HP 9144A Tape Drive
User's Manual

HEWLETT PACKARD

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This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, you should consult the dealer or an authorized field service representative for additional suggestions.

You may find the following booklet prepared by the Federal Communications Commission helpful: "**How to Identify and Resolve Radio-TV Interference Problems**". The booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Table of Contents

Chapter 1 The HP 9144A, This Manual and You

1-1 The HP 9144A

1-2 This Manual and You

Chapter 2 Setting Up

2-2 Unpacking and Inspection

2-6 Adjusting the Voltage Select Switch

2-7 Changing the Fuse

2-8 Changing the Device Address

2-10 Positioning the Drive

2-11 Connecting to the Host Computer

2-15 Connecting to the Power Supply

Chapter 3 Using the HP 9144A

3-2 Switching On

3-2 Cartridges and Their Care

3-3 Looking After the Cartridges

3-4 Loading and Unloading the Cartridge

3-4 Inserting the Cartridge

3-5 Initializing
3-5 Removing the Cartridge
3-6 **Write-protecting Cartridges**
3-8 **Use with a System**
3-8 **Use with an HP 150 PC**

Chapter 4 Maintenance

4-1 **Maintenance**
4-2 **Self-test Overview**
4-3 **Cleaning the Tape Head**
4-3 How Often?
4-4 How Do I Clean the Tape Head?
4-6 Using the Cleaning Cartridge
4-7 **Cleaning the Case**

Chapter 5 Problems and Solutions

5-3 **Warranty and Service**
5-3 Warranty
5-3 Service

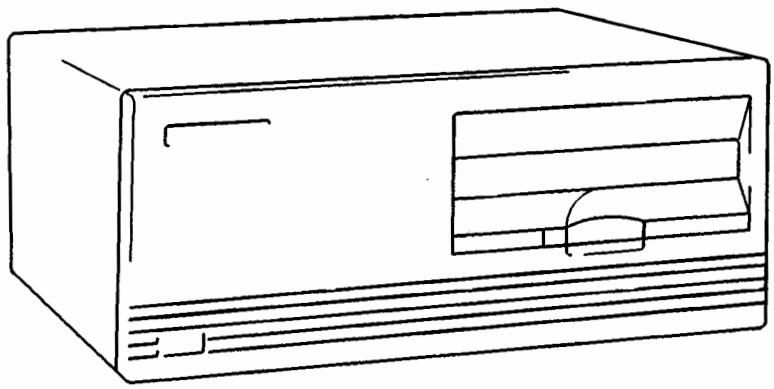
Appendix A	Product Specification
Appendix B	System Support
Appendix C	HP-IB Restrictions
Appendix D	Cartridge Guidelines
Appendix E	Supplies and Accessories
Appendix F	Glossary

Index

Worldwide Sales Offices

1 The HP 9144A, This Manual and You

The HP 9144A



The HP 9144A is a data storage device using quarter-inch tape cartridges.

Each 600 ft cartridge can store up to 67.1 Mbytes (megabytes) of data.

150 ft cartridges are also available, for storing up to 16.7 Mbytes of data.

This Manual and You

This Manual explains how to unpack, set up, use and maintain your HP 9144A tape drive.

Chapter 1 introduces the tape drive and the quarter-inch cartridges it uses for data storage.

Chapter 2 explains the procedure for unpacking the tape drive, connecting it up to the power supply and your computer system.

Chapter 3 is about using the HP 9144A.

Chapter 4 covers maintenance of the tape drive.

Chapter 5 is a problem solving section.

Appendix A gives details of the product specification.

Appendix B shows supported systems.

Appendix C details HP-IB restrictions.

Appendix D has detailed guidelines on the care of tape cartridges.

Appendix E lists supplies and accessories for the HP 9144A.

Appendix F is a glossary of technical terms used in this manual.

An index and a list of worldwide sales offices appears at the end of the manual.

This user manual is written assuming that you have an appropriate computer system to connect to your HP 9144A. A table showing the HP computer systems which will support an HP 9144A can be found in appendix B.

Detailed commands for using the computer system with a backup device are covered in your system manual.

If you are familiar with setting up HP peripherals, you will only need to read chapters 3 and 4.

2 Setting Up

Caution 

You may damage the drive if you attempt to turn on the power before all the following checks and steps have been completed.

When you receive your HP 9144A, you should

A. Unpack the equipment.

B. Check it for damage.

C. Check that the voltage is set correctly for your local power supply.

D. Check that the fuse is correct for your local requirements.

E. Alter the device address if necessary.

F. Position the tape drive.

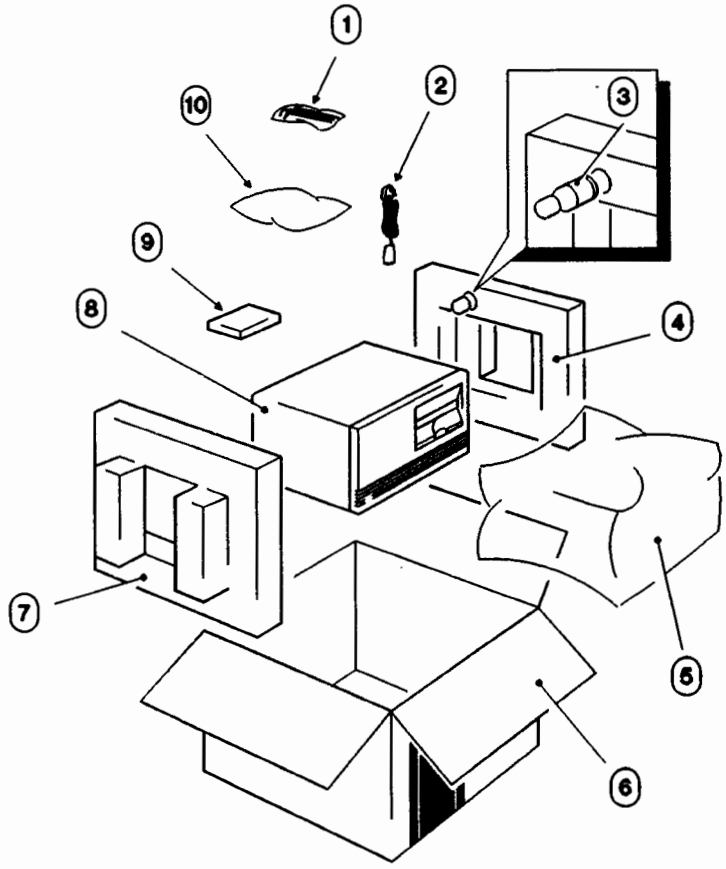
G. Connect the tape drive to the host computer.

H. Connect the tape drive to the power supply.

It is important that you carry out these steps in this sequence, to avoid damaging the drive.

The following sections take you through these steps in detail.

Unpacking and Inspection



1	Cleaning swabs	6	Packing box
2	AC LINE Cord	7	Packing foam
3	Head Cleaning Fluid	8	Tape Drive
4	Packing foam	9	Accessories packet
5	Polythene bag		

Figure 2-1. The Tape Drive, its Accessories and Packaging

A. Inspect the carton for water stains or other signs of damage during transit. If there is damage, insist on a representative of the carrier being present when you unpack the drive.

B. Cut the self-adhesive tape which holds the top flaps of the box together and open the box.

The following equipment is supplied with the HP 9144A:

- **This Manual**
- **Material Safety Data Sheet**
- **Two Spare Fuses (part number 2110-0003) for use in countries outside Europe**
- **A fuseholder (part number 2110-0567) and two fuses (part number 2110-0638) for use in Europe**
- **Cleaning Swabs**
- **Magnetic Head Cleaning Fluid**

In addition, for the option 150:

- **"Read this First" sheet**
- **Tape Backup Utility**

Carefully lift out the tape drive complete with its foam packing.

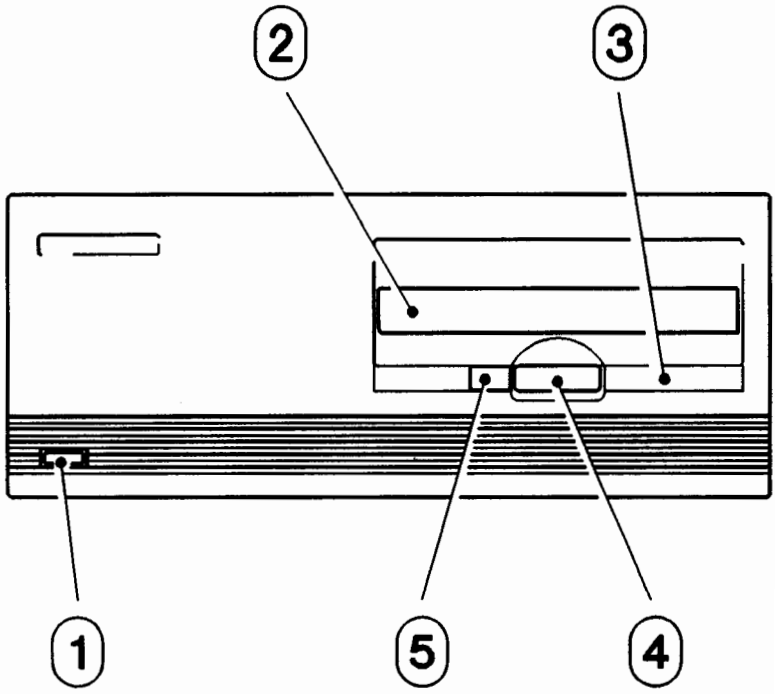
C. Remove the foam packing and the plastic bag covering the drive.

D. Check that no equipment is missing.

E. Inspect the equipment for any physical damage which may have occurred during shipment.

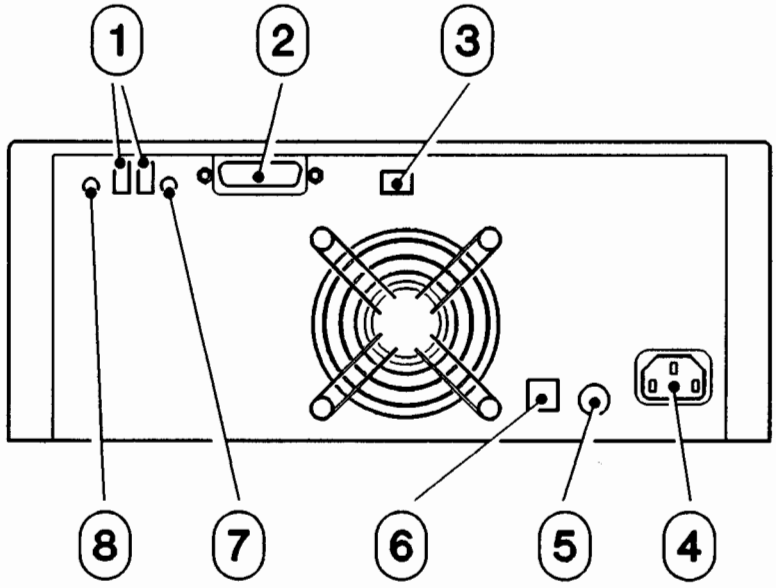
If any equipment is missing or damaged, inform your Hewlett-Packard Sales Office and file a claim with the carrier.

F. Save the shipping carton and packing for future use.



1 AC LINE ~ Switch
2 Cartridge Slot
3 Busy Protect Fault Lamps
4 EJECT Button
5 Unload Button

Figure 2-2. The Front Panel



1 Self-test LED displays
2 HP-IB Connector
3 HP-IB Address Switches
4 Power Cord Socket
5 Fuse/Fuseholder
6 Voltage Select Switch
7 Initiate Self-test Button
8 Display Results Button

Figure 2-3. The Rear Panel

Adjusting the Voltage Select Switch

The **Voltage Select Switch** *(item 6 fig. 2-3)* is on the rear panel of the tape drive and can be set to 115V or 230V. The switch is usually preset to 115V for the U.S.A., and 230V for Europe. The 115V setting covers a voltage range of 90 to 132V. The 230V setting covers 198 to 264V.

Caution

To avoid damage, you MUST check the voltage before connecting power to the drive.

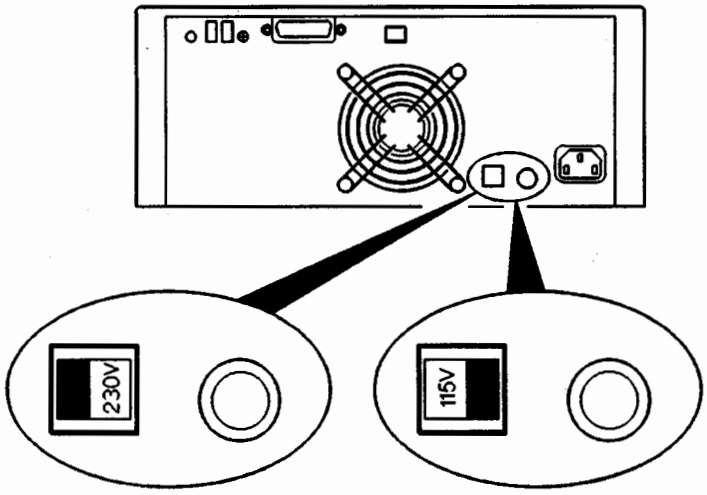


Figure 2-4. Voltage Select Switch.

A. Check the position of the **Voltage Select Switch.**

B. If it is incorrect for the local power supply, slide the switch to the right or left so that it indicates the correct voltage.

Changing the Fuse

The **Fuse holder** *(fig. 2-3, item 5)* is beside the voltage select switch on the rear panel. The fuse is **either** a **F3A-250V Fast-Blow** for countries outside Europe, or a **T3.15A-250V Slow-Blow** for Europe.

Note

The tape drive leaves the factory fitted with a **F3A-250V Fast-Blow** fuse. If you use the tape drive in **Europe**, change to the fuseholder and fuse supplied in your accessories packet.

In order to change the fuse:

1. Turn the drive **OFF**.
2. **UNPLUG THE POWER CORD.**
3. The fuse holder *(fig. 2-3, item 5)* is on the rear panel, between the voltage select switch and the power cord socket.

   Using a small screwdriver, press in the central part of the fuse holder, and twist it counter-clockwise.
4. Remove the screwdriver and the fuse holder will spring outwards; remove it with your fingers.
5. Take the old fuse out of the fuse holder and discard it.
6. Insert a new fuse into the holder.
7. Fit the holder in its hole again.
8. Using the screwdriver, press the holder and twist it clockwise, so that it catches securely.
9. Plug the power cord back in.

Changing the Device Address

When the host computer needs to communicate with a peripheral device, it is essential that it can find the correct one; therefore, each device must be allotted a unique number called the **device address.**

- The HP 9144A is preset to device address 3 on delivery.
- You only need to change the preset address if you already have a device with address 3 connected to your computer.
- If you need to change the address:

  A. Turn off the drive by the switch on the front panel.

  B. Choose an address which is not already being used by a device on the system.

  C. Using the tip of a ball-point pen, or similar object, alter the **Device Address Switches** *(fig. 2-5)* on the rear panel to match the pattern shown in figure 2-6 for the address you have chosen.

  D. When the drive is next turned on, look at the right hand LED display *(item 1 fig. 2-3)* on the rear panel. It should show the number you have chosen.

Note 

The device address is only read by the electronics of the tape drive when the drive is first switched on. So if you change the device address switches without switching the drive off and on, the electronics will take no notice of the change until next time the drive is switched on or the Initiate Self-Test button *(item 7 fig. 2-3)* is pressed.

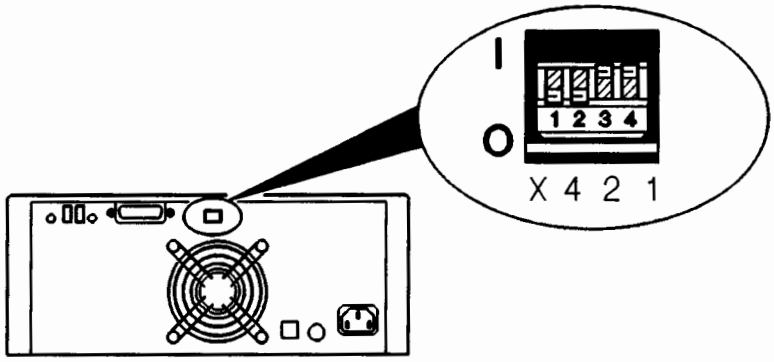


Figure 2-5. The Device Address Switches

The view of the rear panel shows the Device Address Switches as they are preset in the factory to **Down, Down, Up, Up,** giving address 3.

Ignore the figures on the switches themselves; look only at the figures printed on the rear panel to understand the value of each switch. You may find the following table easier to follow:

Address	Position of 4 small switches			
	Left	Middle Left	Middle Right	Right
0	Down	Down	Down	Down
1	Down	Down	Down	Up
2	Down	Down	Up	Down
3	**Down**	**Down**	**Up**	**Up**
4	Down	Up	Down	Down
5	Down	Up	Down	Up
6	Down	Up	Up	Down
7	Down	Up	Up	Up

Figure 2-6. Device Address Switch Positions

Positioning the Drive

Position the tape drive so that it has adequate ventilation.

Make sure that the ventilation slots at the front of the drive and the grille at the rear are not obstructed.

Sudden changes in temperature could affect the integrity of data while reading from, or writing to cartridge tapes. Therefore it is advisable to place the tape drive in a position where the temperature is reasonably stable (for example, away from open windows, fan heaters or doors). *Appendix D gives details of recommendations from HP's factory tests concerning temperature and environment.*

Try to achieve the shortest possible cable run between the host computer and the tape drive. *Appendix C gives further details about cabling restrictions.*

Connecting to the Host Computer

The drive must be connected to the computer using an HP-IB cable. Do not use a cable longer than 2 meters.

Further information about HP-IB restrictions can be found in appendix C.

Caution

To avoid damage to the computer or your tape drive, turn the drive OFF before connecting them together. If possible, turn the computer off as well.

A. If possible, turn off the host computer.

B. Ensure that the tape drive is switched OFF by checking that the **AC LINE ~ switch** *(item 1 fig. 2-2)* on the front panel is OUT.

C. Connect one end of the HP-IB cable to the socket *(item 2 fig. 2-3)* on the rear panel of the tape drive. The plug can only be fitted one way round *(see fig.2-7)*.

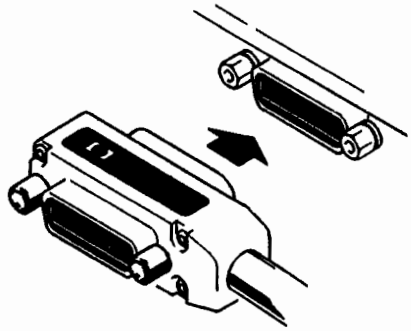


Figure 2-7. Fitting the HP-IB Cable.

D. Screw in the two retaining knobs on the plug with your fingers to secure the plug. Do NOT use a screwdriver to tighten them, the screwdriver slots are only there as an aid to removal *(see fig. 2-8)*.

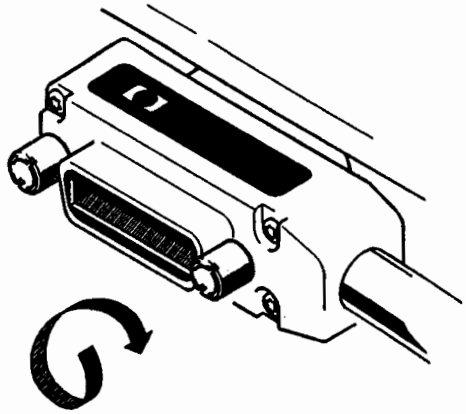


Figure 2-8. Tightening the Retaining Knobs.

E. Connect the other end of the cable to the HP-IB socket on the computer. Again, screw the two knobs which hold the plug in place finger tight.

If you already have an HP-IB cable attached to the computer, take the following actions:

1. Remove the HP-IB cable from the computer.
2. Connect the HP-IB cable leading to your HP 9144A to the socket on the computer.
3. Re-connect the HP-IB cable you removed in step 1 to the back of the connector on the HP 9144A, i.e onto the back of the cable from the computer which you attached to your HP 9144A in step C. The plugs are designed to stack on top of each other as shown in *fig. 2-9.* If you need to connect a number of peripherals to your computer, we recommend that you connect them one to another in a linear configuration (like a chain) with the computer at the start of the chain. Do not connect peripherals to the computer in a star configuration (with a number of HP-IB cables all radiating from the computer). *Fig. 2-10* shows the difference between Linear (recommended) and Star (not recommended) configurations.

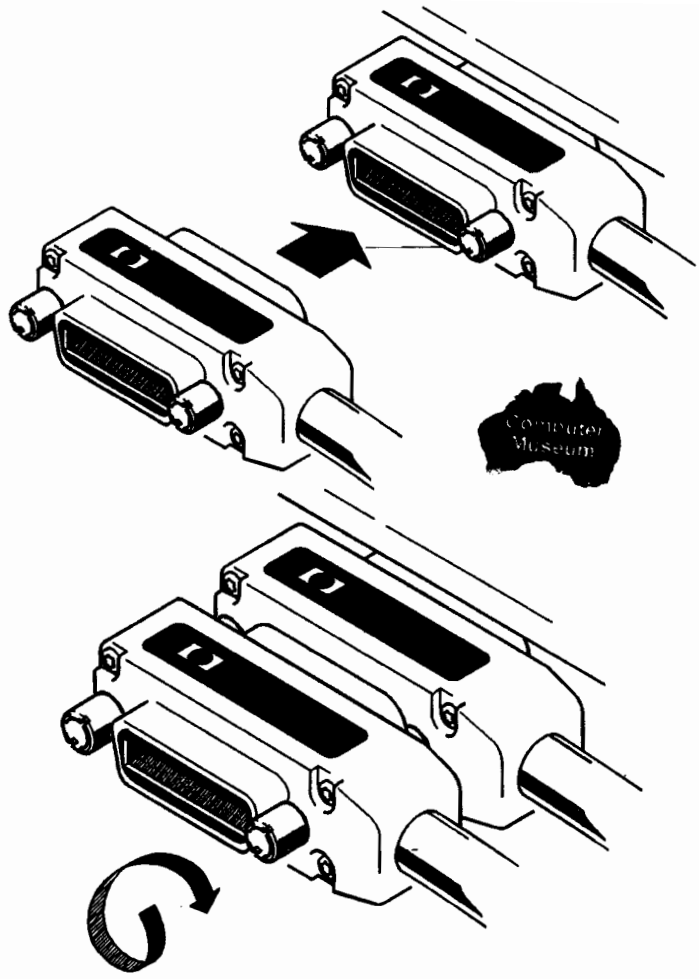
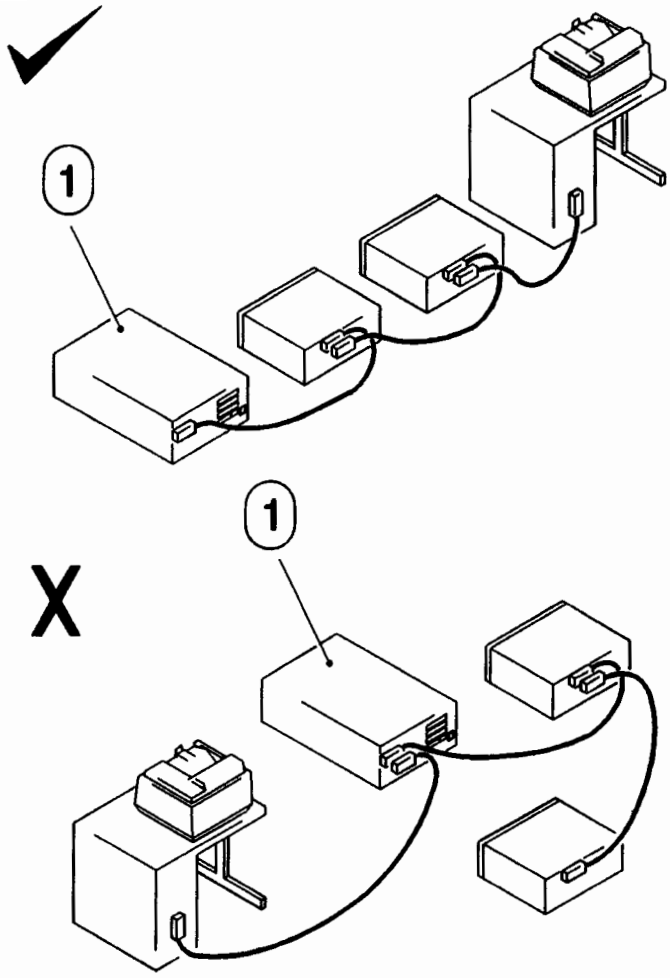


Figure 2-9. Stacking the Connectors.

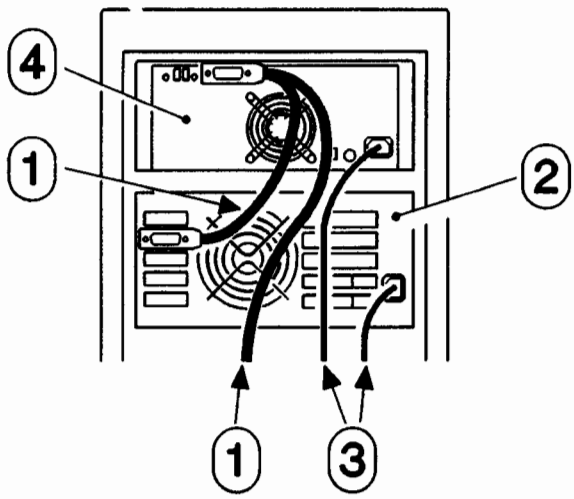


1 Host Computer

Figure 2-10. Connections to the Host Computer.

Fig. 2-11 shows how the cables might look with an HP 3000 Series 37 computer. With another computer, the sockets may be in a different position.

Connecting to the Power Supply



1 HP-IB Cables
2 HP 3000 Series 37 Computer (example)
3 AC LINE Cord
4 HP 9144A Tape Drive

Figure 2-11. Connections to Power and Host Computer

Caution 

To avoid damage to the tape drive, always ensure that the power (**AC LINE ~**) switch is OFF before connecting to the power supply.

A. Ensure that the tape drive is switched off by checking that the **AC Line ~ switch** on the front panel is OUT.

B. Plug the power cord securely into the socket labeled **AC LINE ~** on the rear panel of the drive.

C. Plug the other end of the power cord into the power supply outlet *(item 4 fig. 2-3)*.

3 Using the HP 9144A

This chapter covers:

- Switching on the HP 9144A.
- Cartridges and their care.
- Loading and unloading cartridges.
- Protecting cartridges from accidental erasure of data.
- Using the HP 9144A with a computer system.
- Using the HP 9144A with an HP 150 personal computer.

Note 

Because of the variety of applications and systems available, this manual does not describe the commands you will use to back up and transfer your data. Refer to the software and systems manuals for this information.

Switching On

Once you have completed the steps in the last chapter, you can switch the drive **ON** by pressing **IN** the **AC LINE Switch** *(item 1 fig.2-2)* on the front panel. The drive is **ON** when the switch is **IN**, and **OFF** when the switch is **OUT**.

A. Ensure that the ventilation grille on the rear panel is free from obstructions.

B. Switch **ON** the tape drive by pressing **IN** the **AC LINE Switch.**

The tape drive will now go through a self-test routine which takes about 7 seconds. After the self-test is complete, the drive is ready to accept a tape cartridge.

Cartridges and their care

Tape cartridges for the HP 9144A are available in two capacities:

Type L 67.1 Mbyte 600ft part no. 88140LC (box of 5)
Type S 16.7 Mbyte 150ft part no. 88140SC (box of 5)

When you receive cartridges, they are in hard plastic cases wrapped in cellophane. You should always store cartridges in their plastic cases when they are not in use.

The two types of cartridge listed above are formatted and certified at the factory before you buy them.

Caution 

The cartridges used in the HP 9142A tape drive are NOT compatible.

Looking after the cartridges

In addition to the following guidelines, please see *appendix D* for guidelines about conditions where the temperature varies.

- Do not touch the tape, or attempt to clean the tape path or tape guides inside the cartridge.
- Do not leave cartridge tapes in excessively warm, dry or humid conditions.
- Do not leave tapes in direct sunlight or in places where magnetic fields are present (e.g. under telephones, near transformers, motors etc.).
- Do not use cartridges at temperatures less than 5°C (41°F) or greater than 40°C (104°F).
- Do not store cartridges at temperatures less than -40°C (-40°F) or greater than 45°C (113°F).
- Do not drop cartridges or handle them roughly.
- Do not stick extra labels onto cartridges; they could cause the cartridges to jam in the tape drive.
- Always store cartridges in their plastic cases when not in use.
- Always keep the cartridges in a clean environment.
- If the storage temperature of the cartridge is different from the operating temperature, refer to *appendix D* for guidelines on how long you need to stablize the cartridge before use.
- To prevent overwriting data stored on the cartridge, use the write-protect switch on the cartridge. See *Write-Protecting Cartridges*, later in this chapter.

Loading and Unloading the Cartridge

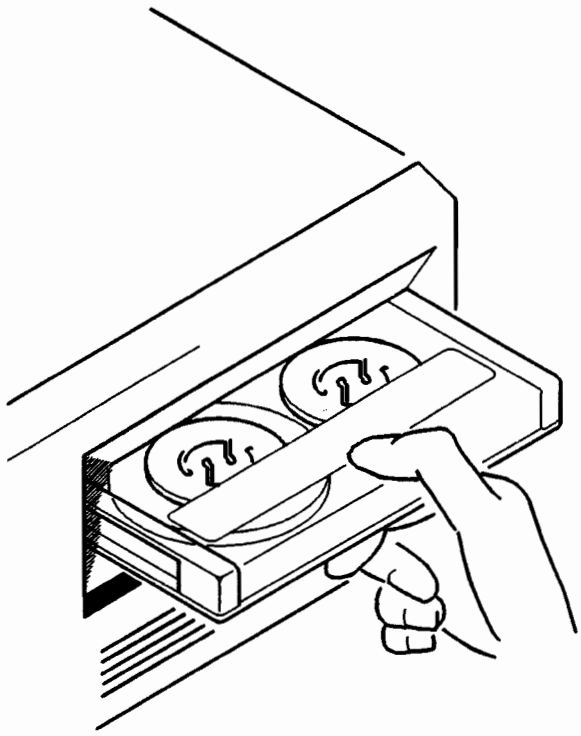


Figure 3-1. Inserting the cartridge

Inserting the Cartridge

Insert a cartridge into the cartridge slot with the label saying CERTIFIED DATA CARTRIDGE facing upwards.

When a cartridge is inserted, the load sequence begins. The load sequence takes 1 minute 15 seconds for a 16.7 Mbyte cartridge, or 2 minutes 25 seconds for a 67.1 Mbyte cartridge.

Initializing

Initializing sets up a volume label and file directory on the tape. You **MUST** initialize a cartridge before you use it for the first time. To do this, consult the instructions for the particular computer and operating system you are using.

Caution

Once data has been stored on a tape, initializing the tape a second time will destroy the data.

Removing the Cartridge

A. Press the Unload button *(item 5 fig. 2-2)*.

This starts a sequence which unlocks the cartridge to allow you to remove it. The unload sequence takes about two and a half minutes for a 67.1 Mbyte cartridge or about one and a half minutes for a 16.7 Mbyte cartridge.

During the unload sequence the Busy lamp *(item 3 fig. 2-2)* is illuminated. Towards the end of the sequence the tape drive can produce a clattering sound which lasts for 2 or 3 seconds; this is quite normal, and indicates that the tape drive has unlocked the cartridge.

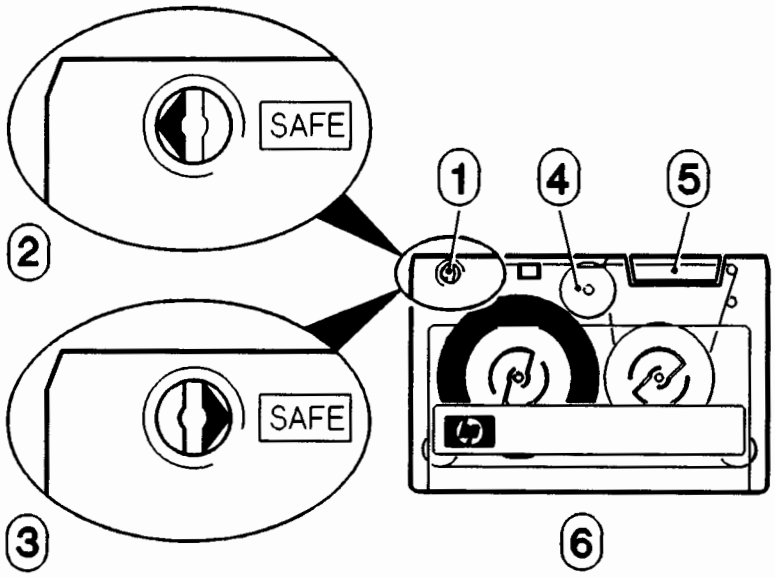
After the Busy lamp goes out...

B. Press the EJECT button *(item 4 fig. 2-2)* and remove the cartridge.

C. Store the cartridge in its plastic case after use.

Write-Protecting Cartridges

If you want to protect the data on a cartridge from being altered or overwritten you can write-protect the cartridge.



1	Write-protect Switch	4	Drive Wheel
2	Unprotected Position	5	Tape Head Door
3	Protected Position	6	Tape Cartridge

Figure 3-2. Write-protecting a Cartridge

To write-protect a cartridge, rotate the write-protect switch with a screwdriver or coin until the arrow points towards the word **SAFE**. The switch clicks into place when it is in the correct position.

If a cartridge is write-protected, the **Protect** lamp *(item 3 fig. 2-2)* will light when the cartridge is inserted into the drive.

Caution

When changing the position of the write-protect switch, make sure that the switch clicks into position with the arrow pointing **directly** towards or away from the word **SAFE**. If the switch is left in any other position it can damage the tape drive.

Write-protection will not prevent a cartridge being erased by bulk-erasure or degaussing.

Use with a System

The HP 9144A can be used with a variety of computer systems and applications. To find out the commands which you should use with your particular system, consult your system or software manual. For example, *Section 4* of the *HP 3000 System Operation and Resource Management Reference Manual,*
(part no. 32033-90005) explains to system operators how to back up system and user files. Similar sections can be found in other system manuals.

Use with an HP 150 PC

To use the HP 9144A Tape Drive with an HP 150 Personal Computer, you need the Option 150 Tape Backup Utility *(part no. 09142-87910).* This consists of an instruction manual and a flexible disc containing a backup application program.

4 Maintenance

This chapter covers.

- How the HP 9144A monitors the condition of your tape cartridges.
- An overview of the tape drive's self-test features.
- Cleaning the tape head.
- Cleaning the case.

Caution 

There are no user-serviceable parts in the HP 9144A. Service must be carried out by Trained Service Engineers.

Media Monitor

The HP 9144A monitors the condition of your tape cartridges.

If the **Protect** lamp flashes at the end of an unload sequence (when the **Busy** lamp goes out) this means that the tape is nearing the end of its useful life.

When **Protect** flashes...

A. Copy the data from the existing cartridge onto disc.

B. Copy the data from the disc onto a new cartridge.

C. Discard the old cartridge.

Self-test Overview

The power-on self-test checks the major assemblies in the HP 9144A and displays the HP-IB address on the right-hand LED display on the rear panel.

If the self-test routine finds a fault, the front panel **Fault** lamp lights and remains illuminated until another self-test is initiated or the tape drive is turned off.

While the self-test is taking place, the LED displays on the rear panel show the following sequence:

A. Both displays are off

B. All segments are turned on for a moment

C. The LEDs are turned off except for the decimal points

D. A pass or fail indication (or) shows in the left-hand display, with the HP-IB address (to) appearing in the right-hand display, for example .

The self-test takes about seven seconds.

If the tape drive passes all the tests and there is a cartridge in the drive, the load sequence starts.

If a cartridge is not in the drive and a pass condition ( ) is indicated, the next step is to insert a cartridge.

When a cartridge is inserted, the read and write part of the self-test sequence is performed. If the cartridge is write-protected, only the read part of the self-test is done.

If the **Fault** lamp lights, but the LED display on the rear panel shows a (Pass) condition, the most likely problem is a faulty tape cartridge; so, try another tape cartridge to see if the **Fault** lamp lights again.

If your HP 9144A fails the self-test, it is possible to find out what has gone wrong by using the DR (Display Self-Test Results) push-button *(item 8 fig. 2-3)* on the rear panel.

For example:

If the LED display shows 5.3 (Failed with HP-IB address 3). . . .

Press the DR button with the tip of a ball-point pen or similar object.

The LED display will then indicate which part of the tape drive has failed the self-test.

If, after pressing the DR button, 8.4 is displayed, this means that the tape head is probably dirty. Clean the head and try the self-test again with a new tape cartridge.

If pressing the DR button gives any other display, contact your HP service representative, who will interpret the results and take the appropriate action.

Cleaning the Tape Head

How Often?

The tape head needs to be kept clean, and should be cleaned....

- At least once a week.
- After using a new cartridge for the first time.
- After every three backup operations using the 67 Mbyte (600 ft) data cartridges.
- After every ten backup operations using the 16 Mbyte (150 ft) data cartridges.
- Most importantly, if data errors are experienced.

How do I clean the tape head?

A. Switch the tape drive on.

B. Depress the cartridge-in switch with a cleaning swab, which causes the tape head to rise.

The cartridge-in switch is the lower of the two micro-switches at the back of the cartridge slot towards the left side *(see fig. 4-1.)*.

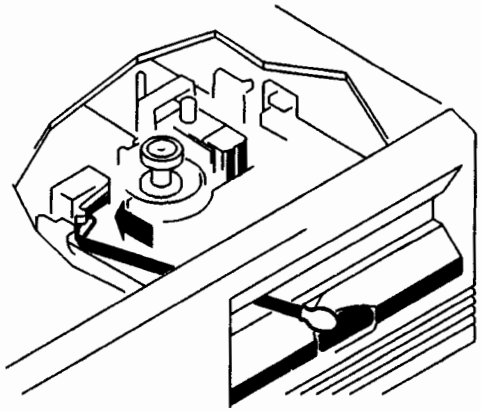


Figure 4-1. Depressing the cartridge-in switch.

Note

Take care not to press the switch in for too long. After about four seconds the load sequence starts. If this happens, turn the tape drive off to stop the load sequence then turn it back on and start again.

C. Pour a small amount of cleaning fluid into a clean container, such as a small UNWAXED paper cup.

Dip a cleaning swab into the fluid.

Caution

HP *ONLY* supports the use of LIQUID FREON TF * as a tape path cleaning solvent. DO NOT USE ANY OTHER SOLVENT.

Freon TF dissolves wax. If a waxed cup is used, the wax will be transferred to the tape path.

D. Applying gentle pressure, clean the following surfaces

- The Tape Head (clean from side to side, NOT up and down)

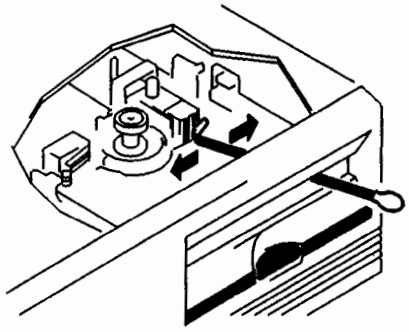


Figure 4-2. Cleaning the Tape Head.

- The Capstan (the rubber drive wheel)

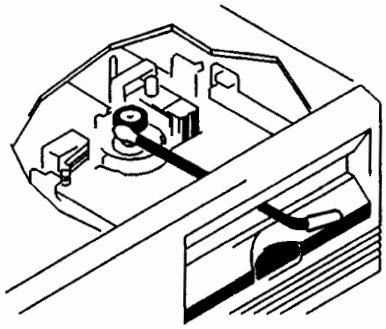


Figure 4-3. Cleaning the Capstan.

E. Throw away the swab after use.

F. Load a cartridge in the normal way, the load sequence will automatically re-set the position of the tape head.

G. Press the Unload button to start the unload sequence.

H. When the Busy lamp goes out, press EJECT to remove the cartridge.

The tape drive is now ready for use.

Using the Cleaning Cartridge

Tape head cleaning is simpler if you use the head cleaning cartridge kit (HP 92193E) which includes a cleaning cartridge, cleaning fluid and replaceable cleaning pads. Full instructions are provided with each kit.

Cleaning the Case

Warning 

To avoid electrical shock, unplug the power cord before cleaning the case.

The front panel and top cover of the tape drive are made of colored plastic and are unpainted. The rear panel and chassis are finished in a durable, non-toxic paint. With occasional cleaning, the finish should be preserved for many years, but if it does become damaged, consult your local HP Sales and Support Office for the touch-up paint which is available.

To clean the case...

A. DISCONNECT THE POWER CORD AND CONNECTING CABLES.

B. Dampen a clean, soft, lint-free cloth in a solution of clean water and mild soap.

C. Wipe the soiled areas of the case, making sure that no cleaning solution gets inside the case or into the connectors.

D. Remove the soap solution by wiping with another clean, soft, lint-free cloth moistened only with clean water.

E. Dry the case with a soft, clean cloth.

Remove pen and pencil marks with a non-abrasive eraser.

Caution 

Do not use spray-on cleaners or other chemical cleaners. They may damage the case finish.

Do not use detergents that contain ammonia, benzenes, chlorides or abrasives.

5 Problems and Solutions

What if the **Fault** *lamp remains illuminated?*

This means that the tape drive has failed the self-test.

Take the following action:

A. Turn off the tape drive, then turn it on again.

This repeats the self-test. The **Fault** lamp will light again if the self-test detects an internal error.

B. Repeat step A two or three times.

C. If the tape drive still fails the self-test (the **Fault** lamp lights each time you turn on the drive) contact your dealer or HP representative (see also the section in *chapter 4* on self-test).

What if the power fails with a cartridge in the tape drive?

If the power fails, the tape cartridge is locked into the drive until power is restored and you press the the [Unload] button.

Take the following action:

A. Turn the tape drive off.

B. Wait for power to be restored.

C. Turn the tape drive on.

D. When the **Busy** lamp goes out, press the [Unload] button.

E. When the **Busy** lamp goes out again, press the [EJECT] button and remove the cartridge.

What if the tape cartridge will not come out of the drive?

When the tape head is raised (for cleaning or reading the tape), the [EJECT] button is locked. If a cartridge is inserted into the drive with the tape head raised, it becomes locked in the drive. The only way to lower the tape head is to go through an unload sequence.

If you have just cleaned the tape head, turn the power on and insert a tape cartridge to begin the load sequence. Press the [Unload] button to start the unload sequence. When the **Busy** lamp stays off, you can remove the tape cartridge by pressing the [EJECT] button.

What do I do if the **Fault** *lamp lights when I put in a cartridge and the* [Eject] *button is unlocked?*

This indicates a dirty tape head or a bad tape cartridge. Clean the head and try a new cartridge. If the problem continues, call your HP representative.

What if I get an error message saying
TAPE OR DISC ERROR READING DRIVE __ *?*

Your tape cartridge is probably worn or damaged. Try using other tapes to see if you get the same message. If you receive the message on only one tape cartridge, copy the tape immediately and discard the old one. (Please note that if the tape is worn or damaged, the copy might not work).

If you get the same message with several tapes, contact your HP representative.

What if the computer displays a message saying
NO TAPES OR DISCS WERE FOUND... *or*
NO MASS STORAGE FOUND... *or*
TAPE OR DISC DRIVE IS EMPTY... *or*
TAPE OR DISC DRIVE IS OFF... *or*
TAPE OR DISC DRIVE IS UNDEFINED... *?*

A. Check that the tape drive is turned ON.

B. Ensure that the **Fault** lamp is OFF.

C. Switch OFF the tape drive, check that all the connections

are secure and then switch the drive ON again.

D. Ensure that there is a tape cartridge in the drive.

E. Ensure that the tape cartridge has been initialized.

F. Check that the left-hand LED display on the rear panel shows 8, indicating a self-test pass.

G. Ensure that the tape drive is set to the correct HP-IB address. The HP-IB address is shown on the right-hand LED display on the rear panel.

H. If all these things are correct, the cartridge itself might be faulty. Try using another tape cartridge.

How can I destroy or remove data from a cartridge?

Use the **Initialize** or **Format** command from your computer. This will destroy all the data on the cartridge, but leave the formatting blocks. Do NOT erase, bulk-erase, degauss your cartridge tapes, or otherwise destroy the formatting blocks, which would leave the cartridge useless.

Warranty and Service

Warranty

The complete warranty statement is included in the front of this manual. If you have questions concerning the warranty, please contact your dealer, or HP Sales Office. There is a list of these offices in *appendix E.*

Service

There are no user-serviceable parts in your HP 9144A Tape Drive. The only service item a user can do is to clean the tape head. If at any time you suspect that your tape drive is malfunctioning, consult the problem-solving section of this chapter. If a malfunction is confirmed or still suspected, call your HP Sales Office or Dealer.

A Product Specification

Physical

Net weight: 6.8 kg (15 lbs)
Height: 132 mm (5.2 in)
Depth: 290 mm (11.4 in)
Width: 325 mm (12.8 in)

Interface

Type: HP-IB (IEEE-488 1978) using CS/80 protocol

Format and Density

Encoding Technique: MFM
Speed: 60 inches/sec reading and writing
90 inches/sec searching
Bit Density: 10 000 bits/inch (bpi)
Maximum Sustained
Transfer rate: 34 Kbytes/second

Capacity

Bytes/Frame: 256
Frames/Block: 6 (4 blocks for user data - 2 blocks for error correction)
Tracks/Tape: 16
User Blocks/Track
88140SC: 1024 Maximum
88140LC: 4096 Maximum

Power requirements

90-132 volts or 198-264 volts at 50 watts RMS (102 voltamps)
47-66 Hertz
Fuse 3A Fast-Blow, 250 Volt Rating (Outside Europe)
Fuse T3.15A Slow-Blow, 250 Volt Rating (Europe)

Environmental Specifications

Operating Limits

Temperature: 5°C to 40°C (40°F to 104°F)
Humidity: 20 to 80% with maximum wet bulb temperature (non-condensing) not to exceed 26°C (79°F)
Altitude: 0 to 4572m (0 to 15 000 ft)
Noise Level: Less than 60 dbA Sound Power

Non-operating limits

(Storage and transit of Drive)
Temperature: -40°C to 75°C (-40°F to 167°F)
(Storage and transit of Tape)
Temperature: -40°C to 45°C (-40°F to 113°F)
Altitude: -304 to 15240m (-1000 to 50 000 ft)

Electromagnetic Emissions

Radiated and Conducted Interference

USA: meets FCC Rules Part 15 Class B computing devices requirements
Europe: meets FTZ 1046/84 computing devices
Japan: meets Class 2 ITE computing devices

B System Support

The HP 9144A Tape Drive is supported on the following host systems.

Host	Op. System	Supported	Interface	Cable	Notes
HP 9000 Series 200 & 300	Basic	Yes	98624A, Internal or 98625A	Must order HP-IB cable separately. Optional cable lengths available. (All)	Represents 1 HP-IB load (All)
	Pascal	Yes			
	HP-UX	Yes			
Series 500	HP-UX	Yes	27110A		
	Basic	Yes	27110A		
HP 1000 M E F Series	RTE-6/VM A. 85	Yes	12821A		Does not support System Bootup
A Series	RTE-A A.85	Yes	12009A		
HP 3000 (All)	MPE-V	Yes	30079A		
HP 150B,C/ Touchscreen & Touchscreen II	MS-DOS	Yes			Order Option 150

C HP-IB Restrictions

The exchange of data between a host computer and the HP 9144A is at a high transfer rate (a burst rate greater than 500 kbytes/second). Because of this high rate, the following restrictions and cautions apply to devices connected to the HP-IB:

- ALL AC line switches (both on the computer and on peripherals) should be turned OFF when connecting and disconnecting devices.
- ALL devices on the system must be turned ON for any transfer of data at a high transfer rate. If the transfer is at a lower rate (e.g. to a floppy disc drive or to a printer), at least two-thirds of the devices on the HP-IB should be turned ON.
- The HP-IB cables which connect devices should be as short as possible. For this reason, HP-IB cables of 4m and longer are NOT recommended.
- Do not turn any device ON or OFF while there is activity on the HP-IB.

Note 

Use of a non-shielded interface cable will invalidate the FCC certification. HP-IB cables supplied by Hewlett-Packard are shielded.

D Cartridge Guidelines

One of the advantages of cartridge tapes is that they are portable. Because of this, they may be exposed to rapid changes in environmental conditions. The guidelines in this appendix are recommended so that your HP 9144A should continue to perform reliably and you can be confident of a high standard of data integrity.

Cartridge Specifications

The ANSI X3.55 - 1982 specification applies to the cartridge tapes used in an HP 9144A. In part, this states:

Temperature.... 41°F to 113°F (5°C to 45°C)

Relative Humidity.... 20% to 80% non-condensing

Maximum Wet Bulb Temperature.... 79°F (26°C)

The cartridge shall be conditioned by exposure to the operating environment for a time equal to or greater than the time away from the operating environment (up to a maximum of 8 hours). If a user of a data cartridge knows or suspects that the cartridge has been exposed to a drop in temperature exceeding 30°F (16.7°C) since last used, it is recommended that the cartridge be rewound one complete cycle on the tape transport before it is used for data interchange.

This specifies the normal operating limits for cartridges, but does not clarify restrictions relating to changing conditions within those limits.
Hewlett-Packard has tested cartridges in order to determine conditions for reliable data recovery after temperature changes. Stable conditions will obviously help to ensure data integrity, but where they are not possible, the following precautions are recommended.

Cartridge Guidelines

The following conditions refer to changes in the room temperature, or the temperature surrounding the tape drive. It is assumed that:

- the cartridges have been stabilized to the temperature of the room before the change; that is, they have been in the room long enough to reach room temperature.
- the cartridge is in the drive,
- the drive is turned on,
- the temperature never leaves the specified operating range for the HP 9144A drive: 5°C to 40°C (40°F to 104°F).

In each case, the ANSI specification requires up to 8 hours stabilization time after the temperature has changed and before the cartridges should be used.

HP's factory tests have explored the stabilization times necessary to ensure excellent performance, and these times are given for each condition.

Controlled Temperature Environment

The temperature varies within ±5°C.

HP's factory tests show that no stabilization is necessary.

Moderately Varying Temperature Environment

The temperature variation is between 5°C and 16.6°C.

HP's factory tests show that 35 minutes stabilization is sufficient.

Extremely Varying Temperature Environment

The temperature varies more than ±16.6°C while remaining within the specified range of 5°C to 40°C.

HP tests recommend stabilizing for one hour, followed by re-tensioning the cartridge. Re-tensioning is achieved by doing a normal load sequence on the cartridge.

Conditions To Be Avoided

- Do not place the tape drive in or near the flow of air from a heater or air conditioner. The cycling of the heater or air conditioner can cause data recovery problems.
- Do not place the tape drive near a door which is often used, and which separates different temperature conditions. If the drive is placed near an outside door, for example, the blast of hot or cold air when the door is opened can affect data recovery.
- Do not leave cartridges in severe temperature conditions for any length of time; for example in a car standing in the cold overnight or in sunlight during the day. If it is unavoidable, then before you use the cartridge for data recovery, stabilize it for one hour and then re-tension it by performing a normal load sequence.
- Avoid transferring data (reading from and writing to cartridges) when the temperature is changing by more than 3°C per hour.

Supplies & Accessories

Supplies

It is advisable to keep a supply of cartridges and cleaning materials in stock at all times. The following HP products are recommended for use with the HP 9144A. They are listed with their part numbers:

Cartridges

16.7 Mbyte (150 ft) Cartridge, formatted and certified (Box of 5).....HP 88140SC

67.1 Mbyte (600 ft) Cartridge, formatted and certified (Box of 5).....HP 88140LC

Cleaning Supplies

Tape Head Cleaner, 6 x 4oz bottles.....HP 92193X

Foam Swabs (10 per packet) wooden shaft.....9300-0468

Foam Swabs (10 per packet) plastic shaft.....9300-0767

Lint-Free Wipes.....HP 92193W

Magnetic Head Cleaning Kit.....HP 92193H

Kit Contents:

- 2 x 4oz bottles of Tape Head Cleaner
- 50 Lint-Free Wipes
- 10 Foam Swabs with plastic shafts
- 1 easy-pour dispensing cap

Cleaning Accessories

Cleaning Cartridge Kit.....HP 92193E

Cleaning Cartridge Replenishment Kit (Foam pads and Cleaning fluid).....HP 92193P

Spare Fuses

3A Fast-Blow 250V (Outside Europe) 2110-0003

T3.15A Slow-Blow 250V (Europe) 2110-0638

Cables (HP-IB)

0.5m.....HP 10833D

1m.....HP 10833A

2m.....HP 10833B

Cabinet and Accessories

Design Plus mobile mini-rack system cabinet.....HP 92211R

Rail kit for HP 92211R (4 sets of rails and module locks)..... HP 92211S

Filler Panel Kit for HP 92211R (20 snap in panels).....HP 92211T

19-Inch Rack Mount Kit.....HP 19500B

Publications

Hardware Support Manual.....09144-90030

Customer Engineer Handbook.....09144-90039

Ordering

The following list gives addresses and telephone numbers of the main computer supplies centers. Further telephone numbers will be found in the list of worldwide Sales Offices at the end of this manual.

The telephone numbers in the following list are given in the standard format: **(ccc) rrr-nnnnnnnn.** **(ccc)** is the country code and should be used when calling from outside the country. **rrr** is the regional code. If you are in the country, you may need to prefix the regional code with zero. **nnnnnnnn** is the actual telephone number

Australia

Hewlett-Packard (Australia) Ltd.
31-41 Joseph St.
BLACKBURN, Victoria 3130
Tel: **(61) 3-895 2895**

Austria

Hewlett-Packard Ges.m.b.H
Liebigasse 1
P.O.Box 72
A-1222 VIENNA
Tel: **(43) 222-2500 615**
(43) 222-2500 616

Belgium

Hewlett-Packard Belgium S.A./N.V.
Boulevard de la Woluwe 100
Woluwedal
B-1200 BRUXELLES
Tel: **(32) 2-762 32 00**

Canada

Hewlett-Packard (Canada) Ltd.
3710 Nashua Dr., Units A-E
MISSISSAUGA
Ontario L4V IM5
Tel: **(1) 416-671 8383**

Denmark

Hewlett-Packard A/S
Datevej 52
DK-3460 BIRKERØD
Tel: **(45) 2-81 66 40 (ext.258)**

Finland

Hewlett-Packard Oy
Revontulentie 7
SF-02100 ESPOO 10
Tel: **(358) 0-4550211**

France

Hewlett-Packard
Département Fournitures
Consommables
B.P. 19
91941 LES ULIS CEDEX
Tel: **(33) 6-928 32 64**

German Federal Republic

Hewlett-Packard GmbH
Computer-Zubehoer
Dornierstr. 7
7030 BöBLINGEN
Tel: **(49) 130-3322**

Italy

Hewlett-Packard Italiana S.p.A.
Prodotti Ausiliari
Via G. di Vittorio 9
1-20063 CERNUSCO
SUL NAVIGLIO (MI)
Tel: **(39) 2-92 369 437**
(39) 2-92 369 478

The Netherlands

Hewlett-Packard Nederland B.V.
Van Heuven Goedhartlaan 121
NL-1181 KK AMSTELVEEN
Tel: **(31) 20-47 06 39**

Norway

Hewlett-Packard Norge A/S
P.O.Box 34
Østerndalen 18
N-1345 ØSTERÅS
Tel: **(47) 2-17 11 80**

South Africa

Hewlett-Packard So Africa Ltd.
Private Bag, Wendywood
SANDTON 2144
Tel: **(27) 11-802 5111**

Spain

Hewlett-Packard Española SA
Calle Jerez 3
E-MADRID 16
Tel: **(34) 1-637 4013**

Sweden

Hewlett-Packard Sverige AB
Skalholtsgatan 9, Kista
Box 19
S-16393 SPÅNGA
Tel: **(46) 8-750 2028**

Switzerland

Hewlett-Packard (Schweiz) AG
Allmend 2
CH-8967 WIDEN
Tel: **(41) 57-31 22 54**
(41) 57-31 22 59

United Kingdom

Hewlett-Packard Ltd.
Eskdale Rd.
Winnersh
WOKINGHAM
Berkshire RG11 5DZ
Tel: **(44) 734-697201**

U.S.A.

Computer Supplies Operations
1320 Kifer Road
SUNNYVALE, CA 94086
Tel: **(1) 800-538 8787**
(1) 406-738 8858

F Glossary

Address An identification number, unique to each peripheral on a computer system. The device address is used to ensure that the computer knows with which device it is communicating.

Backup A copy of data or files made to guard against damage to the original. Tape is often used to back up discs.

Bulk-erasure A method of destroying the magnetic patterns which contain the coded information on tape. Do not bulk-erase the tape cartridges for your HP 9144A because there is important formatting information on them which bulk-erasure would destroy, making the cartridges useless.

Cartridge A housing containing magnetic tape wound between two spools and which incorporates a write-protect switch.

Degauss A method of bulk-erasing magnetic tapes.

Directory An index to the contents of a tape, stored in a special block on the tape.

Formatting A process where tape is magnetically divided into blocks in which data can be stored. Special blocks are set up for the Directory, for testing purposes and for recording information about the tape's history of usage. Formatting is done before you receive the tape and can **only** be done by the factory.

Host Computer The computer which controls the HP 9144A.

HP-IB The Hewlett-Packard Interface Bus. A cable with standard connectors for transfer of data between the computer and peripherals. It is HP's implementation of IEEE Standard 488-1978.

Initializing The process which sets up a directory on the tape and names the tape. You must initialize a tape by sending commands to the tape drive from the host computer.

Interface The method of joining computer equipment and peripherals together to allow them to communicate with each other. In the case of the HP 9144A, the interface is the HP-IB cable.

LED Light Emitting Diode. This is a type of indicator lamp. The HP 9144A uses displays made up of seven LEDs forming a figure 8, with an eighth LED providing the decimal point after the figure eight arrangement. The individual LEDs can be illuminated in different combinations to display any digit or one of several letters.

Mbyte Short for Megabyte, a unit of data approximately equal to one million bytes (in fact 1,048,576 bytes)

Peripherals Devices controlled by a computer, usually through cables, but not physically part of that computer (e.g. printers, plotters, disc and tape drives).

Tape Head The part of the tape drive which magnetically encodes or decodes data on the tape. (Often called the Read/Write Head).

Write-Protect A method of preventing information being erased from or added to a tape.

Index

A

AC LINE Cord 2-2, 2-15
AC LINE Switch 2-4
Address 2-8, 2-9, F-1
Adjusting the Voltage Select Switch 2-6

B

Backup 3-1, F-1
Bulk-erasure F-1
Busy lamp 2-4, 3-5

C

Cable restrictions 2-10, C-1
Capstan 4-5
Cartridge 1-1, 3-2, 3-6, E-1, F-1
Cartridge care 3-3, D-2, D-3
Cartridge guidelines 3-3, D-3
Cartridge slot 2-4
Cartridge loading 3-4
Cartridge locked in drive 5-2
Cartridge-in switch 4-4
Cartridge, unloading 3-5
Case, cleaning 4-7
Certified Data Cartridge 3-2
Changing the device address 2-8, 2-9
Changing the fuse 2-7
Cleaning cartridge 4-6, E-2
Cleaning fluid 2-2, 4-4
Cleaning supplies E-1
Cleaning swab 2-2
Cleaning the case 4-1, 4-7
Cleaning the Tape Head 4-3/4-5
Conditions to be avoided 3-3, D-3
Connecting to the power supply 2-15

Connecting to the host computer 2-11/2-14

D

Degaussing F-1
Destroying data 5-3
Device Address Switches 2-8, 2-9
DR (Display Self-Test Results Button) 2-5, 4-2, 4-3

E

Eject button 2-4, 3-5
Erasure of data 5-3
Error Messages 5-2

F

Fault lamp 2-4, 4-2, 5-1, 5-2
Formatting 3-2, 5-3, F-2
Front panel 2-4
Fuse 2-3, 2-5, 2-7, A-1, E-2

H

Head cleaning 4-3/4-5
Host computer 2-11/2-14, F-2
HP 150 Personal Computer 3-8
HP 3000 System Reference Manual 3-8
HP-IB 2-5, 2-11/2-14, E-2
HP-IB Restrictions C-1
Humidity A-2

I

Initializing 3-5, 5-3, F-2
Initiate Self-Test Button 2-5
Inserting the cartridge 3-4
Interface F-2

L

LED display 2-5, F-3
Linear configuration 2-12/2-14
Loading cartridges 3-4

M

Maintenance 4-1
Media Monitor 4-1
Mbyte F-3
Option 150 ..... 2-3, 3-8

O

Ordering E-3

P

Peripheral F-3
Positioning the drive 2-10

Power cord socket 2-5
Power supply connections 2-15
Problems and Solutions 5-1/5-3
Product specifications A-1
Protect lamp 2-4, 3-7, 4-1

R

Rear panel 2-5
Removing cartridge 5-3

S

Self-Test LED display 2-5, 4-2
Self-Test Overview 4-2
Service 4-1, 5-3
Setting up 2-1/2-15
Star configuration 2-12/2-14
Supplies and Accessories E-1/E-2
Switching On 3-2
System support B-1

T

Tape Head 4-3/4-5, F-3
Temperature 2-10, 3-3, D-1/D-3

U

Unload button 2-4
Unloading cartridge 3-5
Unpacking 2-2, 2-3
User-serviceable parts 4-1

V

Ventilation 2-10
Voltage Select Switch 2-5, 2-6

W

Warranty 5-3
Write-protecting cartridges 3-3, 3-6/3-7, F-3