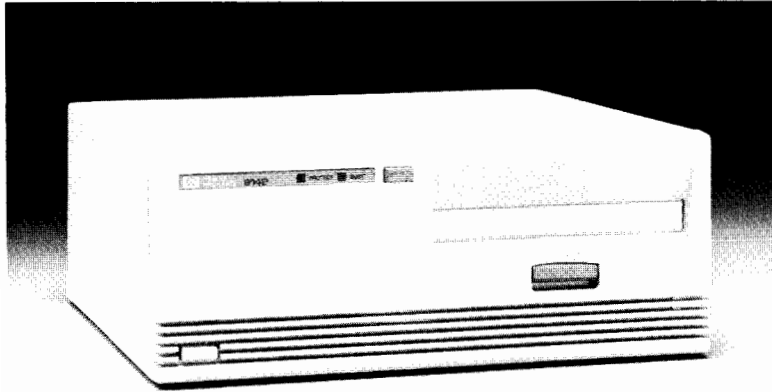


# HP 9142A



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## **NOTICE**

This Handbook is intended only for service personnel trained in its use by Hewlett-Packard. It is designed as a quick reference guide to commonly used service information. The information contained here is highly condensed from other manuals and this volume is not intended to be a substitute for, but rather a supplement to those manuals.

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## SECTION I



### PRODUCT INFORMATION

#### [1] INTRODUCTION

The HP 9142A Tape Drive (Figure 1-1) is a mass storage product intended for low-end personal computer systems. The HP 9142A supports the Personal Computer Tape Format (PCT). The host interface is HP-IB and the CS/80 command set. The HP 9142A uses a dual-gap head, which, through use of a stepping motor, is capable of writing 16 tracks. Using a 600-foot cartridge, the HP 9142A has a 60-Mbyte storage capacity.

#### [2] TECHNICAL SPECIFICATIONS

##### POWER REQUIREMENTS

Nominal Voltage (selectable by rear panel switch)	100-120V~ (115V setting) 200-240V~ (230V setting)
Voltage Range	86-127V~ (115V setting) 195-253V~ (230V setting)
Frequency Range	48-66 Hz
Power	92 Voltamps

#### [3] SERVICE KITS

The following list of assemblies and parts is recommended for your Field Service Inventory (FSI).

09142-83410	Misc. Hardware Kit
09142-65201	Dr Mtr/ Tach Assy
09142-69501	Drive Mechanism

09142-69500	Controller Assembly
09144-68502	Fan Assembly
2110-0003	Fuse, 3A
3140-0797	Stepper Motor
09133-67120	Power Supply
09142-67700	Optical sensor assy
09142-83410	Misc. hardware
09142-61601	Power Cable
09142-61602	Switch Cable

**SECTION II****ENVIRONMENTAL/INSTALLATION/PM****[1] ENVIRONMENTAL CONSIDERATIONS****Temperature**

Operating (media limited)	5 to 40 degrees C (41 to 104 degrees F)
------------------------------	--

**Non Operating**

Storage and Transit of Drive	-40 to 75 degrees C (-40 to 167 degrees F)
---------------------------------	---

Storage and Transit of Media	-40 to 45 degrees C (-40 to 113 degrees F)
---------------------------------	---

**Humidity**

Operating non condensing (media limited )	20% to 80%
--	------------

26 degrees C  
maximum wet-bulb

Non-Operating non-condensing	20% to 80%
------------------------------	------------

**Altitude**

Operating	0 to 4572m (0 to 15000 ft)
-----------	-------------------------------

Non-Operating	-304 to 15240m (-1000 to 50000 ft)
---------------	---------------------------------------



The following chart shows the acceptable environment for the HP 9142 Tape Drive.

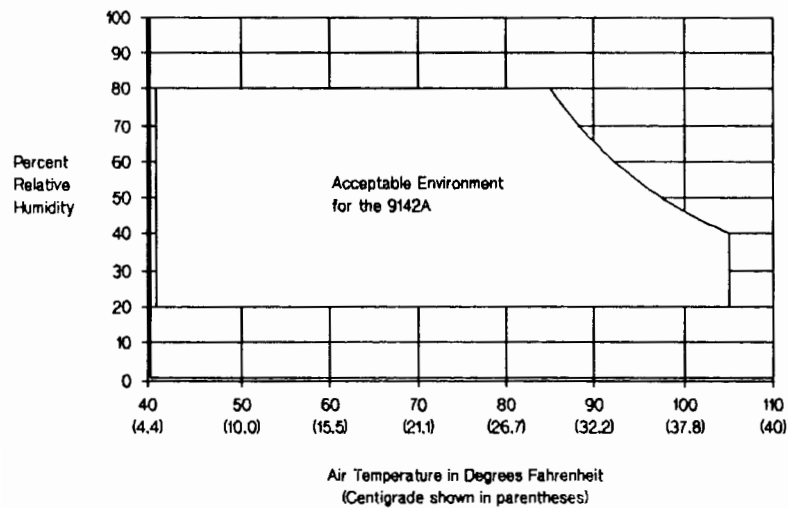


Figure 2-1. Temperature and Humidity Range.

## [2] INSTALLATION CONSIDERATIONS

Installation is normally a customer responsibility. Refer to Section III for information on HP-IB address settings.



### [3] PREVENTIVE MAINTENANCE

The HP 9142A Tape Drive requires regular read/write head cleaning maintenance. The performance and life of the tape cartridge media and tape drive depend directly on how carefully they are handled and on the proper cleaning of the read/write head.

The following materials are supplied with the HP 9142A:

Description	HP Part Number
Head Cleaner (Freon TF)	8500-1251
1 - 12 oz bottle can be ordered using part number	92193F
Swabs (1/package)	9300-0468

#### Cleaning The Read/Write Head

- The read/write heads must be cleaned after each 8 hours of tape operation (approximately 8 hours of the BUSY light being on).
- Clean the read/write heads after using a new cartridge for the first time.
- Clean the read/write heads if you are experiencing any problems with the tape drive or tape cartridges.

The Read/Write head can be raised for easy cleaning. To do this, use the following steps:

- Turn on the tape drive.
- Without a tape cartridge in the transport, press the Unload button. This raises the read/write head.
- The BUSY light will flash as the read/write head moves upward.
- Pour a small amount of solvent into a clean container, such as a small UNWAXED paper cup or similar container.

#### NOTE

Freon TF dissolves wax. If a waxed cup is used, the wax will be transferred to the tape path. Wax can damage the magnetic tape, the tape cartridge, and read/write head.

- Dab the swabs into the container as needed.
- While applying gentle pressure clean the following surfaces.
  - read/write head (clean from side to side, NOT up and down)
  - capstan
- Press the Unload button. This lowers the read/write head.

Once the tape drive is cleaned, a cartridge can be inserted. If a cartridge is inserted while the drive is turned off with the head raised in the cleaning position, the cartridge is locked in the drive; to retrieve the cartridge, turn on the drive and press the Unload button.

## SECTION III

### CONFIGURATION

#### [1] ADDRESS CONFIGURATION

Configuration consists of setting the HP-IB address only. Configure the unit for the desired address as stated below. Refer to Figure 3-1 for location of HP-IB address switch.

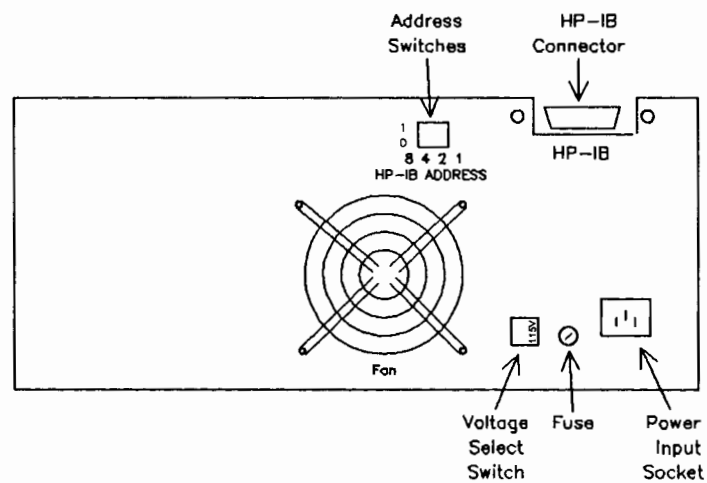
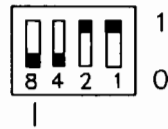


Figure 3-1. Rear view 9142A.

#### HP-IB Address Switch

The HP-IB device address switch is located at the rear of the unit. See Figure 3-1 for location of the switch. Figure 3-2 illustrates an HP-IB address selection



Switches 1,2,and 4 are shown in the shipping configuration (address 3 selected)  
Switch 8 must be in the "0" position for normal operation

- \* Test switch segment is used only when selecting a selftest.

Figure 3-2. HP-IB/Selftest Select Switch.

## SECTION IV

### TROUBLESHOOTING



#### [1] POWER-ON SELFTEST

At power-on, a selftest of the ROM, RAM, processor, HP-IB, both of the universal state machines (USM), and the Tape Drive Mechanism is performed. The tests performed on the tape drive are Servo Test, Servo Motor Test and Head Stepper test. A failure of the power-on selftest will blink the PROTECT LED and the BUSY LED at the same time.

#### [2] POWER SUPPLY

Power supply voltages should be checked before any troubleshooting procedures are started. Figure 4-1 shows the location of power supply voltage test points. This will aid in isolating the failure to a replaceable assembly. The power supply is a non exchange assembly.

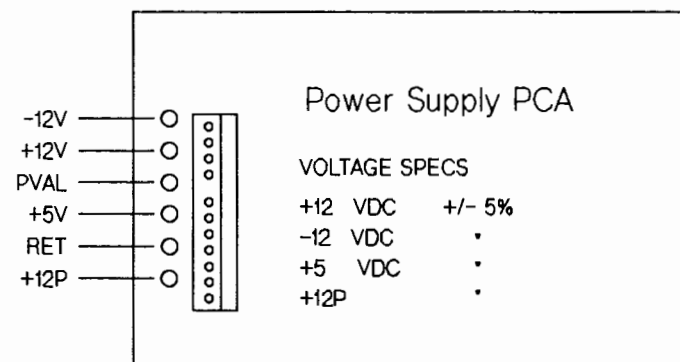


Figure 4-1. Power Supply PCA.

See Section V, for description of selftests. Refer to Section 10 for a list of CS/80 Status Error bits and their error codes.

## SECTION V

### DIAGNOSTICS

#### [1] SELFTESTS

##### MANUAL EXECUTION OF SELECTED SELFTESTS

To run the tests, perform the following steps:

1. With power off, select switch 8 of the HP-IB address/Test select switch to the "1" or (up) position (See Figure 8-3).
2. Power-on the unit. The unit powers-on in the selftest mode.
3. To select a specific test, first select switch 8 to the "0" (down) position. Select the test you want to run (see list of test under heading INDIVIDUAL SELFTEST AVAILABLE). Select switch 8 to the "1" (UP) position. The test which was selected will now be executed continuously.

To return to normal operation:

1. Turn the unit off
2. Set switch 8 to the "0" (down) position
3. Turn the unit on.

##### NOTE

The tape cartridge cannot be unloaded or removed during execution of test 0 through 5. To stop test execution, set switch 8 to the "0" (down) position.



**LED INDICATIONS DURING SELFTESTS**

The following explanation describes the operation of the BUSY and PROTECT LEDs during execution of Selftests.

- Both LEDs will be lit while the selftest executes.
- When a failure occurs, the PROTECT LED turns off, and the Busy LED stays on.
- In a successful test the PROTECT LED turns off, and the BUSY LED blinks 5 times.

**INDIVIDUAL SELFTESTS AVAILABLE****NOTE**

Test 4 must always be run before test 6 to initialize the servo electronics. Test 3 must be run before test 4 to prevent the tape from unspooling. A cartridge must be in the drive for test 6.

TEST #	TEST TIME	TEST DESCRIPTION
0	30s	RAM test; tests each location of RAM.
1	1s	HP-IB test; test registers of the HP-IB chip
2	1s	USM test; test the DMA and PCT Formatter USM registers.
3	3s	Servo electronics test
4	10s	Servo Motor/Tach test; performs a speed calibration test.
5	15s	Servo head stepper test; steps the head to its upper most position and back down.
6	120s to 180s	Performs a load sequence.

The following chart shows the test number and the Most Suspect Failing Replaceable Assembly (MSFRA) if the test should fail.

Test #	MSFRA
0	Controller PCA (A3)
1	"
2	"
3	"
4	Controller PCA (A3) or Drive Motor/Tachometer (7) (See Figure 8-1) (See Figure 8-2)
5	Head Stepper Motor (12) (See Figure 8-2)
6	N/A

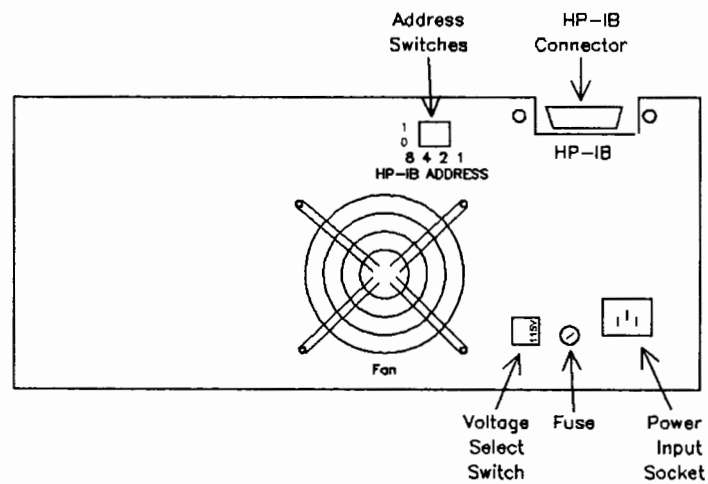


Figure 5-1. Rear View HP 9142A.



\* Test

Switches 1,2,and 4 are used to select the desired selftest. Test 3 is shown selected. Switch 8 must be in the "1" position prior to powering-on the unit to initiate the selftest mode of operation.

\* Test switch segment is used only when selecting a selftest.

Figure 5-2. HP-IB Address/Test Select Switch.

## **SECTION VI**

### **ADJUSTMENTS**

**There are no suggested field adjustments.**



## **SECTION VII**

### **PERIPHERALS**

**This section has been intentionally left blank.**





## SECTION VIII

### REPLACEABLE PARTS

#### [1] INTRODUCTION

An exploded view of the HP 9142A (Figure 8-1) and the Tape Drive Mechanism (Figure 8-2) is provided in this chapter. Items referenced on the figures are also referenced in the following subsections.

#### [2] EXCHANGE ASSEMBLIES

Exchange Part number	Description
09142-69501	Drive Mechanism
09142-69500	Controller

#### [3] NON-EXCHANGE ASSEMBLIES

The Power Supply assembly is a non-exchange assembly. The part number for the Power Supply is 09133-67120

#### [4] FIELD REPLACEABLE PARTS

Part number	Description
0403-0427	Bumper, Foot
09144-42501	Clamp Wheel
09144-42502	Roller Guide
09144-89101	Anti-Backlash Spring
09144-45404	Guard, Power
09142-61601	Power Cable



**Case Parts (Refer to Figure 8-1 for location)**

07940-00026	Guard, Fan (5)
5041-1203	Power Button (7)
09133-40202	Shaft Switch (6)
09133-67120	Power Supply (A4)

**Tape Drive Assembly (Refer to Figure 8-2 for location)**

1460-2020	Drive Motor Load Spring (14)
09142-65201	Drive Motor/Tach Assembly (7)
09142-67700	Hole Sensor Assembly (2)
09142- 1602	Switch Assembly (13)
09144-45401	Right Motor Insulator (4)
09144-45402	Left Motor Insulator (5)
09144-45403	Spring, Insulator (6)
09144-40301	Drive Door (3)
07942-40006	Keycap Eject Button (1)
09144-89104	Spring, Door (8)

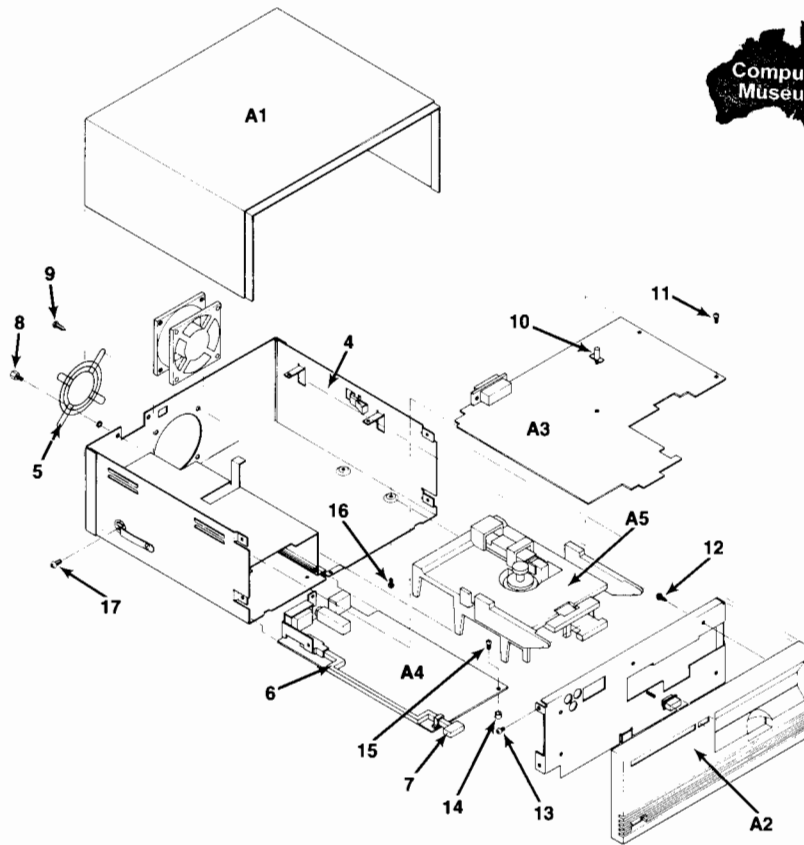


Figure 8-1. Field-Replaceable Assemblies.

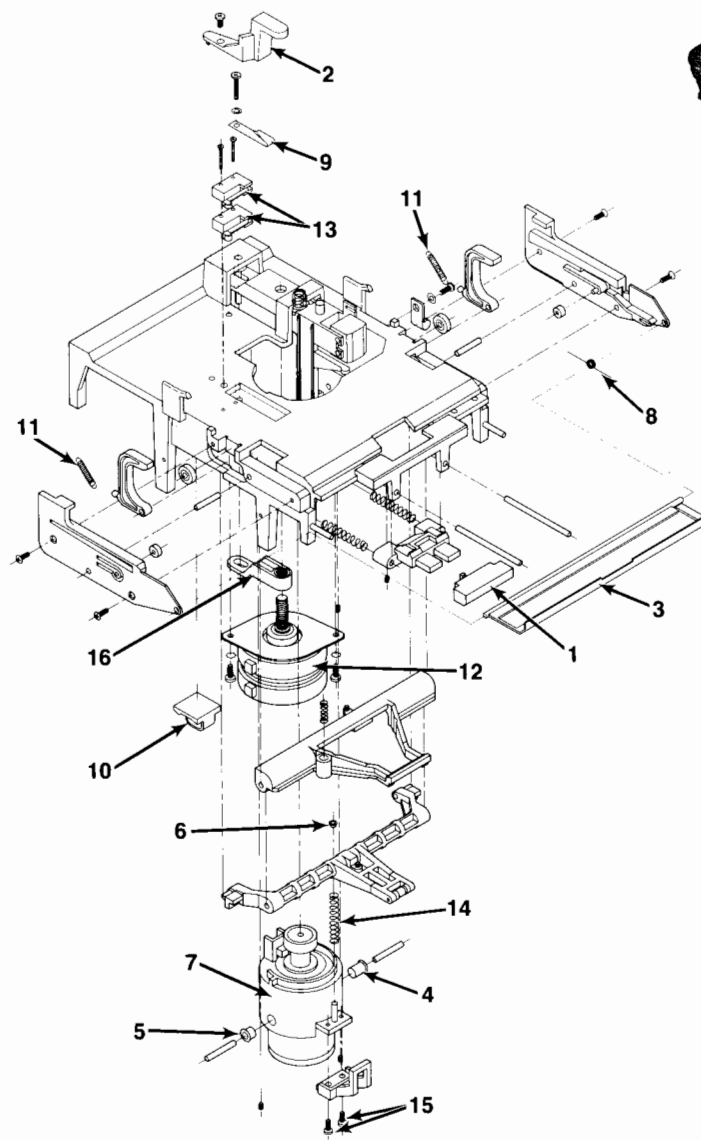


Figure 8-2. Tape Drive Mechanism Exploded View.

## **SECTION IX**

### **DIAGRAMS**

**No additional diagrams are needed for service.**



## SECTION X

### REFERENCE

#### [1] CS/80 Status Bits and Error Codes

The error codes are returned in byte 8 (P8) of the Parameter Field. The error codes are shown in decimal form.

##### 19 Controller Fault

- 1 No Buffers
- 6 Hole encountered
- 14 Unlacatable target
- 15 Write timeout
- 18 Division error
- 19 Servo timeout
- 41 Buffers not released by previous process

##### 22 Unit Fault

- 5 Wrong hole encountered
- 6 Hole encountered
- 7 Illegal timeout
- 19 Servo timeout
- 20 Servo handshake error
- 24 Undefined servo command
- 25 Speed control lost
- 26 Speed calibration error
- 27 Motor failure
- 28 Tach failure
- 29 Stepper failure
- 30 6805 failed
- 31 Servo loopback failure
- 35 Tape unspool
- 36 Edge find failure
- 37 6809 failed
- 38 Checksum failure
- 39 RAM failure
- 40 R/W test failure

**24 Diagnostic Failure**

- 7 Read timeout
- 9 CRC error detected
- 12 Read value mismatch
- 15 USMs timed out during write operation
- 21 No CRC error detected
- 22 Unable to set one or more bits in DMA USM registers
- 23 Unable to clear one or more bits in DMA USM registers

**33 Uninitialized Media**

- 34 Certification of media failed

**44 End of Volume**

- 43 Attempted to read accross end of volume

**41 Unrecoverable Data**

- 11 No ID found
- 13 Exceeded the number of retries to recover data
- 16 Seek error

**46 Stranger Bit (Unique to HP 9142 only)**

- 44 Illegal media (Not the correct type of media)

**61 Maintainance track overflow**

- 33 Error table contained more than 128 errors

**34 No Spares Available**

- 33 Error table overflow (more than 128 errors on certification)

**8 Parameter Bounds**

- 45 Code mismatch (ROM code revision incorrect)
- 46 Parameter error (Parameters in command buffer are illegal)

## **SECTION XI**

### **SERVICE NOTES/IOSMs**

This section of the handbook may be used to file service notes.





