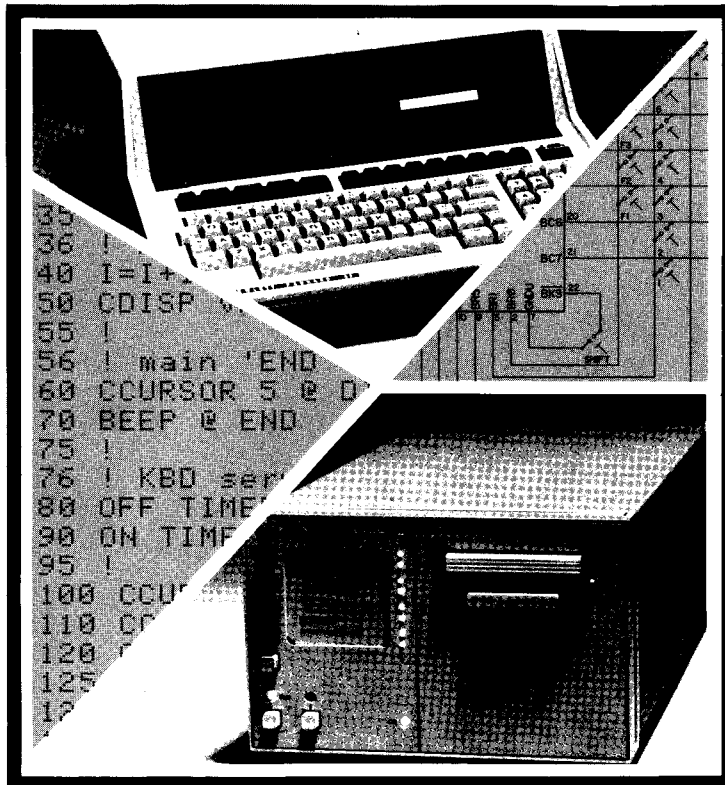


# HP Modular Computer

## HP 9915 Installation Manual



# HP 9915 Modular Computer Installation Manual

Manual Part No. 09915-90000

Microfiche No. 09915-99000



**Hewlett-Packard Desktop Computer Division**

3404 East Harmony Road, Fort Collins, Colorado 80525

(For World-wide Sales and Service Offices see back of manual.)

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## Printing History

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**October 1980...First Edition**

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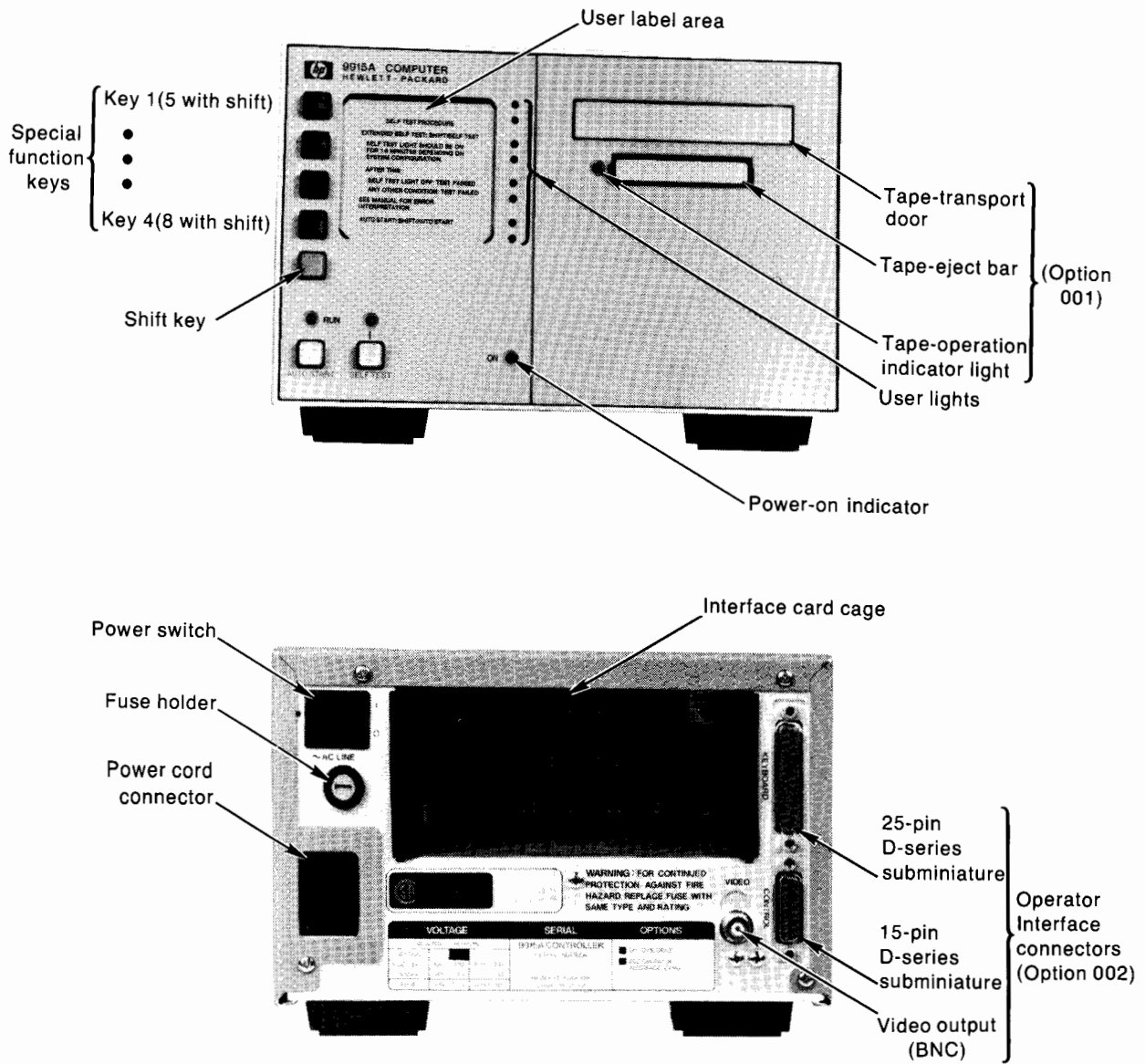


Figure 1-1. External Features of the Computer



# Chapter 1

## General Information

This manual describes how to install and verify operation of your HP 9915 Modular Computer. Installation and self-test procedures are outlined so you can ensure optimum reliability and verify correct operation of the computer. You should familiarize yourself with all the information in this manual before attempting to operate the computer.

### Description

The 9915 Computer is an instrumentation controller which runs BASIC-language programs developed on an HP-85 Computer. Although optional components such as a keyboard, display and printer are not needed to run pre-recorded programs, they can be added later to enhance the system.

The computer has a minimum of operator controls, as shown on the facing page. The four special function keys are defined by an applications program and can be labelled by inserting a plastic card next to the keys. The display lights allow the program to communicate to the operator without the need of an external display. Each light's function can be indicated on the plastic card. The AUTOSTART and SELFTEST keys allow the operator to initiate program operation and run an internal test sequence.

The computer automatically runs a self-test program at powerup and then runs an application program stored either internally or on an optional tape cartridge. Instructions for writing and storing programs are in the 9915 System Development Manual, supplied with the HP 98151 Program Development ROM.

The computer backplane provides connections for an external keyboard, display and up to three HP-85 interface cards. Installing interface cards and a keyboard is covered in the next chapter. The System Development Manual contains instructions for connecting external displays.



**Table 1-1. Operational Specifications**

**Power Requirements**

ac line voltage range (at selected settings)	$\pm 10\%$	$\left\{ \begin{array}{l} 100 \text{ V} \\ 120 \text{ V} \\ 220 \text{ V} \\ 240 \text{ V} \end{array} \right.$
line frequency range	48 to 66 Hz	
maximum power consumption <sup>1</sup> (at selected settings)	0.45 A @ 100 V 0.40 A @ 120 V 0.22 A @ 220 V 0.20 A @ 240 V	
fuse rating (normal blow)	0.75 A @ 100/120 V 0.40 A @ 220/240 V	

**Environmental Range**

	Without Tape Transport	With Tape Transport <sup>2</sup>
temperature range (operational)	0 to 55° C	0 to 40° C
temperature range (storage)	-40 to 75° C	-40 to 60° C
relative humidity range (operational)	0 to 95% 0 to 40°C	20 to 80% non-condensing (30° C maximum wet bulb)

<sup>1</sup> This is the required power for a 9915 containing a tape transport (Option 001) operating at 10% duty cycle, an Operator Interface (Option 002), four Option ROMs, three interface cards, and a fully loaded PROM board.

<sup>2</sup> The tape transport is available as Option 001.

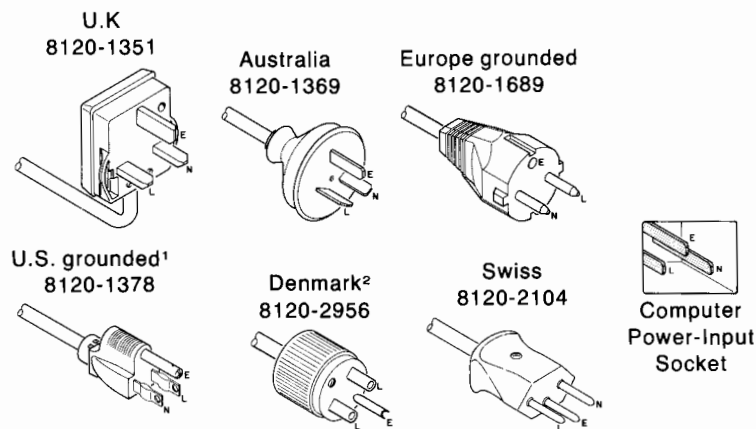
## Inspection Procedure

The computer has been thoroughly inspected before shipping and should be fully functional when you receive it. Carefully inspect the computer for any signs of physical damage sustained during shipment. Notify HP and file a claim with the carrier if there are any signs of damage.

Please check to ensure that you have received all of the accessories listed in the shipping list that accompanies the shipping carton. If any accessories are missing, please contact the HP Sales and Service office through which your order was placed.

## Power Cords

The computer is shipped with several different cord options. The particular cord shipped with your computer depends on your location. The different cord plugs are shown below with the corresponding areas to where they are shipped. If the wrong cord has been shipped, please contact your nearest HP Sales and Service office to obtain the proper cord.



**Figure 1-2. Power Cord Options**

To protect personnel, all equipment not doubly insulated must be properly grounded. The computer is equipped with a three-conductor power cord which grounds the computer when connected to a properly grounded outlet. To preserve this protection, do not operate the computer from a power outlet that does not have an earth ground connection.

---

### WARNING

USE ONLY THE POWER CORD SPECIFIED FOR YOUR AREA. IF IT IS NECESSARY TO REPLACE THE POWER CORD, THE NEW CORD MUST HAVE THE SAME POLARITY AS THE ORIGINAL. IF THE POLARITY IS CHANGED, AN ELECTRICAL SHOCK HAZARD TO PERSONNEL MAY BE CREATED, OR EQUIPMENT DAMAGE MAY RESULT FROM THE ABUSE.

---

<sup>1</sup> UL and CSA approved for use in the United States of America and Canada with equipment set for either 100 or 120 Vac operation.

<sup>2</sup> UL and CSA approved for use in the United States of America and Canada with equipment set for either 200 or 240 Vac operation.

## Warranty Information

The complete warranty statement is included on the inside front cover of this manual. If you have any questions concerning the warranty, please contact the sales office from which the computer was purchased. Should you be unable to contact the office, please contact:

**In the U.S.:**

Hewlett-Packard  
Desktop Computer Division Customer Support  
3404 E. Harmony Road  
Fort Collins, Colorado 80525  
Tel. (303) 226-3800

Toll free number: (800) 648-4711  
[in Nevada call: (800) 992-5710]

**In Europe:**

Hewlett-Packard S.A.  
7, rue du Bois-du-Lan  
P.O. Box 85  
CH-1217 Meyrin 2  
Geneva, Switzerland

Tel. (022) 82 70 00

**Other countries:**

Hewlett-Packard Intercontinental  
3495 Deer Creek Road  
Palo Alto, California 94304  
U.S.A.

Tel. (415) 856-1501

# Chapter 2

## Installing the Computer

This section describes the procedure for rack-mounting the computer, installing interface cards, and changing the fuse. If necessary, the computer line-voltage setting can be changed to match the power-line voltage.

### Rack Installation

The computer is contained in a rack-mountable case. The relevant dimensions are shown below.

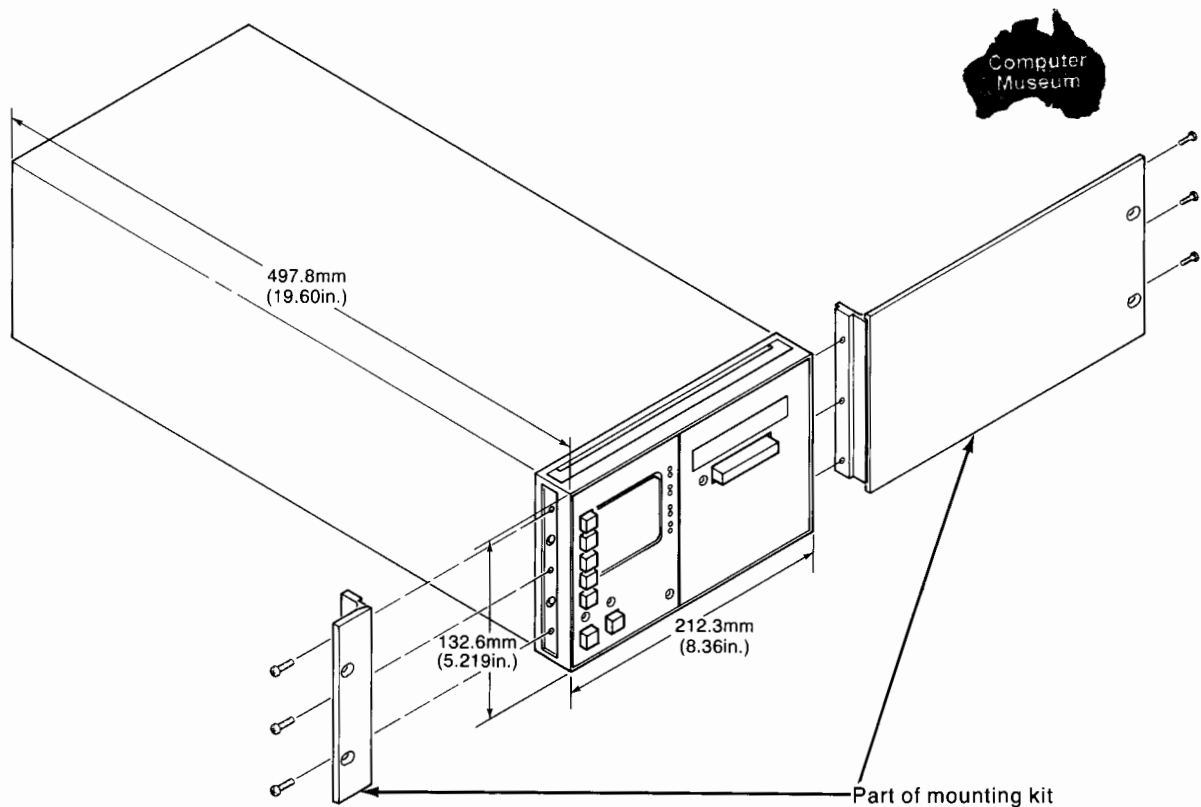


Figure 2-1. Rack Mounting the Computer

**Table 2-1. Rack-Mount Kits Available from HP**

HP Part No.	Type of Mount
5061-0077	Rack-mount kit
5061-0057	Half-rack kit (shown above)
5061-0089	Front-handle kit

---

**CAUTION**

The computer is ventilated by an internal fan that draws air through the bottom and out the right side of the case. Never restrict this air flow, as excess internal heating and consequent component damage may occur. Always leave a minimum of 20 mm ( $\approx$  0.75 inches) clearance on these two sides of the case during operation.

---

## Connecting an External CRT Display

The Operator Interface also provides the capability of connecting a CRT display to the computer. The output signal on the Option 002 rear panel is similar to the EIA RS-170 standard. However, it is necessary to **first** consult the Operator Interface Technical Supplement (P/N 09915-90021) to obtain the electrical specifications required of any CRT that is to be connected to the computer. The supplement also gives the adjustment procedure.

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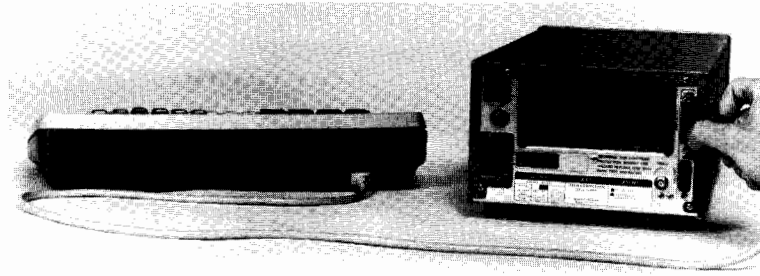
**CAUTION**

Damage to the computer may result if the computer and CRT are not electrically compatible. Consult the Operator Interface Technical Supplement **before** connecting any CRT to the computer. All necessary specifications and adjustment procedures are described in the supplement.

---

## Accessory Keyboard Installation

A special keyboard is available from HP which is compatible with a 9915 equipped with the Operator Interface (Option 002). The keyboard has a terminated cable which connects directly to the "KEYBOARD" connector provided by the Option 002 computer.



**Figure 2-2. Connecting the 98155A Accessory Keyboard**

This accessory keyboard contains only passive components (key switches and a speaker); the encoding circuitry is contained in the computer. Hence, an encoded keyboard **cannot** be connected directly to the rear-panel connector. Connecting keyboards other than the 98155A is covered in the Operator Interface Technical Supplement (P/N 09915-90021).

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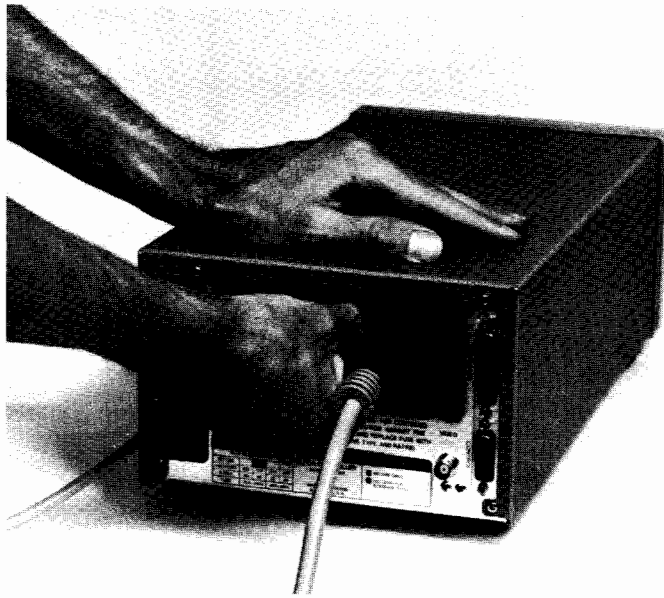
### CAUTION

Connecting a keyboard other than the 98155A accessory keyboard to the computer without first ensuring electrical compatibility may result in damage to the computer. Consult the Operator Interface Technical Supplement before attempting to connect other keyboards.

---

## Interface Card Installation

The interface cards are optional components and are shipped separately. You must install them yourself. The procedure is outlined in the installation and theory of operation manual supplied with each interface. The manuals describe installing the cards in the HP-85 Personal Computer; however, installation of the cards in the 9915 is identical except that the 9915 holds three cards while the HP-85 accomodates four.



**Figure 2-3. Inserting an Interface Card into the Computer**

---

### CAUTION

Do not attempt to insert or remove any interface card while power is on. Doing so may cause damage to the computer or the interface card or both.

---

---

### WARNING

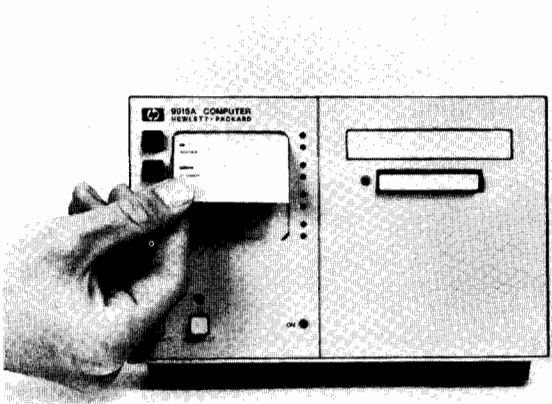
TO AVOID PERSONAL INJURY AND EQUIPMENT DAMAGE, FOLLOW THE SAFETY PRECAUTIONS AND INSTALLATION PROCEDURE OUTLINED IN THE INSTALLATION AND THEORY OF OPERATION MANUAL SUPPLIED WITH EACH INTERFACE CARD.

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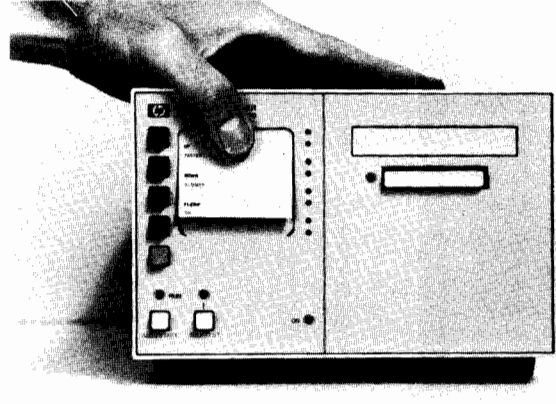


## User Label Area

The user label area is located in the front panel. Special plastic cards are available from HP which fit into the recessed area, and can be printed with the programmed definitions of the lights and keys. The cards can be changed when the programs are changed. The label cards fit into the area as shown below:



**Figure 2-4. Installing a User Label Card**



**Figure 2-5. Removing the Label Card**

The card is inserted into the slot at the top of the recessed area. Slide the card up until the bottom of the card is past the bottom corners of the recessed area. Now slide the card down while keeping the bottom of the card against the front panel.

To remove the card, slide the card up and then pull out on the bottom of the card.

User label cards can be purchased from HP by ordering the desired quantity of part no. 7121-0714. Text may be applied by either silkscreening, typing, or printing on the cards. After typing or printing on the cards, it is recommended that a "fixer" be applied to prevent smudging. Any clear, plastic-adhering coat, such as clear acrylic spray, will suffice.

To help locate the text with reference to the lights and keys, four dots are provided on the cards. The dots define the centerline of the keys and the vertical midpoint of the lights directly across from the keys.

## Changing the Line-Voltage Setting

The computer is capable of operating within a wide range of line voltages. The voltage setting has been made at the factory for your nominal line voltage and is marked on the rear panel of the computer. If the marked voltage matches the power-line voltage, proceed to Installing the Fuse and Power Cord. You should only have to remove the cover if the voltages do not match.

Two slide switches on the right, inner panel allow you to select the proper voltage setting to match your nominal line voltage. The switches are accessed by removing the computer's cover. First, disconnect all cables from the rear panel, including the power cord. Remove the four screws that retain the cover and pull it straight toward the rear of the computer.

Locate the line-voltage switches on the right, inner panel. The voltage settings for different line voltages are printed on the panel. Change the switch settings with a small screwdriver and then be sure to indicate the change on the rear-panel sticker. Replace the cover in the reverse order of its removal.

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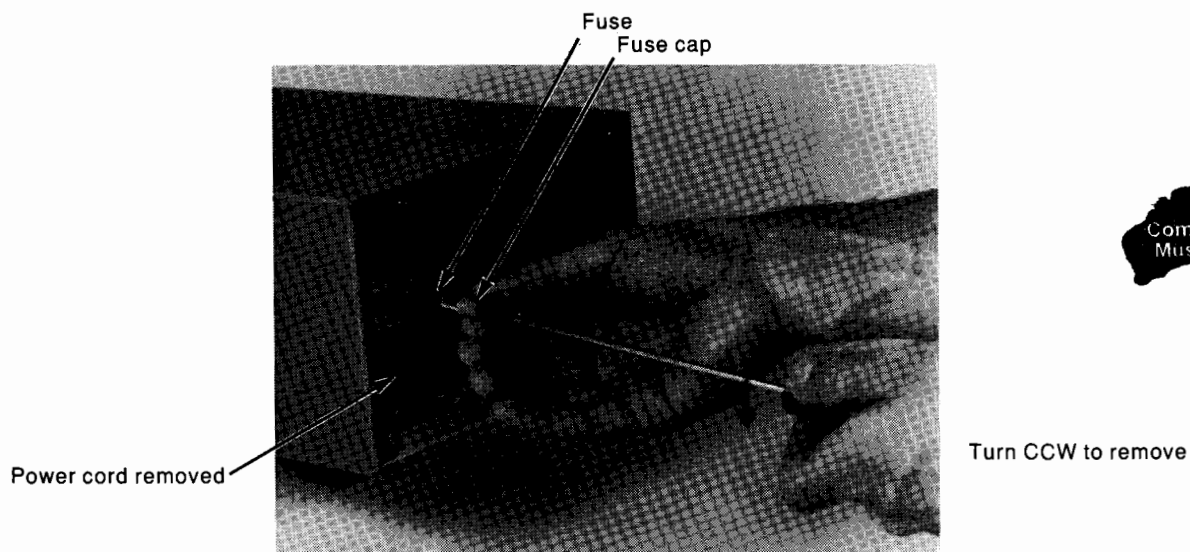
### WARNING

THE POWER CORD MUST BE DISCONNECTED BEFORE YOU ATTEMPT TO CHANGE THE LINE-VOLTAGE SETTING. A POTENTIAL SHOCK HAZARD IS CREATED IF THE COVER IS REMOVED WHILE THE POWER CORD IS PLUGGED IN.

---

## Installing the Fuse and Power Cord

The fuse holder is located on the rear panel of the computer. Before installing or changing the fuse be sure to unplug the power cord! Remove the fuse cap by turning it about 1/4 turn counterclockwise. The proper fuse sizes are listed in the Operational Specifications section. After you have verified the fuse to be of proper rating, replace the cap and turn it clockwise until it locks into place.



**Figure 2-6. Changing the Fuse**

The power cord plugs into the three-terminal socket in the rear panel. The power outlet must have a ground terminal. Once the cord is plugged into the power outlet, the computer is ready for self-testing.

---

### WARNING

THE POWER CORD MUST BE DISCONNECTED BEFORE YOU ATTEMPT TO CHANGE THE FUSE. A POTENTIAL SHOCK HAZARD IS CREATED IF THE COVER IS REMOVED WHILE THE POWER CORD IS PLUGGED IN.

---

## 2-8 Installing the Computer

# Chapter 3

## Computer Operation

The 9915 features two built-in software procedures, called AUTOSTART and SELF TEST, which can be initiated by pressing front panel keys. This chapter describes the differences between the two procedures and explains how to interpret their results.

### Overview of the Procedures

AUTOSTART is a start-up procedure that must be executed before BASIC programs can be run. It also contains a subset of the hardware tests contained within the SELF TEST procedure. Program memory and display contents are cleared before the hardware tests begin. After testing, the computer searches program storage for the "Autost" program, which is run if found in storage.

SELF TEST is an extensive hardware-verification procedure which can be run whenever a test of the computer hardware is desired; it is especially useful to help the user differentiate between hardware and software failures. Program memory and display contents are also cleared when this test is initiated. Test results inform the operator that the computer is (or is not) operating properly.

## The AUTOSTART Procedure

### Initiating AUTOSTART

AUTOSTART is performed automatically at power on and when initiated from the front panel by pressing the AUTOSTART and shift keys simultaneously. The first five hardware tests within SELF TEST are executed, during which the SELF TEST light annunciates the testing procedure.

When testing is finished, the computer begins its start-up procedure. Program storage (internal read-only memory or magnetic tape) is searched for the program called "Autost"; if the program is found, it is loaded and run. If it is not found, the computer enters the keyboard-interpret mode and programs can be entered or requested from the keyboard, if installed.

### Interpreting AUTOSTART Test Results

Success of all hardware tests within AUTOSTART is signaled when the computer turns off the SELF TEST light. No indication of success is reported on the CRT display.

If the program called "Autost" is not found, error 48 will be displayed on the CRT. This does not indicate a failure of any hardware test, but only confirms that the autostart program has not been located in program storage. If no keyboard is installed, check to make sure that the tape containing the autostart program is in the tape transport before re-initiating AUTOSTART. If a keyboard is installed, it can be used to enter programs or to request them from program storage.

Failure of any AUTOSTART test will result in the SELF TEST light remaining on. Errors may also be reported on the CRT display. Note any error(s) displayed on the CRT and then initiate SELF TEST. The more extensive nature of SELF TEST will give a better indication of the problem. Note the failing test numbers and associated error codes and call your service representative for assistance.

# The SELF TEST Procedure

## Initiating SELF TEST

To start the SELF TEST procedure, press the SELF TEST and shift keys simultaneously. Notice that while these keys are pressed all front panel lights are lit. If all lights are not lit, call your service representative. When the keys are released the SELF TEST light remains lit, but the user lights are lit in a sequence of binary patterns which correspond to the test being performed. The lights are assigned the binary values shown below during SELF TEST.

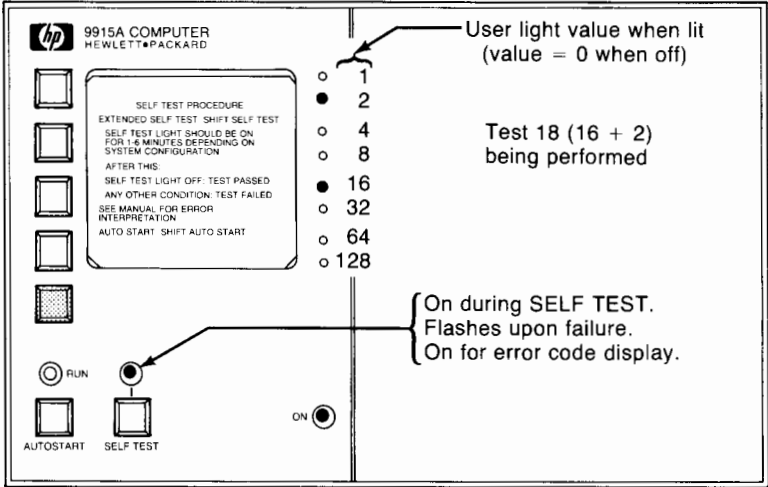


Figure 3-1. SELF TEST Definition of User Lights

The values of the lights which are **on** are added to form the number of the test currently being run, which corresponds to the latest test number displayed on the CRT. These test numbers and their passing results are shown below. Keep in mind that a CRT is necessary to see the test results below. The next section discusses the interpretation of the test results.

Table 3-1. Passing Results of SELF TEST

Test Number	Test Description	CRT Display of Passing Results	Requires Option?
1	Secondary processor self test	(not displayed)	Std.
2	Secondary processor communications test	(not displayed)	Std.
3	Central processor communications test	T03 = OK	Std.
4	Central processor timeout test	(not displayed)	Std.
5	AUTOSTART hardware tests	T05 = OK	Std.
6	Central processor register test	T06 = OK	Std.
7	Internal RAM test	T07 = OK	Std.
8	External RAM test	T08 = OK	82903A 16K Memory Module
9	Operating system ROMs test	T09 = OK	Std.
10	I/O ROM test	T10 = OK	Std.
11	Option ROM test	T11 = OK <sup>1</sup>	Std.
12	I/O card log-in test	T12 = OK <sup>2</sup>	Std.
13	Printer character ROM test	T13 = OK	Option 002
14	Tape controller test	T14 = OK	Option 001
15	Tape condition test	T15 = OK <sup>3</sup>	Option 001
16	Tape motor speed test	T16 = OK <sup>3</sup>	Option 001
17	Tape write-then-read test	T17 = OK <sup>3</sup>	Option 001
18	Interrupt test	T18 = OK	Std.
19	Timer test	T19 = OK	Std.
20	Beeper test	T20 = -- <sup>3</sup>	Option 002
21	Special function keys test	T21 = -- <sup>3</sup>	Std.
22	Display controller test	T22 = OK	Std.
23	Display memory test	T23 = OK	Option 002

<sup>1</sup> Test 11 is performed at least twice in the standard 9915, plus one additional time for each option ROM installed in the computer.

<sup>2</sup> Test 12 requires special consideration if it is skipped. See the section called "Interface Card Log-In Test".

<sup>3</sup> These tests may require action by the user. See the section called "User-Interactive Tests".



## Interpreting SELF TEST Results

If the SELF TEST light has been turned off after all required tests have been run, SELF TEST is successful. However, if any test result is not displayed on the CRT or if any test which is listed for your computer's options in Table 3-1 is not run, a hardware failure exists. Exceptions to this are test 12 and tests 15 through 17. These tests are further described in "Interface Card Log-In Test" (test 12) and "User-Interactive Tests" (tests 15-17).

Make sure that all standard tests and any optional tests, if your computer is so equipped, are reported on the CRT during SELF TEST. If any test is skipped, note the test number and call your service representative.

If any of the tests should fail, the error code is immediately displayed on the CRT (if installed), and the rest of the tests are performed. After all tests have been performed, the user lights display the binary number of the first test that failed. The SELF TEST light then flashes to indicate the failure.

The error code associated with the test failure can be displayed on the user lights by pressing the SELF TEST and shift keys for less than one second. If only one test has failed, subsequent presses of the shift and SELF TEST keys will toggle the user lights between the test number and its associated error code. If more than one test has failed, all test numbers and error codes can be displayed sequentially by further presses of these two keys, eventually cycling back to the number of the first test that failed.

Notice that the SELF TEST light flashes while the test number is being displayed but it remains on while the error code is being displayed. Presses of these two keys for longer than one second re-initiates SELF TEST.

Note the failing test number(s) and error code(s) and call your service representative for assistance. This information alone is often not sufficient to diagnose the exact cause of the failure.

### Interface Card Log-In Test

If test 12 is run and passes, it can be interpreted as all other test results, indicating that the I/O hardware is functioning properly.

The absence of the test 12 report on the CRT must be interpreted differently than the absence of any other test which you can expect to be performed on your computer, according to Table 3-1. If any other expected test or its result is not displayed on the CRT, it is an implicit indication that the test has failed. However, when test 12 results are not reported, it only means that computer hardware was unable to differentiate an empty I/O address from an occupied address. The test is automatically skipped because the results would be indeterminate.

A failure of test 12, as with other tests, definitely indicates a hardware failure. The user lights show the select code at which any failure has occurred. The following drawing shows the light definitions during this test-result display; failures have occurred at select codes 4 and 6, not at select code 10.

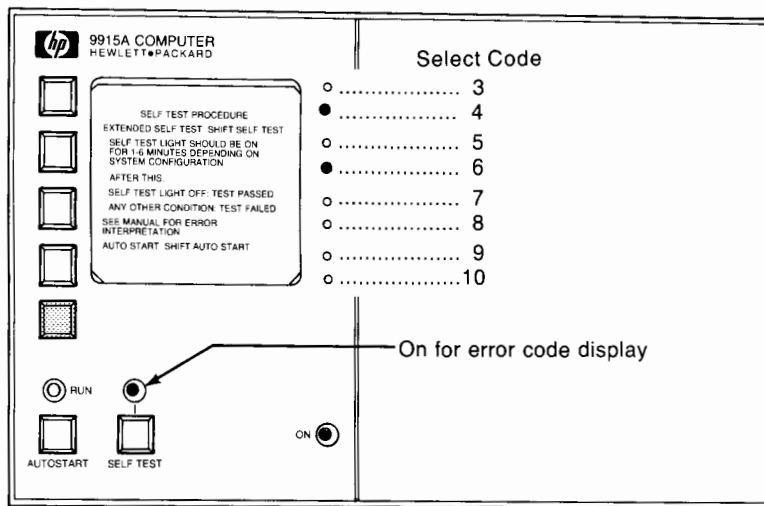


Figure 3-2. I/O Card Failure at Select Codes 4 and 6

Note the select code(s) and call your service representative.

## User-Interactive Tests

Most of the individual hardware tests within SELF TEST require no user action. This section discusses the action that the user may take to evoke or evaluate certain tests, and describes any corrective action that the user can take upon a test failure. The tests in this category are as follows:

**Tests 15 through 17** are tape tests; in order to run the tests the computer must be equipped with a tape transport (Option 001) and must have a tape in the transport at certain points of the test sequence. See Chapter 4 for further instructions.

**Tests 20 and 21** allow the user to check the operation of the beeper and special function keys. The user determines the success or failure of these two tests.

### Tape Tests

The tape transport tests and user actions are explained in Chapter 4.

### Beeper Test

This test (test 20) is only performed if the 9915 is equipped with Option 002. Without an external speaker, the test results cannot be concluded by the operator.

The speaker sounds two frequencies during the test (1.2 kHz followed by a higher tone). If the operator fails to hear both beeps, the rear-panel, 25-pin connector must be checked. If inspection shows the connection to be good and the test still fails, please notify your service representative.



### Special Function Key Test

This test (test 21) is run immediately after the beeper test. The RUN light flashes to announce the test. If no special function keys are pressed for seven seconds, the test is ended. Pressing any special function key will turn the corresponding user light on (or off, if the light was already on) to register the keystroke. If any light is not operational, this test cannot verify the corresponding key. (Remember that the user lights were checked at the initiation of SELF TEST.)

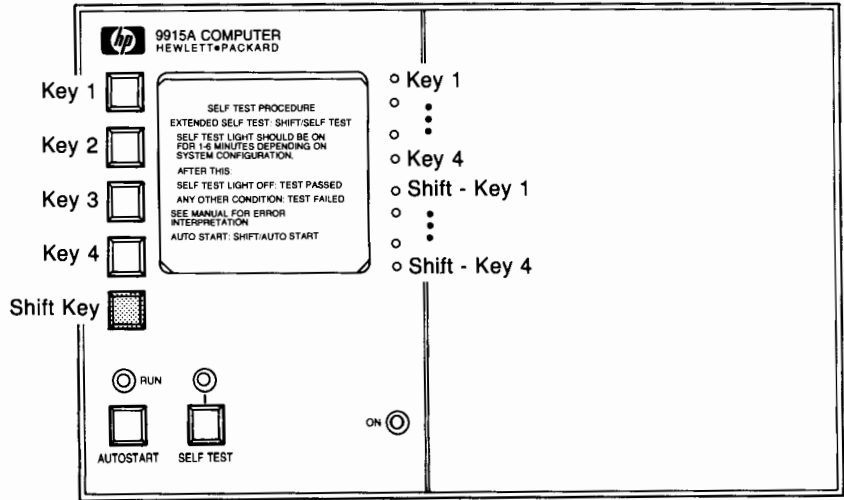


Figure 3-3. SELF TEST of Special Function Keys

The test continues as long as the keys are being pressed (for up to two minutes). Failure of any key to turn on the corresponding light indicates that the key is not functioning properly. Please note the key(s) and call your service representative.

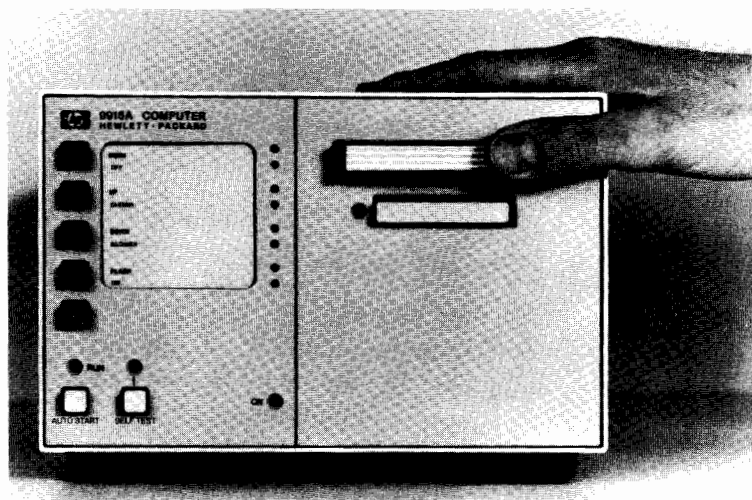
# Chapter 4

## Tape Operations

This section provides instructions on using, caring for and testing tape cartridges.

### Inserting and Removing a Tape Cartridge

Insert the tape cartridge by positioning it in front of the tape drive door as shown below. Then slide the cartridge into the drive until it locks in place.



**Figure 4-1. Inserting a Tape Cartridge**

Remove a tape cartridge by pressing the bar below the drive door and sliding the cartridge out. Keep each cartridge in its plastic case when not in use.

---

#### CAUTION

Do not remove a cartridge while the tape is in motion; damage to the tape could result.

---

## Write Protection

To prevent the computer from recording information on a cartridge, slide the cartridge's RECORD tab to the left before inserting the cartridge. Sliding the RECORD tab to the right allows recording.

## Tape Drive Errors

Check the following if a STALL error is displayed or the tape drive fails to operate:

1. Examine the tape cartridge for defects. Replace any defective cartridge.
2. Clean the tape head as described in the next section.
3. Run SELF TEST with a new cartridge inserted.

If the tape drive still fails to operate properly, call HP for service.

## Tape Care

The most common problem encountered with tape drives is the buildup of oxide on the recording head. The following instructions and precautions are provided to help avoid this and other tape problems.

**Clean the tape head and tape drive capstan** after every eight hours of cumulative use, or more frequently in dirty environments. Use a cotton-tipped swab dampened with isopropyl alcohol, wiping the tape head and capstan in a back-and-forth motion. Do not scrub or use an up-and-down motion. The head is the shiny surface visible when the tape transport door is opened.

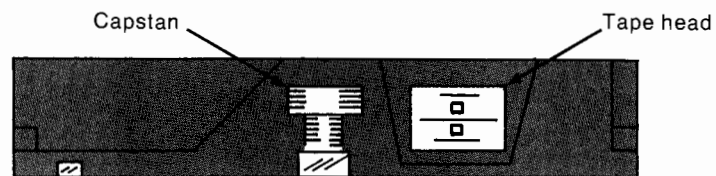


Figure 4-2. Tape Drive Details

Wipe the tape head dry using another cotton swab.

**Remove the tape cartridge when not in use.** Leaving a cartridge in could develop a temporary flat spot on the drive capstan. This could cause errors when using any tape. The flat spot can be removed by conditioning a tape, as explained next.

**Condition the tape** after each six to eight hours of use. “Conditioning” means to run the tape forward to the end and back to the beginning again. This is done by running test 15, as covered later. Conditioning is needed for smooth, continuous tape operation. Any tape which has been subjected to sudden environmental changes, such as being transported by air, should be conditioned before use. Conditioning also restores proper tape tension, avoiding read errors. Keep the tape cartridge in its plastic case when not in use.

**Never eject the tape cartridge when the tape is moving.** This could damage a file or the entire tape.

**Keep your tapes in a safe place.** If needed, store them in a metal box to protect them from strong magnetic fields.

## Tape Life

A tape cartridge has a useful life of 50 to 100 hours of cumulative use. Favorable operating conditions are 25° C (77° F) from 20% to 50% relative humidity. Continuous use over extended periods (1/2 to 3 hours) will decrease tape life. Since any tape will eventually wear out, be sure to maintain a back-up copy of each cartridge.

If READ errors occur frequently, clean the tape head and capstan (explained earlier). If the errors persist, back-up the files onto a new cartridge and discard the old one.

If STALL errors occur, the drive motor is overloaded due to a drive problem or a bad cartridge. Try using a new cartridge. If the STALL errors persist, don't use the drive further; call HP for service.

A cartridge has reached the end of its useful life when:

- READ or STALL errors recur.
- The oxide starts breaking away from the tape's Mylar backing.
- The tape winds very unevenly, caused by a worn cartridge drive belt.
- The cartridge drive pulley has dark spots due to slippage.
- The cartridge rattles during operation.

Any of these danger signals means it's time to replace the cartridge. Failure to do so could cause loss of data or damage to the tape drive.

## Tape Tests

Tests 14 thru 17 check the optional tape drive and a tape cartridge, if inserted. If a cartridge is not present during SELF TEST, tests 15 and 17 are automatically skipped.

**Test 14 checks the drive controller circuits.**

**Test 15 conditions the tape cartridge** (fast-rewind, followed by fast-forward and another fast-rewind), which takes one to two minutes. Conditioning restores an even tension to the tape and reduces any dents made in the capstan by leaving the tape in the transport for extended periods of non-use. Conditioning helps increase tape life.

The test is run **only** if a tape is in the transport at the end of test 14. If the tape is ejected before the conditioning is complete, error 1 is reported for test 15. Re-initiate SELF TEST and make sure that the tape remains in the transport for the duration of the test.

If any error is reported now, including error 1, it may be an indication of failure of either the tape cartridge or the tape drive. If other tapes pass conditioning by test 15, the tape is probably at fault and shouldn't be used any further. If trying to condition other tapes also fails, the tape drive is probably at fault. In this case, call your service representative for assistance.

---

### NOTE

**Test 15** does not disturb any data on the tape being conditioned; thus, the RECORD tab may be in either position for the test.

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**Test 16 is a test of the tape-motor speeds**, and is **only** run if a tape cartridge is not in the transport at the end of test 14. Thus tests 15 and 16 cannot both be run during one SELF TEST.

This test checks all four tape-motor speeds with no tape in the drive in order to differentiate between tape failures and tape-drive failures. Error 1 is reported if the tape is put into the transport during this test. If any other errors are reported, the computer hardware is probably at fault and your service representative should be contacted.

**Test 17 can be evoked to perform a write-then-read test on a tape.** The test is usually used to verify the reliability of a tape **before** it is used for storage operations. The test should **not** be made on a tape that already contains irreplaceable data or programs, as tape contents are overwritten during the test.

In order to prevent accidental overwriting of important data, this test is only run if evoked by inserting a tape into the transport while the tape operation indicator light is flashing. If a cartridge is already in the transport (test 15 has just completed) it must be ejected and then re-inserted to start the test.



If error 1 is reported as the test result, it indicates that the test cannot be completed because either the tape has been removed from the transport or the tape is write-protected. Initiate SELF TEST again after rectifying these conditions.

If any other error is reported, it may indicate that the tape has failed to verify. Try another tape with no (or “expendable”) information on it. If this test then passes, the first tape is probably unreliable and should not be used any further. If the test still fails, the tape drive is probably at fault, and you should contact the service representative.

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**CAUTION**

**Test 17** overwrites any data on the tape used in the test. Do not use a tape that contains important data or program information for this test.

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