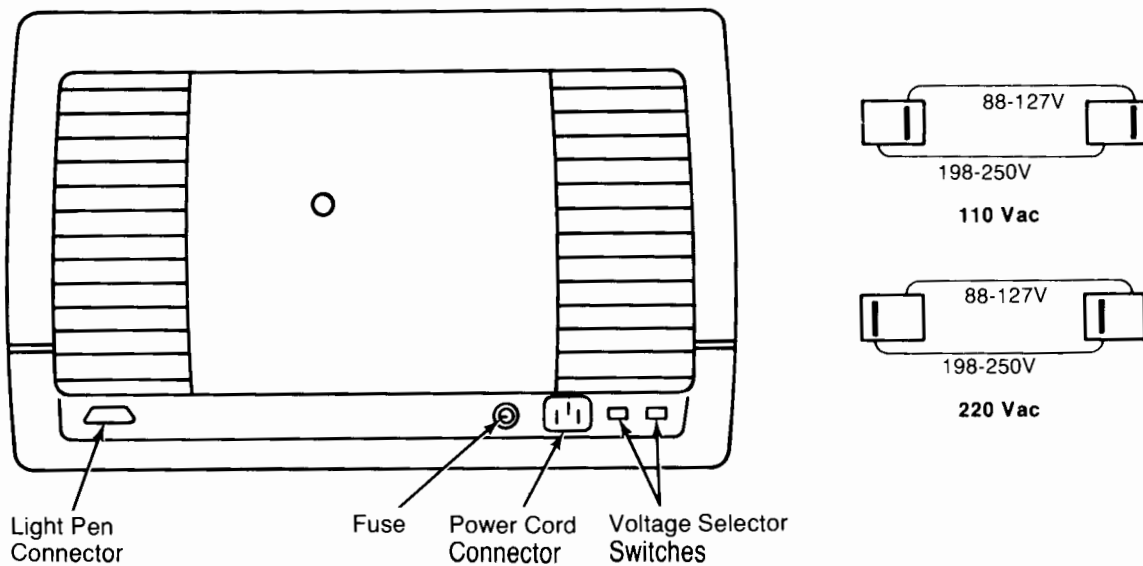
Warning: This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested for compliance with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

9020A and 9020C Display: Voltage Switches, Power Cord, and Fuse

The displays of the 9020A and 9020C can be set to operate on one of two nominal line voltages, as indicated by the drawings. The switches on the back of the display were preset to the line voltage in your area when the display was shipped. Check the switch settings to ensure they are set correctly:



9020A Display



9020C Display

WARNING

TO AVOID DAMAGE TO THE COMPUTER, ALWAYS DISCONNECT IT FROM ITS AC POWER SOURCE BEFORE SETTING A VOLTAGE SELECTOR SWITCH.

To alter the setting of a switch, disconnect the display from its power source. Next, slide the switch so that the position of the slot corresponds to the correct voltage, as shown above.

CAUTION

CHECK THE SELECTOR SWITCH SETTING ON THE COMPUTER'S DISPLAY BEFORE APPLYING POWER. DAMAGE TO THE COMPUTER WILL OCCUR IF A SELECTOR SWITCH IS SET TO 110 VOLTS AC AND 220 VOLTS AC IS APPLIED TO THE POWER INPUT CONNECTOR.

The color display has its own power cord and fuse. Attach the supplied separate power cord to the display. Plug the other end of the power cord into an appropriate ac outlet.

WARNING

TO AVOID THE POSSIBILITY OF SERIOUS INJURY, DISCONNECT THE AC POWER CORD BEFORE REMOVING OR INSTALLING A FUSE.

A different fuse is required for each voltage range (120 Vac and 240 Vac) setting on the color display. The proper types and ratings are listed in this table.

Fuse for 9020A Display

Voltage Rating	Fuse Rating	Part Number
250V	5A NB	2110-0010

Fuse for 9020C Display

Voltage Rating	Fuse Rating	Part Number
100V, 120V	10A NB	2110-0051
220V, 240V	6A NB	2110-0056

WARNING

ALWAYS BE SURE THAT THE CORRECT FUSE IS INSTALLED. IF AN INCORRECT FUSE IS INSTALLED, THE COMPUTER'S DISPLAY MAY BE DAMAGED. WHEN CHANGING A FUSE, MAKE SURE THAT THE REPLACEMENT IS THE PROPER RATING AND TYPE.

To change a fuse:

- Make sure that power to the computer is turned off and that both power cords are disconnected from the power outlets.
- Remove the fuse cap by pressing in on the cap while twisting it counterclockwise.
- Remove the fuse from the cap and insert the correct replacement fuse (either end) into the cap. Place the fuse and cap back into the fuse holder.
- Press on the cap and twist it clockwise until it locks into place.
- This completes the fuse installation procedure. You may now reconnect the power cords to the computer and display.

Power cords for the 9020A, 9020B, or 9020C mainframe must be installed by an HP Customer Engineer. However, you may order and install the power cord for the 9020A or 9020C display yourself.

5. Installing Interface Cards

Interface cards allow your computer to communicate with peripheral devices (such as plotters, terminals, and printers) as well as other computers. To install an interface card, you must first open the outer door on the right side of your computer.

Note

Make sure that power to the computer is turned off before attempting to install an interface card. Opening either of the computer's inner doors (left or right) while the computer is on results in an immediate power down of the system. **Any data and/or programs resident in computer memory at that time are lost.**

Should this occur, turn the computer's power switch to the **OFF** position and then complete the interface installation procedure.

- a. Place your fingertips in the grooves located at the right side of the display supports and pull out and down. The outer door will swing open. The card cage that holds the interface cards is located behind the exposed interior door.
- b. Twist the locking screws counterclockwise and pull the interior door open (a small flat-blade screwdriver may be required to turn the locking screws).

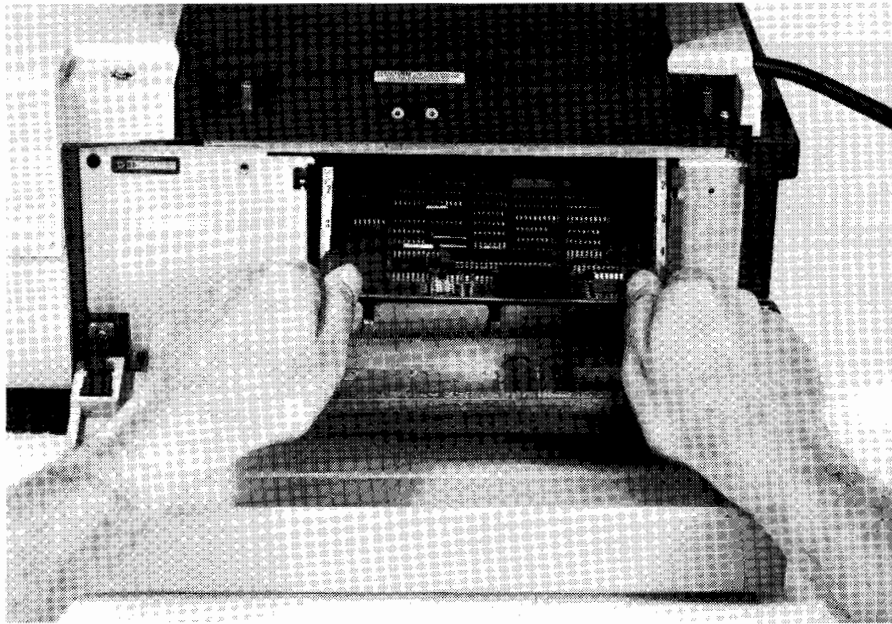
CAUTION

STATIC DISCHARGE CAN DESTROY COMPONENTS ON AN INTERFACE CARD. HANDLE THE CARD BY USING ITS ANTI-STATIC CONTAINER OR BY THE EJECTORS ON THE CARD. DO NOT TOUCH THE ELECTRICAL TRACES OR SET THE CARD ON ANY SURFACE OTHER THAN ITS ANTI-STATIC CONTAINER.

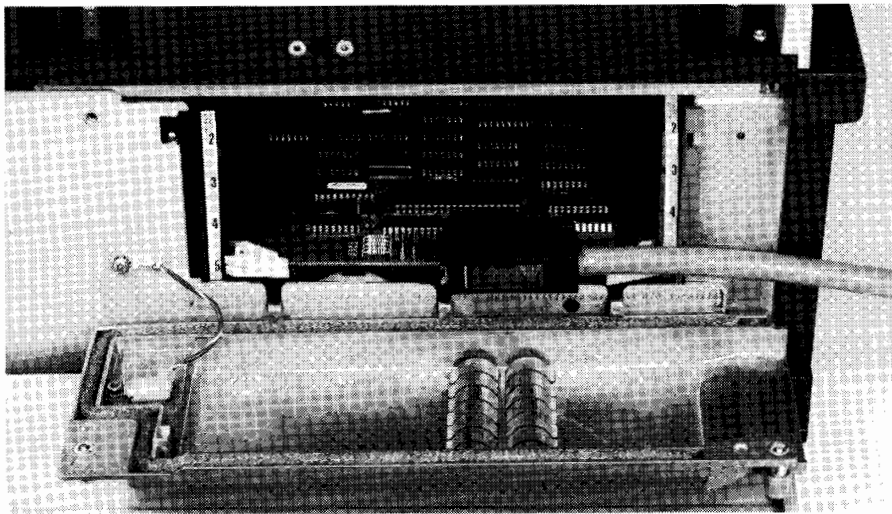
- c. Remove the interface card from its anti-static container and check switch settings and other requirements according to Appendix A.
- d. Holding the interface card by its ejectors, insert it in any available slot and slide the card in (see top photo on next page). The slot occupied by an interface card determines the select code of the card and the select code of all peripherals connected to the computer via that card (refer to the paragraph entitled Select Codes, on the next page).
- e. To seat the card, grasp the edge of the card cage with your fingertips and push firmly on the ejectors with your thumbs. The ejectors should be flush with the edge of the interface card.
- f. Attach the interface cable to the interface card (see bottom photo on next page).
- g. Close the interior door of the computer. Push in and turn the fastening screws clockwise until tight (again, a small flat-blade screwdriver may be needed).
- h. Close the outer door of the computer.

To connect the interface cable to a peripheral, refer to the manual for that peripheral.

To remove an interface card, pull the ejectors from the center of the interface to the near edge. Pull the interface card out of the slot and place it in its anti-static container.



Installing Interface Card



Attaching Interface Card

Select Codes

Each slot in the card cage is assigned a unique number called a select code. An interface occupying a slot assumes that slot's unique select code. The select code is used by the computer to "talk" to the interface card, and thus the peripheral(s) connected to that interface. Four slots are provided in the computer's card cage for your use. Select codes are assigned to the slots sequentially, beginning with the top slot (select code 2) through the bottom slot (select code 5). Additional slots are available by adding an HP 97098 I/O Expander.

6. Connecting an I/O Expander

If the four supplied I/O slots are not sufficient for your application, you may connect a maximum of two HP 97098 I/O Expanders to your computer, each of which provides eight additional I/O slots. Each I/O expander requires the dedicated use of an I/O processor. I/O processors must be installed by Hewlett-Packard when the computer is manufactured or by an HP Customer Engineer once the computer has been delivered to you. After the I/O processor is installed you may connect the I/O expander yourself.

To connect the I/O expander:

- a. Open the left side exterior door. One or two connectors should be visible on the outside of the interior door.
- b. Remove the protective cover from the I/O processor by twisting its fastening screws counter-clockwise (a small flat-blade screwdriver may be needed). Save the cover for later use (see note below).

CAUTION

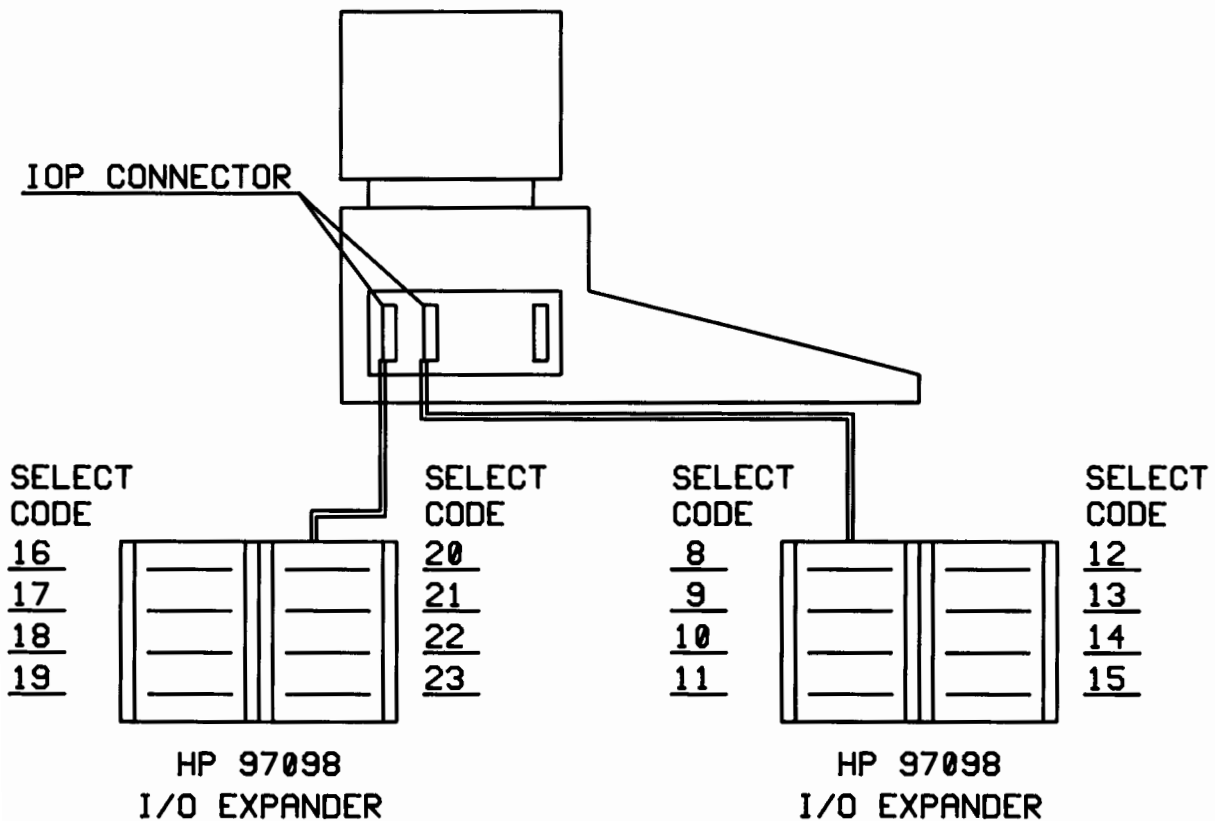
STATIC DISCHARGE CAN DESTROY THE I/O PROCESSOR. DO NOT TOUCH THE CONNECTOR WHEN ITS PROTECTIVE COVER HAS BEEN REMOVED.

Note

To minimize RFI (radio frequency interference) leakage, the I/O processor connector must always be covered with the supplied protective cover when the connector is not attached to an I/O expander.

- c. Take the free end of the ribbon cable from the I/O expander and plug it into the exposed connector.
- d. Twist the two fastening screws clockwise to secure the connector in place.

The select code assigned to each I/O slot in an I/O expander depends upon the location of the I/O processor to which it is connected. The rightmost connector on the interior door connects to the second I/O processor. The I/O expander attached to this connector is assigned select codes 8 through 15. If a third I/O processor is present in the computer, its connector is the leftmost of the two connectors on the interior door. The I/O expander attached to this connector is assigned select codes 16 through 23.



I/O Expander Select Codes

7. Installing Paper in the Printer

The optional printer is an 80-character wide thermal line printer used for hardcopy output. Heat sensitive paper for this printer is available in two widths and in two colors (refer to following table).

Printer Paper

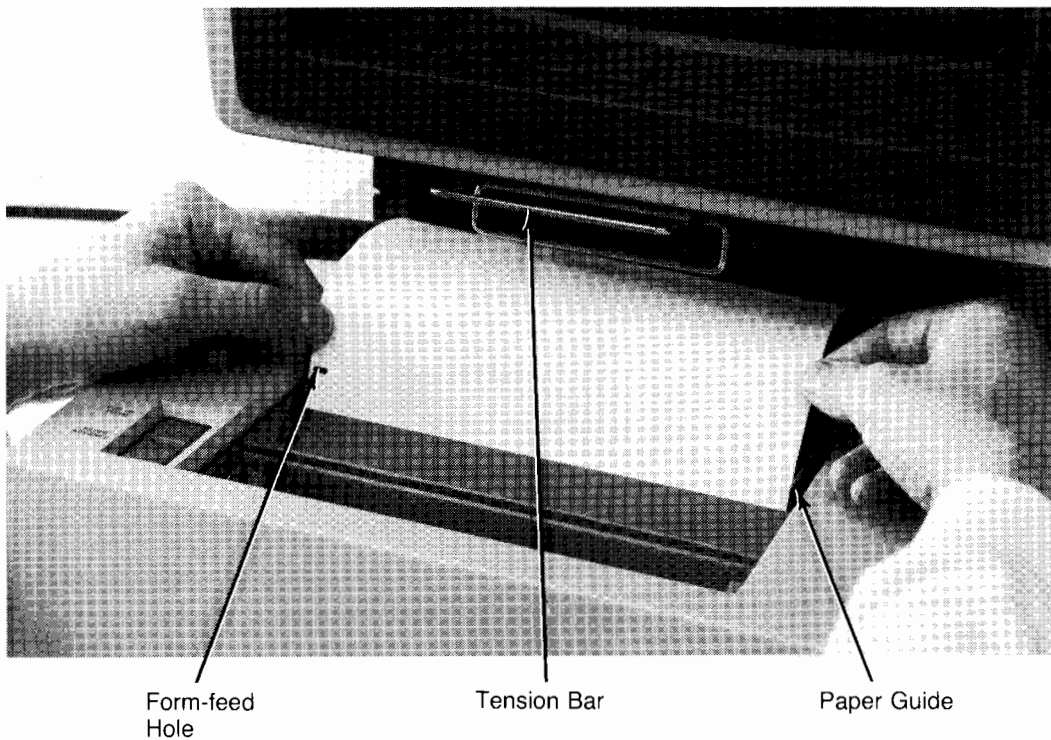
Print Color	Paper Size	Part Number
Black	8.5 x 11 inch	9270-0640
Blue	8.5 x 11 inch	9270-0641
Black	210 x 290 mm	9270-0642
Blue	210 x 290 mm	9270-0643

CAUTION

HP SUPPLIED THERMAL PAPER IS FORMULATED SPECIFICALLY TO WORK WITH THE COMPUTER'S BUILT-IN PRINTER. THERMAL PAPER FROM OTHER SOURCES MAY OR MAY NOT WORK WITH THE BUILT-IN PRINTER. DAMAGES CAUSED BY USING NON-HP-APPROVED PAPER ARE NOT COVERED UNDER WARRANTY OR SERVICE CONTRACT.

To install paper in the printer:

- a. If your computer is not already turned on, switch the power switch to the **ON** position. Ignore any error messages displayed.
- b. The paper tray is located directly behind the printer, under the display. Remove the paper tray from the computer by lifting slightly on the front of the tray and pulling out.
- c. Lift the tension bar on the paper tray and insert the stack of paper. Place the paper in the paper tray such that when the top sheet is pulled out to the printer, the form-feed hole is in the near left corner of the page.
- d. Replace the paper tray.
- e. Place the end of the paper against the paper feeder as shown. Adjust the paper guide so that it just touches the right edge of the paper.



Installing Paper in the Printer

- f. Press the Paper Advance key until the paper threads through and appears at the front of the printer.
- g. Lower the tension bar on the paper tray. The printed output should feed over the tension bar on the paper tray.
- h. If the paper is not exactly square in the printer, try pressing the form feed key once or twice while pushing the paper guide to the edge of the paper. The system attempts to align the paper with the left edge of the printer.

8. The Next Step

Now that your computer is installed, you are ready to power up the computer and test the system. Information and instructions for testing the system are provided in the next chapter.

Chapter 2

Testing Your Computer

Introduction

This chapter contains procedures for testing your computer system hardware. The procedures allow you to verify that your computer system is operating correctly. If the system is not operating correctly, these procedures allow you to identify which portions of the system are not operating correctly.

The Module Self Test tests the individual hardware modules which make up your computer. When you suspect that your computer hardware is not operating correctly, run the Module Self Test. Record any errors found (including all values displayed with any error messages) and report them to your HP Customer Engineer when you call for service.

The Module Self Test is performed automatically each time power to the computer is switched on. When an operating system is loaded at powerup, results of the Module Self Test are displayed.

Portions of the Module Self Test are run each time the BASIC language statements SCRATCH ALL and LOAD BIN are executed; all modules are tested except the CPU, IOP(s), and memory. There are no HP-UX commands which cause the Module Self Test to run.

If you have HP-qualified service personnel and intend to service your computer, you may want to order additional tests which are available. Contact your HP Sales and Support Office for additional information.

Interpreting Test Results

Test results are printed on the computer's display or on the built-in printer. When the computer successfully passes its tests and the BASIC Language System is loaded, the message:

```
BASIC Ready for use.
```

is usually displayed. However, a BASIC error message may be displayed instead if an error has occurred during the system initiated LOAD "AUTOST" or LOAD BIN "AUTOBIN" (which automatically occur each time the computer is powered up with the BASIC Language System).

If no error is detected by the test and the HP-UX operating system is loaded, the system initializes as usual, executes the /etc/rc shell script and displays the login prompt:

```
login:
```

Informational Messages

The message (issued at completion of power up):

```
Clock and date not set.
```

indicates that the contents of NVM (non-volatile memory; such as the time or date) are invalid at power up or that the time/date have not been set since this condition was last detected. This message provides information; it does not necessarily indicate that a hardware error exists.

The computer is designed to operate in an environment with ambient temperature 50-104°F (10-40°C). When the internal temperature of the computer (at the power supply) enters the range 124-207°F (51-97°C), the message:

```
INTERNAL TEMPERATURE APPROACHING MAXIMUM;  
POWERDOWN MAY OCCUR WITHOUT WARNING
```

is displayed. If the internal temperature at the power supply rises above 207°F (97°C) the computer automatically shuts down to prevent damage to the internal components. Should this happen, all programs and data contained in the computer's memory are lost. To restart the computer, you must first turn the power switch to the OFF position. Allow the computer to cool for about 5 minutes and then power up again.

Error Indicators

Most of the errors identified by the Module Self Test are non-fatal errors. That is, a hardware error may exist in a module; however, that error does not restrict access to or use of the rest of the computer. Messages identifying these non-fatal errors have the form:

```
Self test error N: ...
```

The information listed after the error number (represented here as N) identifies the faulty module and the type of error detected.

If a memory fault is detected, the computer denies access to that section of memory and issues the message:

```
Self test error 4: Memory reduced to: XXXXXXXX Bytes
```

Even if the amount of memory is reduced, you can continue using your computer; call for service when it is convenient for you.



Fatal Errors

If one of the following messages is displayed:

```
System halted due to double bit memory error on MC # NN CCCCCC
Insufficient memory to start system
Incompatible IOPs
```

an error has been detected in an essential hardware module and access to the system is denied. This type of error is called a fatal error.

If the computer is unable to successfully load and run an operating system (due to a major module failure), no message is displayed; instead, the computer **beeps once every two seconds**.

If, due to a major memory failure, the system is unable to complete its power up sequence, the computer **beeps once every 0.5 seconds**.

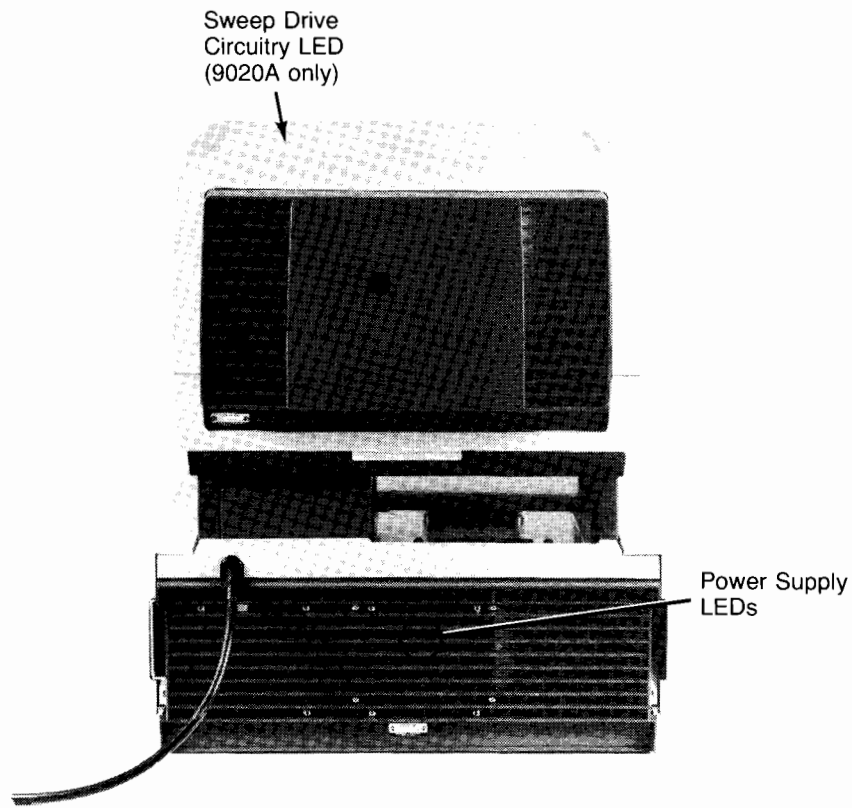
A lack of any kind of a message indicates that a major hardware fault exists (the computer cannot talk to the display).

If No Message Is Displayed ...

If no message is displayed when the Module Self Test is run, LEDs (Light Emitting Diodes) on the computer are used to identify the faulty module. When a module is tested, the LED associated with that module should first light, and then turn off (except where noted). If the LED does not light at all or lights and does not turn off, a hardware error exists in that module. Test all modules, noting which one is in error and then call your HP Customer Engineer.

The following procedure indicates the location of the LEDs and the recommended order in which they should be checked. Since the test runs very quickly and since the LEDs are found at different locations on the computer, you will need to run the test for each module that you wish to check. If you are using the power switch to initiate the test, make sure that you allow one or two seconds to elapse between turning power off and turning power back on each time.

1. Switch on power to the computer. Listen to verify that the fans at the back of the computer are operating. If they are not, make sure that the computer is plugged in and that power is present at the power outlet. If the display is equipped with a fuse and power cord, insure that the fuse is intact and that the power cord is plugged in.
2. With computer's power switch in the on position, look directly into the center exhaust fan at the back of the computer. One yellow LED and one green LED should be visible and glowing (see following photo). If the green LED alone is lit, a problem may exist in the computer's power supply. Make sure both inner doors are closed properly. If this does not fix the problem, discontinue this test and call your HP Customer Engineer. If neither LED can be seen, make sure that all power cords are plugged in.
 - a. If you are testing a 9020A, verify that the display's sweep drive circuitry is operating properly. Look for a green LED at the position indicated in the following photograph. If the LED is lit, the circuitry is operating properly.

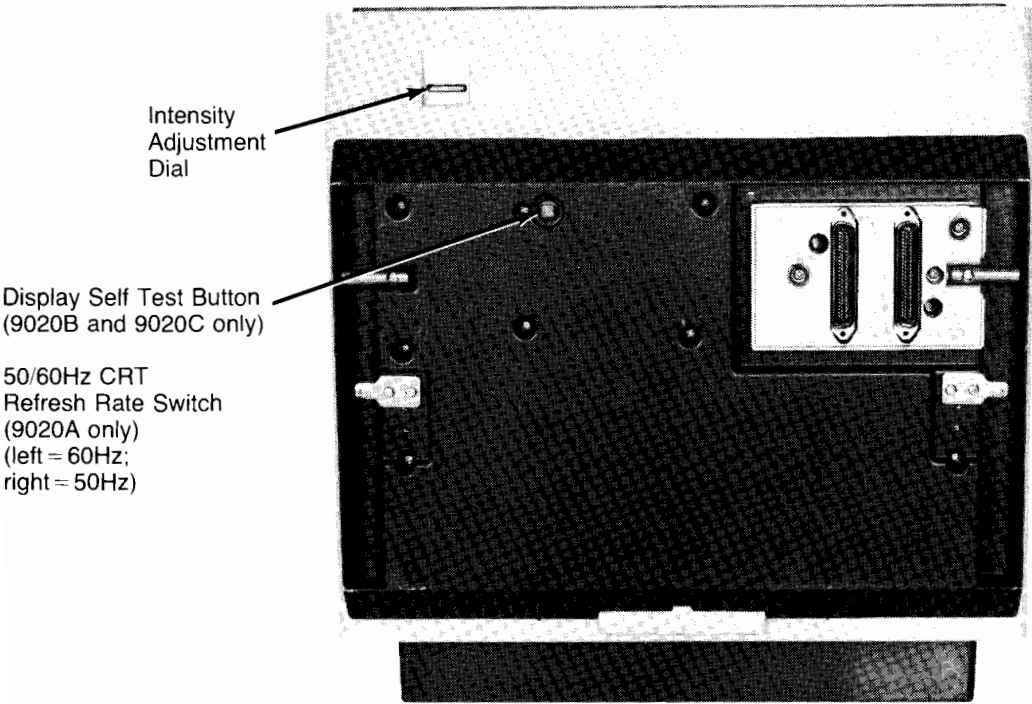


Self Test LEDs, Back and Top

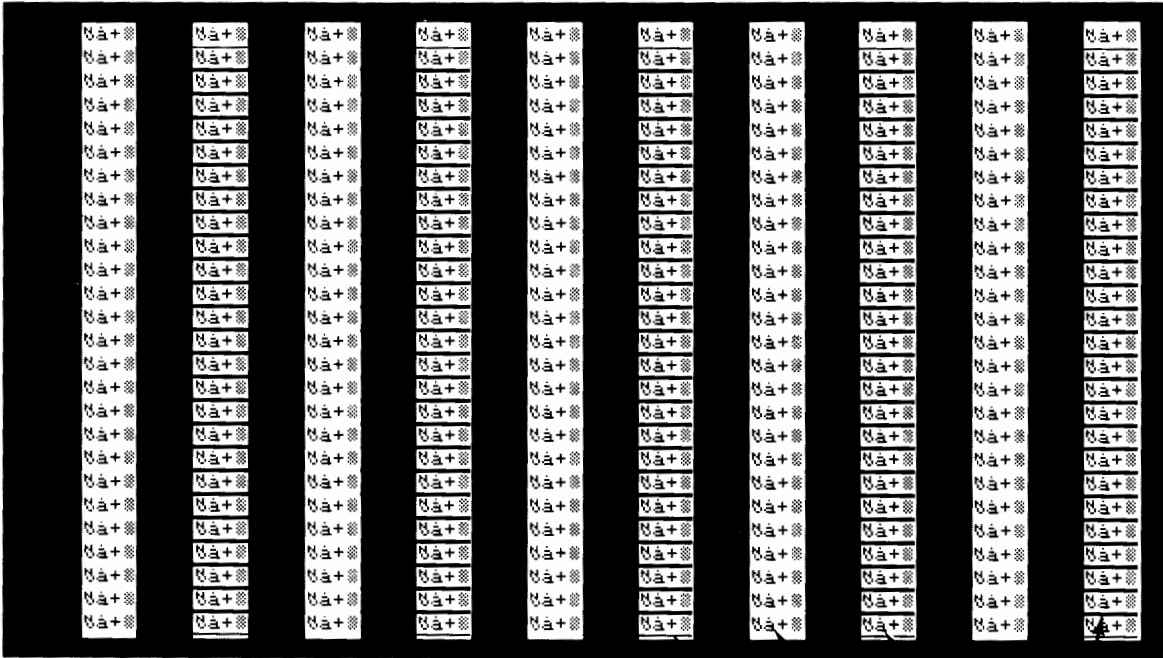
3. Next, you should verify the operation of the display (9020B and 9020C only). Press the self test button located under the display (see photo on next page). The test pattern generated should match the applicable test pattern of the two shown on the following pages. Testing the display does not affect computer operation or alter the contents of memory.

Note

The display self test pattern changes when the computer is in the insert character mode (9020B only). If the pattern generated does not match the appropriate pattern below, try pressing **INS CHR** and repeat the test. If the pattern still does not match, assume a hardware failure and call your HP Customer Engineer.

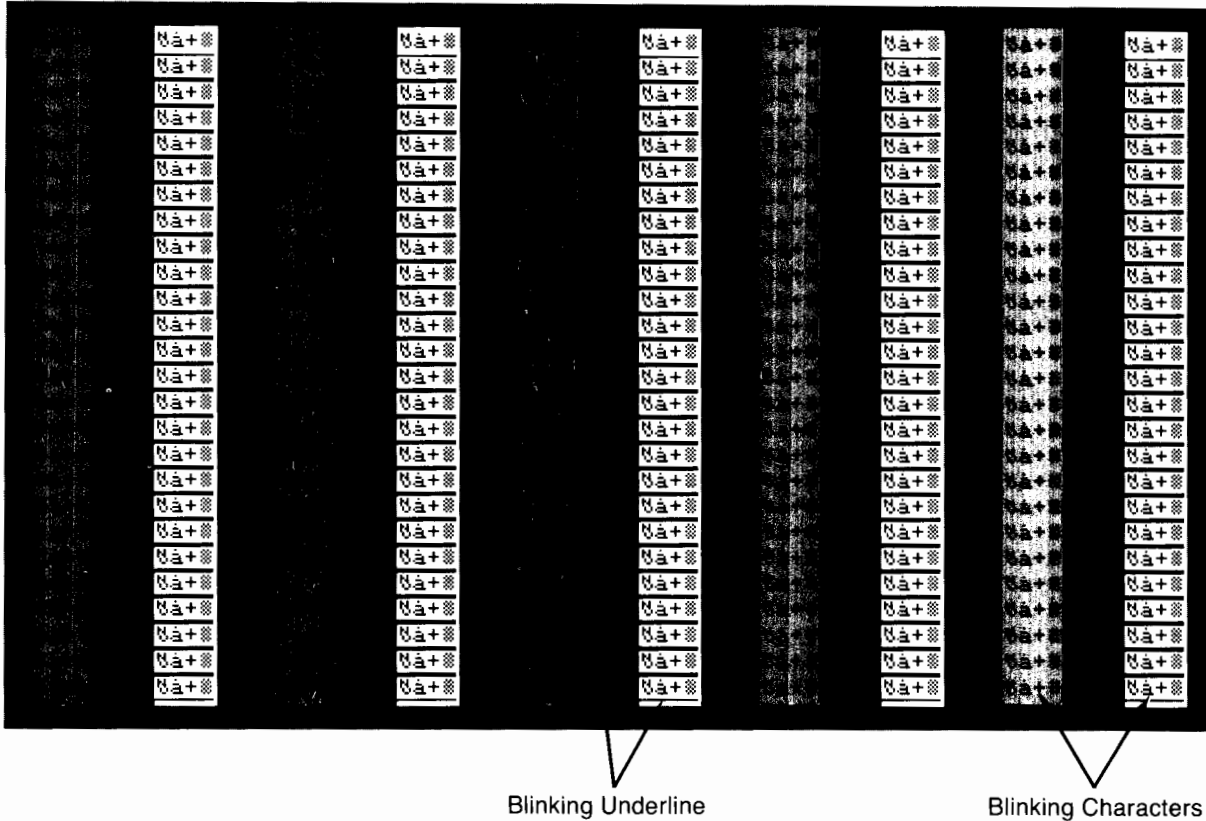


Bottom of Display



Blinking Underline Blinking Characters Blinking Overline

Test Pattern for the 9020B Display

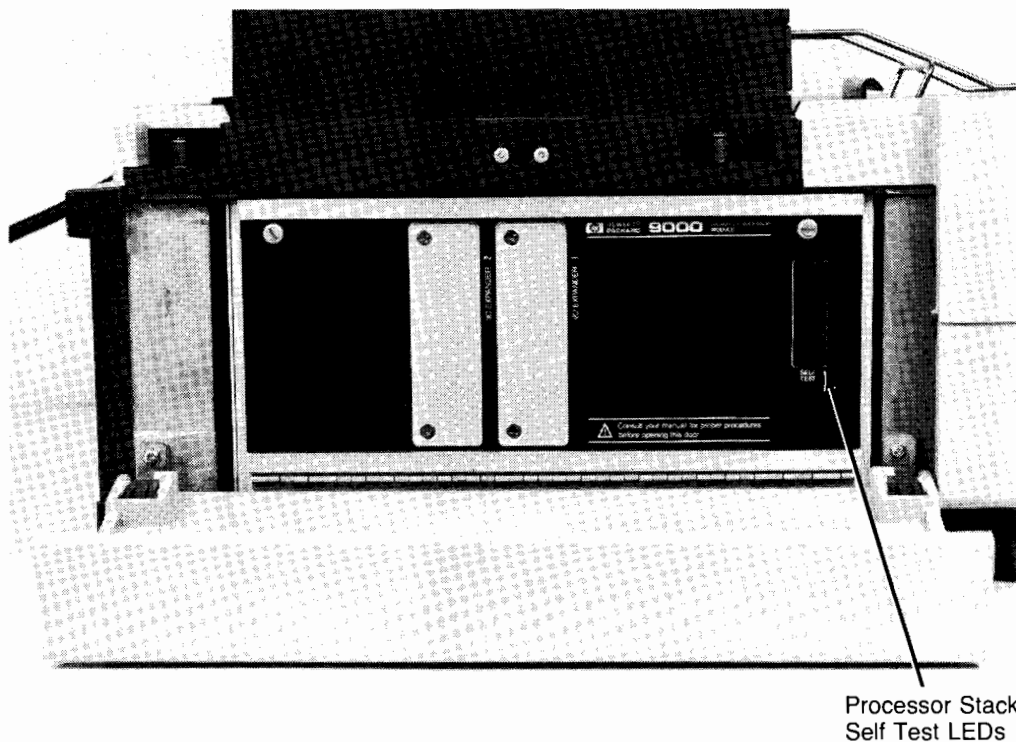


Test Pattern for the 9020C Display

4. Test the computer's keyboard by initiating the Module Self Test (switch off power to the computer, wait a few seconds and switch the power on again). Shortly after the test is initiated (approximately 1 to 3 seconds), the LED directly to the left of the **CAPS** key should light and then extinguish. If the BASIC Language System is being loaded, the LED will again light and remain lit.

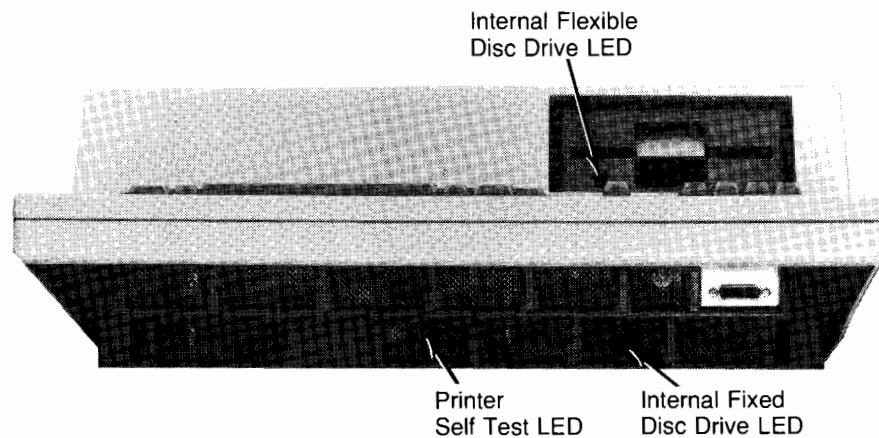
You may verify the operation of the keyboard without the aid of the Module Self Test by pressing the **CAPS** key (an operating system must be present in the computer). The LED directly to the left of the key should switch from off to on or from on to off when the keyboard is operating correctly.

5. Open the left side exterior door of the computer. Look through the window located on the interior door and initiate the Module Self Test (switch off power to the computer, wait a few seconds, then switch power on again). A column of numbered LEDs lights and then turns off (see the following photo). If any of the numbers fail to extinguish, record the number and report it to your HP Customer Engineer when calling for service.



Self Test LEDs, Left Side

6. Next, verify operation of the optional built-in thermal printer. Position yourself such that you can see directly into the vent located on the bottom of the computer, under the keyboard (see following photo). While watching the vent that covers the printer self test LED, switch off the computer's power, wait a few seconds, and switch on power again. The LED should first light, then turn off.



Self Test LEDs, Front

You may test the printer without the aid of the Module Self Test by simultaneously pressing the Paper Advance button and the Top of Form button (in much the same fashion as you use **SHIFT** on a typewriter). The contents of read/write memory are not altered. The output generated should exactly match the following pattern (except the date of the printer firmware).

[illegible]

Sample Printer Output

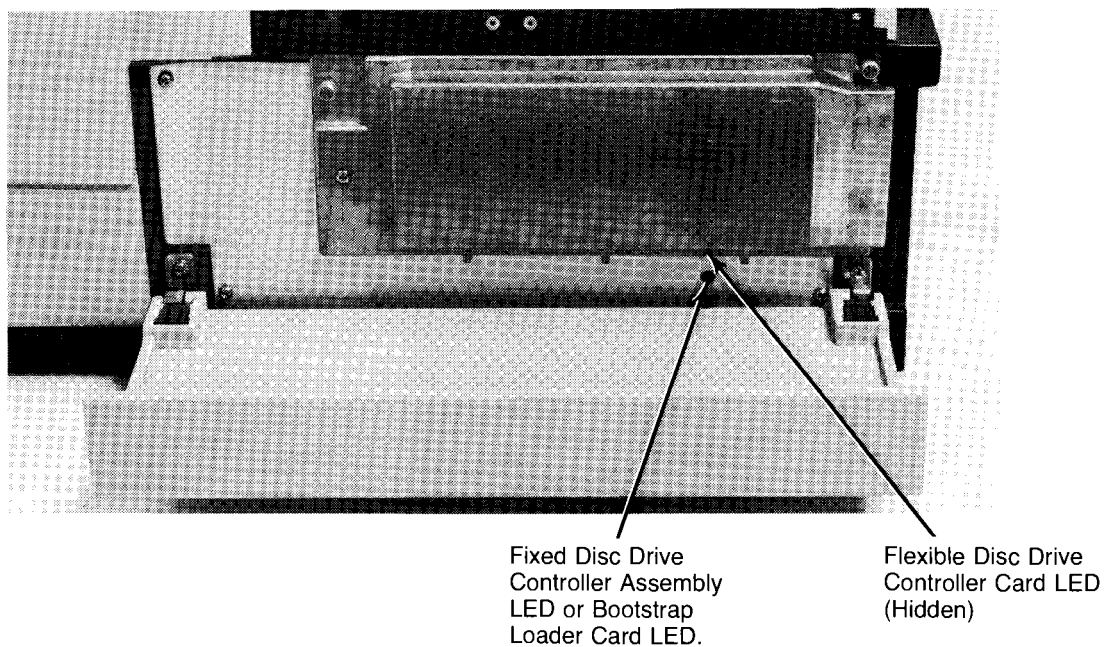
- Next, test the built-in flexible disc drive. Place an initialized disc in the computer's built-in disc drive (the test does not alter any data or programs on the disc). Switch off the computer's power, wait a few seconds, and then switch power on again. The LED located just below and to the left of the disc drive door should first light, then turn off again (see preceding photo).

Open the right side exterior door of the computer. The flexible disc drive controller card has an LED that is visible through the upper hole in the I/O area cover (see following photo). The upper hole is partially covered by the I/O door. While observing the controller card LED through the upper hole, switch off the computer's power, wait a few seconds, and then turn the power on again. The controller card LED should turn on and off once.

8. Finally, test the optional internal fixed disc drive and its controller assembly, or the bootstrap loader card, depending on your configuration.

The disc drive LED is visible through an air vent under the keyboard (see preceding photo). The controller assembly LED is visible through the middle hole in the I/O area cover (see following photo). Turn the computer off, wait a few seconds, and then turn power on again. The drive LED should light while the drive is being accessed; the controller assembly LED should be on while the drive is being accessed and then should turn off and stay off.

If you don't have an internal fixed disc drive, the bootstrap loader card LED is visible through the middle hole. When power is turned on, this LED should go on and then go off and stay off.



Self Test LEDs, Right Side

Now that you have completed the Module Self Test, any hardware error existing in your computer should be identified. If no problem is found and you still suspect a hardware problem in the system, call your HP Customer Engineer.

Chapter 3

Maintaining Your Computer

WARNING

LETHAL VOLTAGES ARE PRESENT INSIDE THE COMPUTER. THERE ARE NO CUSTOMER SERVICEABLE PARTS INSIDE YOUR COMPUTER.

Cleaning the Computer

The computer has been painted with a durable water-based paint. It is both non-toxic and environmentally safe. It will preserve the appearance of your computer for many years.

CAUTION

CHEMICAL SPRAY-ON CLEANERS USED FOR APPLIANCES AND FOR OTHER HOUSEHOLD OR INDUSTRIAL APPLICATIONS MAY DAMAGE THE COMPUTER'S FINISH. THESE OR OTHER CHEMICAL CLEANERS SHOULD NOT BE USED.

A non-abrasive eraser may be used to remove pen and pencil marks. Before cleaning other soiled area, turn off the computer and remove the power cord(s) from the outlet. Disconnect any interconnecting cables. Dampen a clean, lint-free cloth in clean water. Wipe the soiled areas with the cloth, ensuring that no water gets inside the computer. For cleaning more heavily soiled areas, a solution comprised of 80% clean water and 20% isopropyl alcohol may be used. Wipe the cleaned areas with a clean, soft, lint-free cloth dampened in clean water, then dry the case with a dry, soft, clean cloth.

CAUTION

DO NOT USE DETERGENTS THAT CONTAIN AMMONIA, BENZENES, CHLORIDES OR ABRASIVES.

Cleaning the Air Vents

Your computer is cooled by air drawn into the computer through air vents located under the front of the computer. To ensure that your computer runs at the proper operating temperature, these vents must be kept free of dust, lint, and other obstructions. Vacuum the protective grill on the air vents as necessary.

Cleaning the Light Pen

If your computer is equipped with a light pen, its lens must be periodically cleaned to remove dust that can interfere with its operation. Wipe the lens a few times with a cotton applicator that is dampened with a magnetic head cleaning fluid. Make sure that the lens is dry before using the light pen.

Degaussing and Converging the 9020C Color Display

When using the 9020C, colors may appear to accumulate in one or more portions of the display or the entire display may tend to take on a continuous hue (thus the background is no longer black). This is caused by magnetic or static buildup on the surface of the screen. To remove this excess buildup on the screen, you must **degauss** the display. This may be done by simply turning the computer off and then turning it on again.

Flexible Discs

Your computer's built-in flexible disc drive uses standard 5-1/4 inch flexible discs. The flexible disc is a thin piece of plastic enclosed in a special plastic packet. The disc is covered with a thin oxide coating on which your programs and data are stored.

When you insert the disc in the drive and close the door, the drive is ready to read information from or write information onto the disc. When the computer requests a read or write, the disc spins at a constant rate, like a phonograph record. The red LED on the disc drive lights to indicate when reading or writing is taking place. **Do not attempt to remove a disc from the drive when the LED is lit.**

The built-in disc drive reads and writes on both sides of the disc and requires double-sided, double-density discs. Boxes of ten double-sided 5-1/4 inch flexible discs are available from Hewlett-Packard by ordering HP part number 92170A.

CAUTION

HP-SUPPLIED FLEXIBLE DISC MEDIA IS DESIGNED TO WORK SPECIFICALLY WITH HEWLETT-PACKARD FLEXIBLE DISC DRIVES. FLEXIBLE DISCS FROM OTHER SOURCES MAY OR MAY NOT WORK WITH YOUR BUILT-IN FLEXIBLE DISC DRIVE. DAMAGES CAUSED BY USING NON-HP-APPROVED DISC MEDIA ARE NOT COVERED UNDER WARRANTY OR SERVICE CONTRACT.

Inserting and Removing Discs

Open the drive door by pressing just above the handle with a fingertip. Make sure that there is not another disc in the drive already. Insert the disc as shown and close the door.



Inserting and Removing a Disc

To remove the disc, first open the drive door by pressing just above the handle with a finger tip. Remove the disc and close the door.

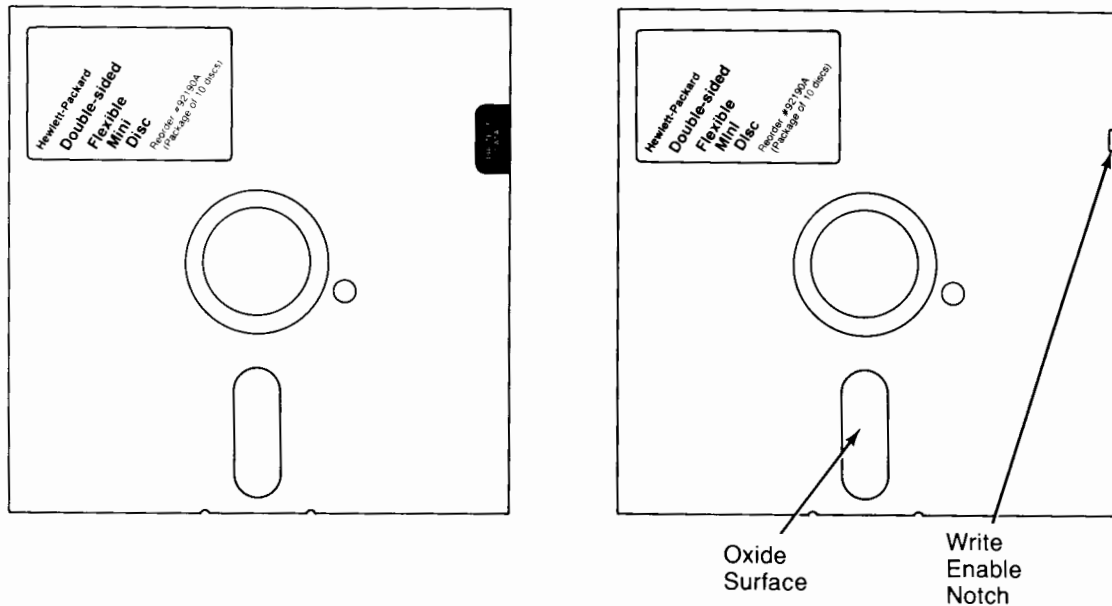
Be sure to return the disc to its storage envelope when not in use. This keeps dust from getting on the oxide surface.

CAUTION

IF YOU ACCIDENTALLY INSERT ANOTHER DISC WHEN ONE IS ALREADY IN THE DRIVE, **REMOVE THE BOTTOM DISC FIRST**. OTHERWISE, THE READ/WRITE HEADS OF THE DISC DRIVE COULD BE DAMAGED.

Write Protection

Covering or uncovering a notch in the disc jacket determines whether the disc drive can write information on the disc. When the notch is covered, the computer is prohibited from writing on the disc; thus information already on the disc is protected from being written over or erased. This is useful when a disc contains source information which should only be read (such as a disc containing an operating system).



Disc Write Protection

Flexible Disc Care

Although a flexible disc is basically maintenance-free, it is delicate and must be handled carefully. Discs contain your valuable data and programs. While they are designed with the same care and quality standards as the rest of Hewlett-Packard products, they eventually wear out. The following list of suggestions is provided to help protect the data and programs stored on your discs:

- Always back up (make a copy of) valuable data and programs.
- Return each disc to its storage envelope when it is not in use.
- Store discs in an upright, dust-free container.
- Keep work area free of contaminants such as dust, smoke, ashes, and eraser particles.
- Maintain proper temperature and environment for the computer.
- Keep the disc away from magnetic fields.
- Remove the disc from the drive when it is not in use.
- Use a felt tip pen to label discs. Label discs only in area provided.
- Do not touch the exposed surface of the disc.
- Do not bend or fold a disc.
- Do not attempt to clean a disc.

Appendix A

HP-CIO Interface Cards

HP 27110A Standard HP-IB

Features

- IEEE-488-1978 compatible.
- Supports DMA with two modes of performance: High Speed Mode for operation with fixed discs or other high-speed peripherals, and Standard Mode for instruments and slower peripherals.
- Supports up to 14 device loads.
- Selectable HP-IB controller or slave capabilities and parallel poll capabilities (BASIC Language System only).
- Built-in hardware self-test.

Configuration

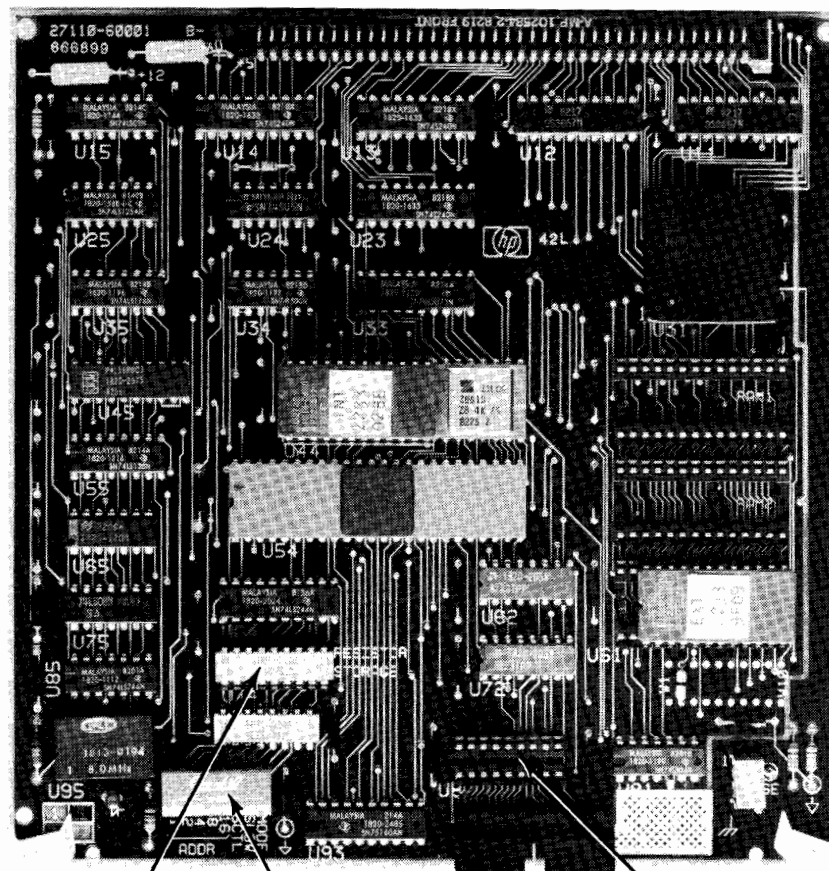
The normal switch settings are shown in the next figure.

The switch functions are:

- S1-S5: Address 30 (decimal); S1 is Least Significant Bit
- S6: System Controller On
- S7: Normal Speed
- S8: Test Mode 1

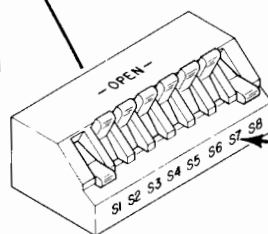
High-speed devices can run on a normal-speed bus, but run slower than their capacity. Normal-speed devices cannot run on a high-speed bus. The following are high-speed devices:

- disc drives
- 7971A tape drive
- 2608S and 2631B/G printers



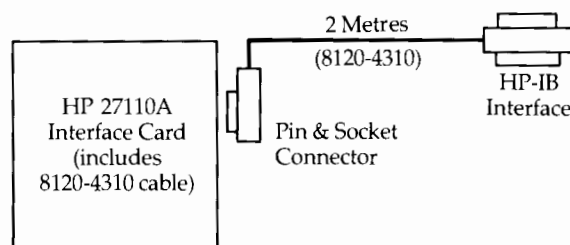
LOAD RESISTOR PACK
IN NORMAL-SPEED POSITION

MOVE LOAD RESISTOR PACK
HERE FOR HIGH-SPEED OPERATION



S7:
•UP FOR NORMAL SPEED
•DOWN FOR HIGH SPEED

HP 27110A HP-IB Interface Card



HP 27110A HP-IB Interface Cabling

HP-IB Cables

HP Product or Part No.	Length (in metres)
10833D	0.5
10833A	1.0
10833B	2.0
10833C	4.0
5060-9459	6.0
5060-9460	8.0

HP 27112A General Purpose I/O (GPIO) 16-Bit Parallel**Features**

- Choice of programmable operating modes (clocked or transparent) for ease of use with instrumentation.
- Supports +5V level on all input and output signals, plus an optional +12V level on output signals.
- Programmed data detection for either positive true or ground true levels.
- Independent 16-bit input and output buses and storage registers.
- Two control and two status lines.

Configuration

The normal switch settings depend on which peripheral device is connected to the GPIO. The 9885M/S Flexible Disc Drive and the 97060A Graphics Processor require the GPIO switch settings shown in the next figure.

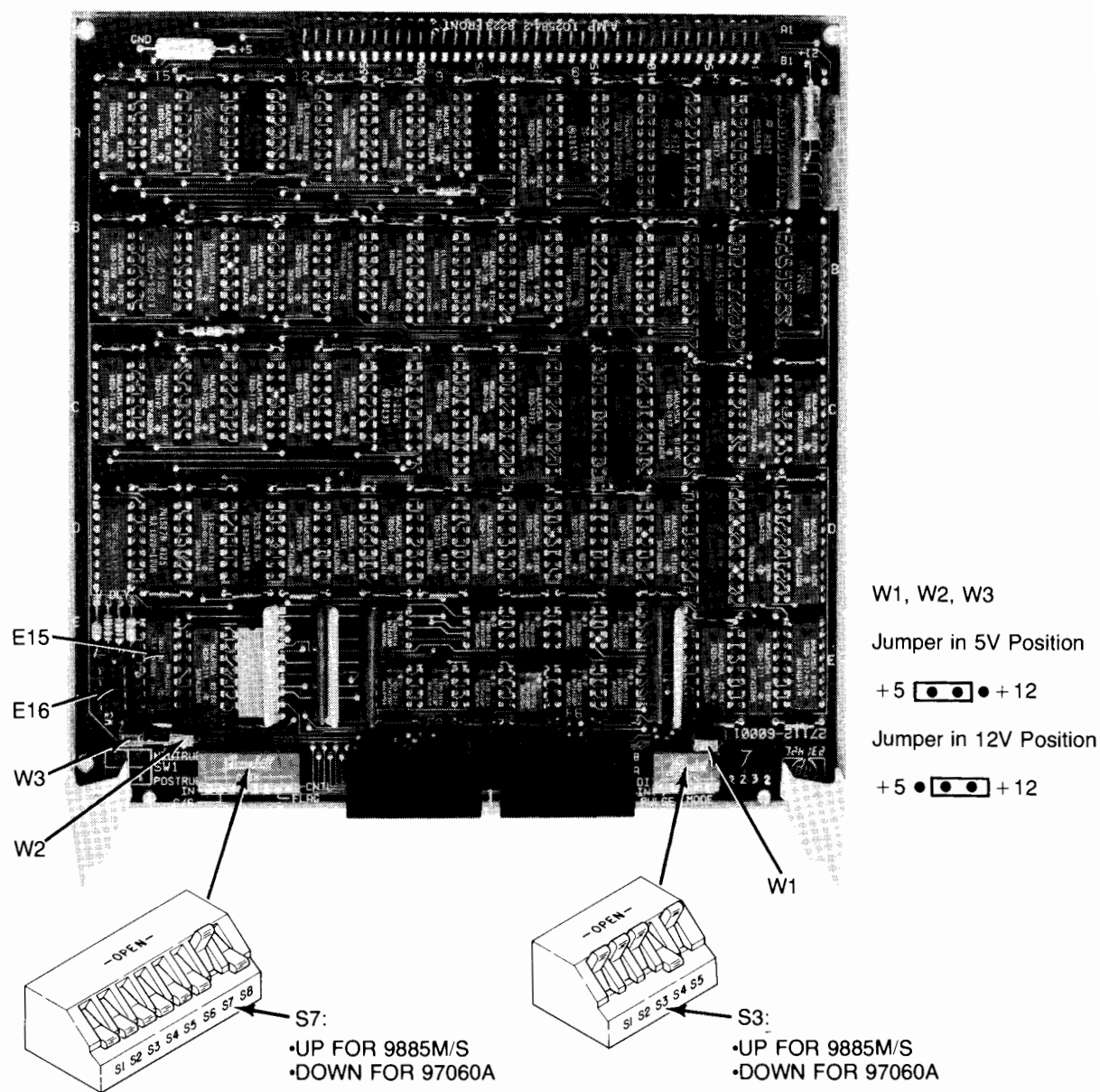
The switch setting functions are:

SW1

- S1: DIN - Negative True
- S2: CTL and STS - Negative True
- S3: PSET - Negative True
- S4: PDIR - Negative True
- S5: DOUT - Negative True
- S6: PEND - Negative True
- S7: PFLAG - Negative True (97060A)
- Positive True (9885M/S)
- S8: PCNTL - Negative True

SW2

- S1: Bidirectional Bus - Disabled
- S2: Internal Handshake - Disabled
- S3: Full/Pulse Handshake - Disabled (9885M/S)
- Enabled (97060A)
- S4 and S5: Data Clocked On Ready To Busy Edge Of PFLAG (Leading Edge)



HP 27112A General Purpose I/O (GPIO) Interface Card

To configure the GPIO card:

1. Install jumpers in W1, W2, and W3, according to whether 5-volt or 12-volt logic levels are to be used.
2. Set the card's switches for proper operation.
3. If necessary, increase the delays on the card as follows:

Two one-shots (E15) on the GPIO card generate the write delay and the internal handshake delay. The write delay one-shot provides approximately 100 nsec for the output data to settle. When extra-long cables are used, or when the peripheral device requires additional settling time for the data, the delay can be increased by adding a capacitor between pins 1 and 4 of the socket at E16.

The formula for selecting the capacitor value is:

$$C = (T - 100) / 1.5$$

where

C = additional capacitance (in pf)

T = total time delay required in nsec

The internal delay one-shot provides a delay of approximately 3 usec between the assertion of PCNTL and the assertion of FLAG. The delay can be increased by adding a capacitor between pins 5 and 8 of the socket at E16.

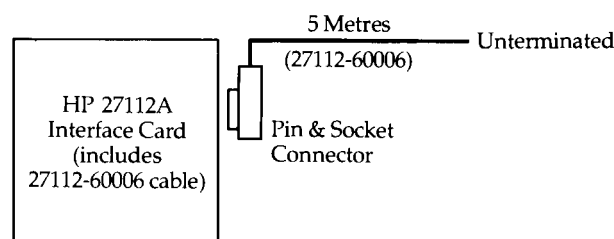
The formula for the value of the capacitor is:

$$C = (T - 3000) / 3$$

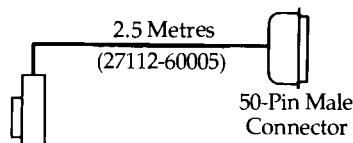
where

C = additional capacitance (in pf)

T = total time delay required (in nsec)



HP 27112A GPIO Interface Cabling

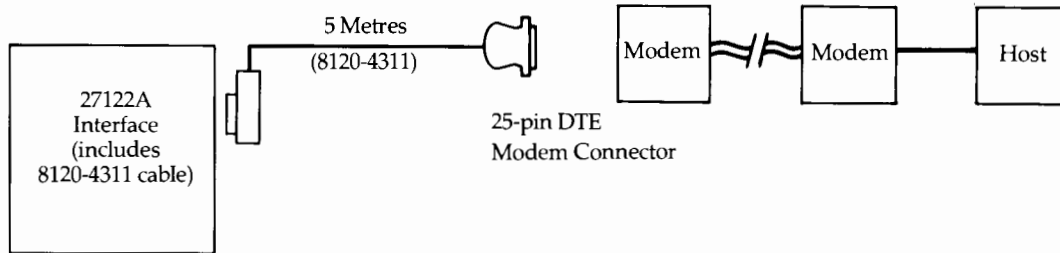


Option 001 Cable (replaces 27112-60005 cable)

HP 27122A Remote Job Entry (RJE)

Features

- 1,200 to 19,200 baud rates.
- Compatible with EIA RS-232C and CCITT V.24 specifications.
- Supports Bell type 208B, 2096, and 212 data sets or equivalent.
- Supports Siemens MSV2 protocol.
- Works with full or half duplex modems, and supports AUTO ANSWER and ORIGINATE.
- Provides link control functions: line bid, normal and transparent data modes, all responses, and link termination.
- Assures data integrity with CRC error checking.
- EBCDIC character recognition.
- Space compression/truncation.



Note: Requires 97077A or 97087A software.

HP 27122A Remote Job Entry (RJE) Cabling

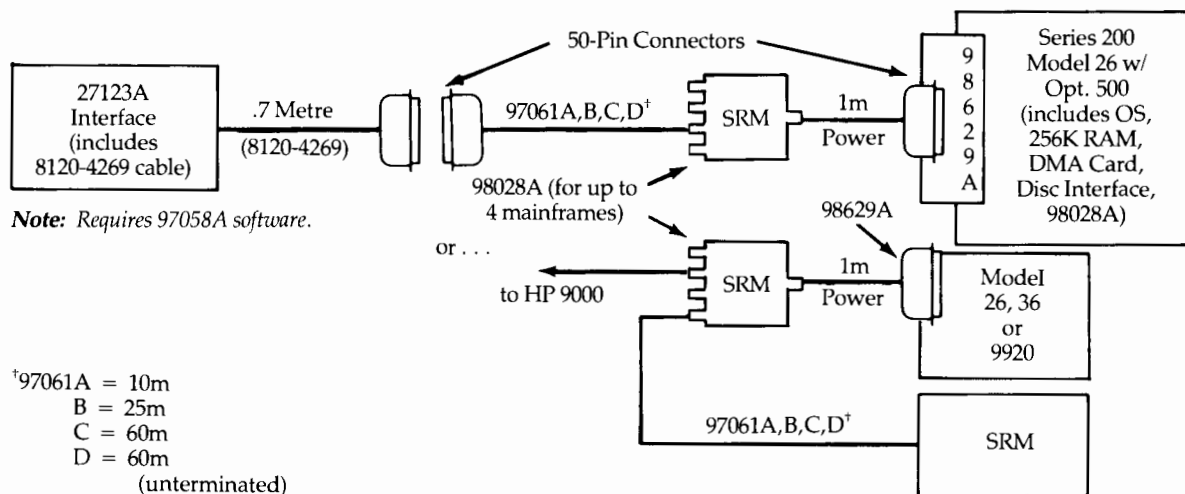
HP 27123A Shared Resources Manager (SRM)

Features

- Data transmission rate is 700 Kbits/sec.
- Access to the network through rotary polling on an HP 98028A Multiplexer (part of the SRM product).
- All transmissions are broadcast to all connections on the HP 98028A Multiplexer.
- Packets can contain up to 512 data bytes.
- Reception of packets is acknowledged.
- Remote file access to create/open/purge a file/directory, read/write bytes, set protection, and catalog.

Configuration

Ensure that the 8 switches are set to the binary equivalent of the assigned decimal node address. S1 is the MSB; S8 is the LSB.



HP 27123A Shared Resources Manager (SRM) Cabling



HP 27128A Asynchronous Serial Interface (ASI)

Features

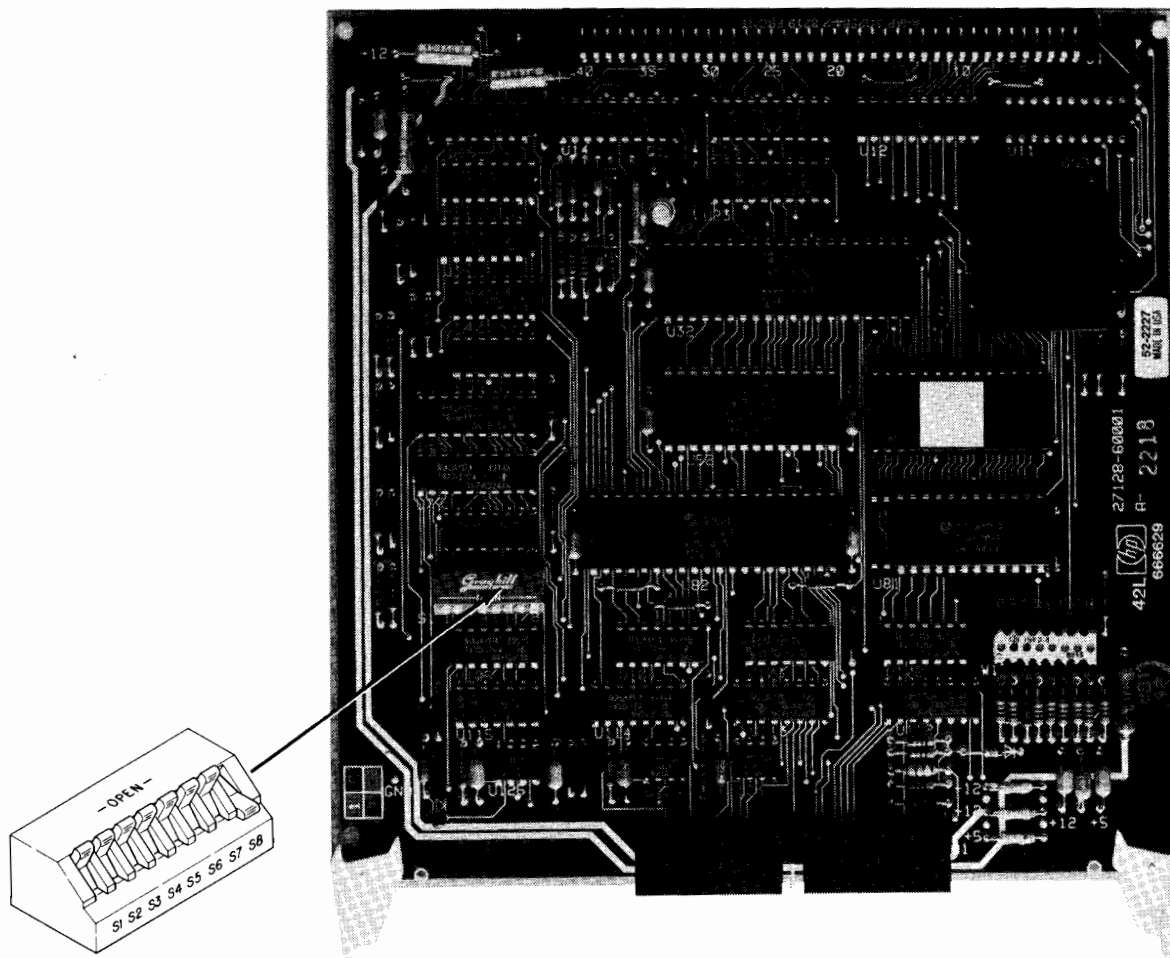
- Switch selectable and software programmable baud rate; up to 19,200 bits per second.
- EIA RS-232C, CCITT V.24, and CCITT V.28 compatibility.
- Asynchronous transmission in simplex, full duplex, and echoplex mode.
- Programmable format control and built-in framing error, overrun error, and parity checking.
- Break detection, support for X-ON/X-OFF and terminal emulation mode.

Configuration

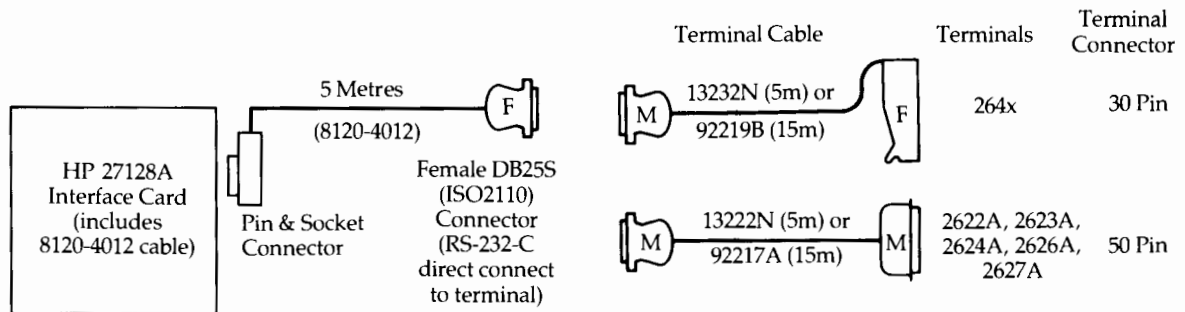
The normal switch settings are as shown in the next figure.

The switch functions are:

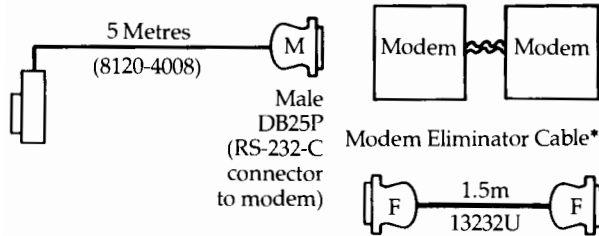
- S1: Single Text Termination
- S2: Device Directly Connected
- S3: No Parity
- S4: 8 Bits Per Character
- S5-S8: 9600 Baud Rate



HP 27128A Asynchronous Serial Interface (ASI) Card



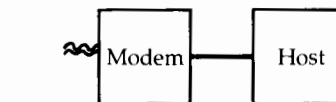
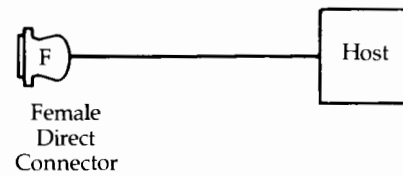
Option 001 Cable (replaces 8120-4012 cable)



* This cable replaces a pair of actual modems in the direct connect environment.



Series 500 Terminal Emulator to Host



Cabling Rules

The total distance from interface to terminal should be less than 50 feet (15m).

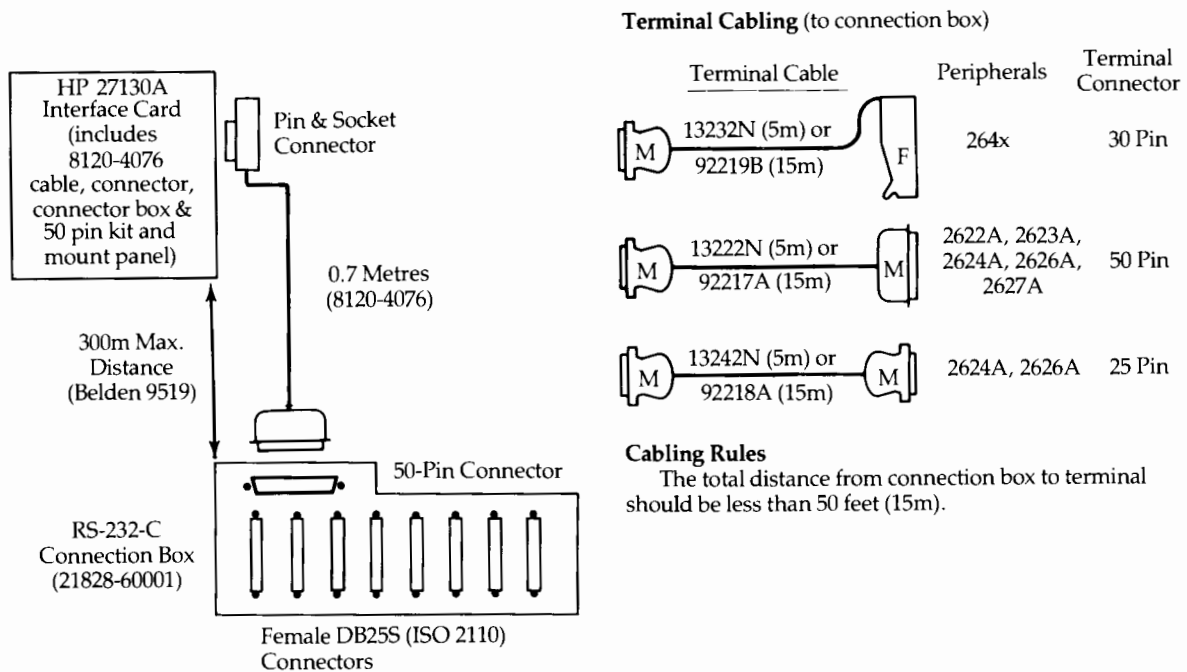
HP 27128A ASI Interface Cabling



HP 27130A Asynchronous 8-Channel Multiplex

Features

- CCITT V.28 and EIA RS-232C compatible.
- Supports simplex, echoplex, or full-duplex mode (asynchronous transmission only).
- Selection of data transmission attributes can be performed independently on each channel.
- Local intelligence reduces time consumed by the CPU during I/O transactions by offering edit functions, special character recognition, and handshake protocol control.
- Parity, overrun, and framing errors are sensed locally to detect transmission errors.
- X-ON/X-OFF (both directions) and ENQ/ACK (one direction, host sending ENQ) handshaking

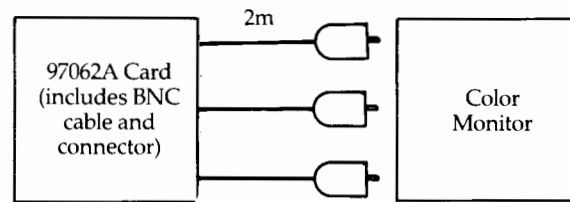


HP 27130A Asynchronous 8-Channel Multiplex Cabling

HP 97062A Color Video

Features

- Medium-resolution interface to 19-inch color monitor.
- Produces RS-343-compatible signals across three coaxial cables.
- Uses four memory planes to display 16 colors from 4096 available.
- Supports all Graphics/9000 plotter commands including area shading.



HP 97062A Color Video Interface Cabling

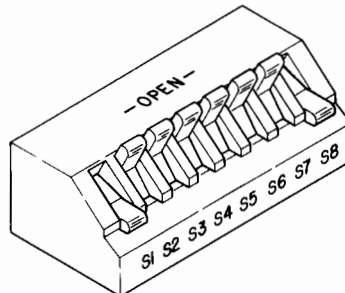
HP 2885A LAN 9000 Local Area Network

Features

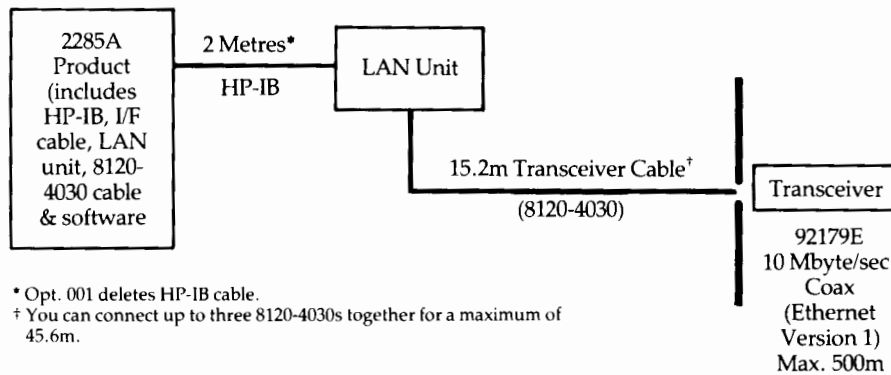
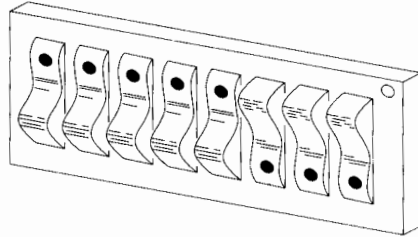
- HP-IB interface to host CPU.
- Coax cable with baseband signaling.
- 10 Mbps data signaling rate.
- Minimum separation between nodes is 2.5 metres.
- Nodes can be up to 50 metres from the coax cable.
- Masterless protocol, Carrier-Sense Multiple Access with Collision Detection (CSMA/CD).
- Up to 500-metre segment coax length and up to 100 nodes per segment.
- Supports broadcast and multicast addressing.
- User-executable diagnostics which can be run simultaneously with other network services.

Configuration

Before you install the HP-IB card, ensure that the resistor pack is installed in socket U74 (normal speed) and that the switches are set in these positions:



Set the bus address of the LAN unit to 0 by setting the switches on the back of the unit to these positions:



HP 2885A LAN 9000 Local Area Network Cabling

Appendix B

System Loader Messages

The **system loader** is a program (which permanently resides in the computer) that causes the computer to search for and load an operating system. If the computer is unable to locate and load an operating system, a message is displayed. Each of these messages is explained below. Possible causes for many of the messages are provided. If the message begins with **ERROR :**, the system halts after issuing the message. If the message begins with **NOTE :**, the message provides information and the computer continues operating.

If the message you receive indicates a hardware failure, run the Module Self Test before calling your HP Customer Engineer for service.

Often, the computer attempts to identify the device to which it was "talking" when the message was generated. A value (represented as NNNNN in the messages below) is displayed with the message. You may identify the device with the following procedure.

1. Divide NNNNN by 8; drop the fractional portion to yield an integer result. This value identifies the I/O Processor (IOP) which controls the device to which the computer was "talking" when the message was generated: 2 identifies the first IOP, 3 identifies the second IOP, and 4 identifies the third IOP.
2. Find the I/O card cage controlled by the IOP identified in step 1 above. The first IOP always controls the I/O card cage located on the right side of the computer. The second and third IOPs control I/O expanders.
3. Find the result of NNNNN modulo 8. This value specifies a slot number of I/O card cage identified in step 2 above. Find the interface card occupying this slot. (The top slot in the computer's built-in I/O card cage is slot 2; the first slot in an I/O expander is slot 0.) The computer was talking to this interface card or to a device connected via this interface card when the message was generated.

For example, if NNNNN is 29 then the second IOP is the controlling I/O processor (since the integer portion of $29/8$ is 3 and since 3 identifies the second IOP). The slot number of the I/O card cage is 5 (since $29/8$ is 3 with remainder 5; the result of modulo division is defined to be the integer remainder of the division).

Message	Probable Causes	Description
Loader XXX	Informational message identifying the revision of the system loader. This message is usually followed by a single line message identifying the operating system the computer is attempting to load.	Normal Operation
Please mount next volume.	Informational message. The loader is ready to load another portion of the operating system. Mount the volume containing an unloaded portion of the operating system. Volumes may be mounted in any order without affecting the loading process.	Normal Operation
SYSTEM NOT FOUND; WILL RETRY: XXX	Unable to find an operating system on any mass storage device. The loader will attempt to find an operating system again in XXX seconds.	Mass storage device not powered up, no media in mass storage device, wrong disc in disc drive, computer or mass storage device hardware failure, media failure, incompatible loader/system revision numbers, etc.
BAD SYSTEM FILE: NNNNN	Operating system loaded; however, an error has been detected in the operating system code during loading.	Corrupt system, media failure, mass storage hardware failure, or computer hardware failure.
INSUFFICIENT USABLE MEMORY: XXXX	The amount of usable memory is too small to load the operating system. The total amount of usable memory available is: XXXX minus 32K bytes.	Corrupt system or hardware (memory) failure.
BAD CARD OR DEVICE: NNNNN	Informational message. A hardware failure has been detected (interface card or mass storage device did not pass Module Self Test). The loader continues searching for an operating system.	Bad interface card or mass storage device.
DEVICE NOT READY: NNNNN	While loading, the device containing the operating system went "off line".	Device went off line while loading.

Message	Probable Causes	Description
VOLUME NOT MOUNTED: NNNNN	While loading, the volume containing the operating system was removed from its mass storage device.	Volume removed from device while loading.
DMA FAILED: NNNNN	Data did not transfer properly from the mass storage device to the computer.	Mass storage device hardware failure or computer hardware failure.
UNRECOVERABLE DATA: NNNNN	Part of the operating system is not readable.	Media failure or mass storage hardware failure.
END OF VOLUME: NNNNN	Attempt to address or read past the end of a volume.	Corrupt system, media failure, or mass storage device hardware failure.
CTRLR/UNIT FAULT: NNNNN	Hardware passed initial self test; however, it failed while being used to load operating system.	Computer (interface card) hardware failure or mass storage device hardware failure.
IO TIMEOUT: NNNNN	Mass storage device failed to respond fast enough while attempting to load from it.	Computer hardware failure or mass storage device hardware failure.
CS80 DEVICE: NNNNN	Indicates a mass storage device hardware failure.	Mass storage device hardware failure.
HPIB CARD: NNNNN	Transaction to the indicated HP-IB interface card was terminated due to a probable interface card failure.	HP-IB interface card failure.
KBD/SCM NOT FOUND.	Indicates a keyboard failure.	Keyboard failure.
BAD IO BUS: NNNNN	Indicates a computer hardware failure on the computer's first I/O processor.	IOP or I/O bus failure.
BAD NVM: NNNNN	Indicates that NVM (non-volatile memory) failed self test.	NVM failure.
BAD RTC: NNNNN	Indicates that the computer's built-in real time clock is not functioning.	RTC failure.

Appendix C

Error Messages

BASIC Language System Error Messages

- | | | | |
|----|--|----|--|
| 1 | Missing OPTION or configuration error | 40 | Improper COPYLINES, MOVELINES, DEL or REN |
| 2 | Memory overflow | 41 | First line number > second |
| 3 | Line not found or not in current program context | 42 | Attempt to replace, modify or delete a busy line or subprogram |
| 4 | Improper return | 43 | Matrix not square |
| 5 | Improper context terminator | 44 | Illegal operand in matrix transpose or matrix multiply |
| 6 | Improper FOR/NEXT matching | 46 | No binary to STORE BIN or no program to STORE or SAVE |
| 7 | Undefined function or subroutine | 47 | COM declarations are inconsistent or incorrect |
| 8 | Improper parameter matching | 48 | Direct recursion not allowed in a single line function |
| 9 | Improper number of parameters | 50 | File number <1 or >10 |
| 10 | String value required | 51 | File not currently assigned |
| 11 | Numeric value required | 52 | Improper mass storage unit specifier, bad subaddress specified, or bad driver name |
| 12 | Attempt to redeclare variable | 53 | Improper file name |
| 13 | Array dimensions not specified | 54 | Duplicate file name |
| 14 | Multiple OPTION BASE statements or OPTION BASE after declaration | 55 | Directory overflow |
| 15 | Invalid string or array bounds | 56 | File name is undefined |
| 16 | Dimensions are improper or inconsistent | 57 | SDF support missing |
| 17 | Subscript out of range | 58 | Improper file type |
| 18 | Substring out of range or improper string length | 59 | Physical or logical End Of File/BUFFER found |
| 19 | Improper value | 60 | Physical or logical End of Record found in random mode |
| 20 | INTEGER overflow | 61 | Defined record size is too small for data item |
| 21 | SHORT overflow | 62 | File is protected, wrong PROTECT code specified or PROTECT not allowed |
| 22 | REAL overflow | 63 | Invalid record size |
| 23 | DOUBLE overflow | 64 | Medium overflow — out of user storage space, possibly due to fragmentation |
| 24 | SIN,COS,TAN argument too large for accurate evaluation | 65 | Incorrect data type |
| 25 | Magnitude of ASN or ACS argument is >1 | 66 | INITIALIZE failed — excessive bad tracks, or can't spare dynamically |
| 26 | Zero to non-positive power | 67 | Mass storage parameter is incorrect |
| 27 | Negative base to non-integral power | 68 | Invalid line number or line did not parse during GET |
| 28 | LOG or LGT of non-positive number | 69 | Format switch on drive is off |
| 29 | Illegal floating point number | 73 | Incorrect device type in mass storage unit specifier |
| 30 | Negative argument to SQR | | |
| 31 | Division by zero, X MOD Y, or X MODULO Y with Y = 0 | | |
| 32 | String does not represent a valid number | | |
| 33 | Improper argument for NUM or RPT\$ | | |
| 34 | Referenced line is not IMAGE | | |
| 36 | Out of DATA items | | |
| 37 | EDIT string longer than 160 characters | | |
| 39 | Multi-line function not allowed here | | |

- 77 File open on PURGE
- 78 Invalid volume label
- 79 File open on target device
- 80 Door open, medium not in drive, medium changed, or printer out of paper
- 81 Device/Interface hardware failure
- 82 Device/Interface not present
- 83 Write protected
- 84 Record not found; medium possibly uninitialized
- 85 Mass storage medium is not initialized
- 86 Incorrect mass storage medium
- 88 Read data error
- 89 Checkread error
- 90 Mass storage system error
- 91 Negative length field in BDAT unformatted string
- 92 TYP not defined for this file type or device
- 100 Item in USING list is a string but the corresponding IMAGE is numeric
- 101 Item in USING list is numeric but the corresponding IMAGE is string
- 102 Numeric field specifier is too large
- 103 Item in USING list has no corresponding IMAGE
- 108 Image is too long and/or complex
- 117 Too many nested structured statements
- 128 Line exceeds maximum line length in GET
- 133 DELSUB of missing or busy subprogram
- 136 REAL underflow
- 137 SHORT underflow
- 141 Variable already ALLOCATED or not allocatable
- 142 Variable not ALLOCATED
- 143 Attempt to reference a missing OPTIONAL parameter
- 145 Too many COM blocks, or COM blocks are interleaved
- 150 Improper device specifier or select code
- 152 Parity error
- 153 Insufficient data to satisfy ENTER
- 155 Invalid interface register number or value
- 157 No ENTER terminator found within 256 characters of satisfying input
- 158 Improper IMAGE specifier
- 159 Numeric data not received for numeric item
- 163 Driver or interface not present
- 164 Illegal BYTE/WORD option
- 165 IMAGE specifier has count > size of variable
- 166 Improper TRANSFER length
- 167 Interface status error
- 168 Device timeout occurred and ON TIMEOUT branch could not be taken
- 170 I/O operation not allowed, or HP-IB improperly addressed
- 171 I/O error – illegal addressing sequence
- 172 I/O device or peripheral error
- 173 I/O operation requires active or system control of the HP-IB
- 174 Concurrent I/O operation not allowed on object – nested I/O
- 175 Unreported overlapped I/O error(s) pending
- 177 Undefined I/O path name
- 208 Volume not mounted
- 209 SDF directory format required
- 210 Bad status array
- 211 Improper data base specified
- 212 Data set not found
- 213 Data base directory not found
- 214 Data base not created
- 215 Operation left at least one data set corrupt
- 216 Maximum number of data bases already open
- 217 Data base definition incomplete
- 220 Improper or illegal use of maintenance word
- 221 Data set not created
- 222 Data base directory not created
- 225 Root file not compatible with current version of IMAGE
- 226 Corrupt root file – must purge and redefine it
- 227 Corrupt data base – some sets require erasure
- 229 Data base in use
- 230 Improper set list or duplicate sets in the set list
- 231 Improper record count specified
- 232 Root file cannot be purged until all data sets have been purged
- 233 Root file not found
- 234 Referenced line not a 'PACKFMT' statement
- 236 String buffer too short for required information
- 244 Device was busy and could not handle request
- 247 Tape runaway – no data found on medium
- 248 Beginning/End of tape
- 306 Interface card failed self test
- 315 Missing clock from multiplexor pod
- 316 Link is down, clear to send false too long
- 326 Register address error
- 327 Register value error
- 330 Lexical table size exceeds array size
- 331 Improper pointer array
- 332 Non-existent dimension specified
- 333 Pointer array contains out-of-range subscript value

- 334 Pointer array length does not equal the number of records in the reorder dimension
- 335 Pointer array is not one-dimensional
- 337 Substring specifier extends beyond dimensioned maximum length
- 338 Subscript out-of-range in key specifier
- 340 Mode table too long or case table indicator is improper
- 341 Improper mode indicator
- 342 Lexical table is not one dimensional or is not of type INTEGER
- 343 Lexical mode section pointer is out of range
- 344 1 for 2 replacement list is either empty or too long
- 345 Data type of expression in CASE does not match type of expression in SELECT
- 347 Improper matching of structured programming construct
- 353 Remote node does not respond, data link failure
- 401 Improper argument passed to system function or statement
- 402 MOVELINES could not completely delete source lines after copying them
- 403 Line failed to copy; program modification may be incomplete
- 404 Specified SCREEN does not exist
- 405 Attempt to delete a SCREEN with system function(s) attached
- 406 File specifier or BUFFER parameter not allowed as a single line function parameter
- 407 SAVE failed; program contains unlistable line(s)
- 408 Out of line numbers during LOAD or LOADSUB
- 409 Attempt to load a non-BASIC intermediate code context
- 410 STORE or STORESUB failed; all contexts reference missing options
- 411 Record length must be 256 for RE-SAVE and RE-STORE KEY files
- 413 Variables must be explicitly declared in FORCE DECLARE ON mode
- 415 Line too complex
- 416 Cannot COMPILE a TRACE or GET statement
- 417 SCREEN number is outside the allowed range of 1 to 99
- 418 Illegal screen size in CREATE SCREEN
- 419 Illegal screen position in CREATE or MOVE SCREEN
- 420 Cannot ASSIGN ROLL KEYS TO SCREEN with no scrolling buffer
- 421 Bad key number in stored SFK definition
- 422 Attempt to ASSIGN KEYBOARD to a public SCREEN
- 423 HP-IB EOI assertion requires data
- 424 Insufficient I/O bandwidth to honor request
- 425 Too many chained SFK definitions
- 426 I/O resource in use by another partition or subsystem
- 450 Specified volume not found
- 451 Volume labels do not match
- 452 Duplicate volume labels
- 453 File in use
- 454 Directory formats do not match
- 455 Possible corrupt directory
- 456 Directory format does not support this operation
- 457 Passwords not supported for this directory format
- 458 Unsupported directory format
- 459 Specified file is not a directory
- 460 Directory not empty
- 461 Duplicate passwords not allowed
- 462 Invalid password
- 465 RENAME cannot specify different volumes
- 466 Duplicate volume entries
- 467 Medium has been improperly inserted
- 468 Disc capacity exceeds 32 bit record address range
- 469 HP-IB TCT byte must be at end of ATN sequence
- 470 Device does not support CHECKREAD
- 471 Device does not support TRANSFER
- 472 Interface cannot be HP-IB active controller
- 473 Synchronous data rate could not be met to complete this operation
- 474 Device failed its self test or diagnostic
- 475 HP-IB interface too slow for this device
- 476 Termination mode not supported by this driver
- 477 Only one driver may be attached to this device
- 478 Media failure
- 479 Operation incomplete due to user programmed holdoff
- 480 Data operation aborted by an interface or device clear operation
- 481 File already locked, or unlocked in exclusive mode
- 482 Cannot move a directory via a RENAME
- 483 Shared Resource Management controller is down
- 484 Password not found
- 485 HP-IB secondary command seen

- 486 Write blocked due to unread inbound data
- 487 Request incompatible with previous requests or current state
- 500 Partition already exists
- 501 Partition not present
- 502 Cannot delete the foreground partition
- 503 Partition must be foreground to ATTACH
- 504 Partition(s) must be in the STOP state
- 505 EVENT not present
- 506 EVENT already exists
- 507 EVENT LEVEL negative – cannot delete
- 508 Unsupported partition type in CREATE PARTITION
- 509 Attempt to COMPILE an empty program
- 510 BUFFER parameters not allowed in a default CALL
- 511 Result array for INV is not SHORT or REAL
- 512 ON EVENT active – cannot delete
- 515 PROG file or PROG file directory too small
- 600 Attribute cannot be modified once established
- 602 BUFFER variable has insufficient longevity
- 603 Variable not declared BUFFER
- 604 Illegal source and destination combination for TRANSFER
- 605 TRANSFER must be to a BDAT file
- 606 TRANSFER termination delimiters not supported
- 607 Inconsistent attributes
- 608 Zero count specified
- 609 IVAL result too large
- 610 Maximum buffer size of .5 Mbytes exceeded
- 612 BUFFER pointer(s) in use – CONTROL/RESET not allowed
- 650 Illegal remote operation
- 700 Graphics driver specifier not recognized
- 701 Incompatible GRAPHICS INPUT and PLOTTER drivers
- 702 Internal CRT has no graphics hardware, or malfunctioning hardware, or no graphics driver
- 704 Upper bound $\leq$ lower bound
- 705 Specified area is outside GDU limits
- 706 Incompatible hardware and driver
- 707 Graphics device limits out of range
- 708 Graphics device not initialized
- 709 Graphics device not selected
- 710 Service request interrupt on HP-IB from unknown origin
- 711 Maximum number of graphics devices already initialized
- 712 Memory overflow while attempting to report an overlapped I/O error
- 713 Request not supported by the device or driver
- 714 An attribute value (PEN or LINE TYPE) is out of range for a graphics device
- 730 Array not in COM for array PLOTTER
- 731 The specified TRACK operation has not been initiated
- 733 GESCAPE opcode not recognized
- 734 FONT identifier out of range or not found
- 735 FONT identifier already in use
- 736 FONT specification data invalid
- 737 FONT stroke data invalid
- 740 Parameters specify the zero length vector
- 741 Perspective image for the point is undefined – zero distance from center of projection along the view normal
- 742 Front plane is not between the center of projection and the back plane
- 743 Parameters specify a point that is on the wrong side of the view plane as determined by the view normal
- 744 Viewing matrix is not invertible
- 745 Two vectors specifying the viewing transformation are parallel
- 746 GDU z value too large – no point has a perspective image with that value
- 749 Graphics system error

IMAGE Status Error Messages

- | | | | |
|-------------|---|------------|---|
| 0 | Successful execution — no error | 11 | End of file encountered |
| -1 | Miscellaneous host system error, see status element 10 for error number | 12 | Negative record number specified |
| -10 | Maximum number of data bases already open | 13 | Record number greater than capacity specified |
| -11 | Bad data base reference or preceding blanks missing | 14 | Beginning of chain encountered |
| -12 | Not all necessary data sets are locked | 15 | End of chain encountered |
| -14 | DBPUT, DBDELETE, and DBUPDATE not allowed with DBOPEN mode 8 | 16 | The data set is full |
| -21 | Improper or nonexistent data set, data item, password, or volume specified | 17 | No current record, no chain head, or the selected record is empty |
| -22 | Detail data set required | 18 | Broken chain encountered |
| -23 | Write access to data set required | 20 | At least one requested data set is already locked |
| -24 | DBPUT, DBDELETE, or DBUPDATE not allowed on an Automatic master data set | 41 | DBUPDATE will not alter a key or sort item |
| -31 | Improper mode specified | 43 | Key value already exists in Master set |
| -32 | DBOPEN mode conflicts with another user | 44 | Can't delete a Master entry with non-empty Detail chains |
| -52 | Item specified is not a key item in the specified set or bad List parameter | 50 | String buffer is too small for requested data |
| -91 | Root file not compatible with current version of IMAGE | 51 | Variable size or type does not match the item size or type |
| -92 | Data base not created | 52 | Number of variables specified does not match the item list |
| -93 | Corrupt root file, must purge and redefine it | 53 | Argument parameter type or size incompatible with key item type or size |
| -94 | Corrupt data base, some sets require erasure | 94 | Corrupt data base opened in read-only mode |
| -135 | Wait lock not allowed while a lock is already in effect | 1xx | There is no chain head for path xx |
| 10 | Beginning of file encountered | 3xx | The Automatic Master for path xx is full |

