



7925 DISC DRIVE

USER'S MANUAL

Printed: MAR 1983

The Federal Communications Commission (in 47 CFR 15.805) has specified that the following notice be brought to the attention of the users of this product.

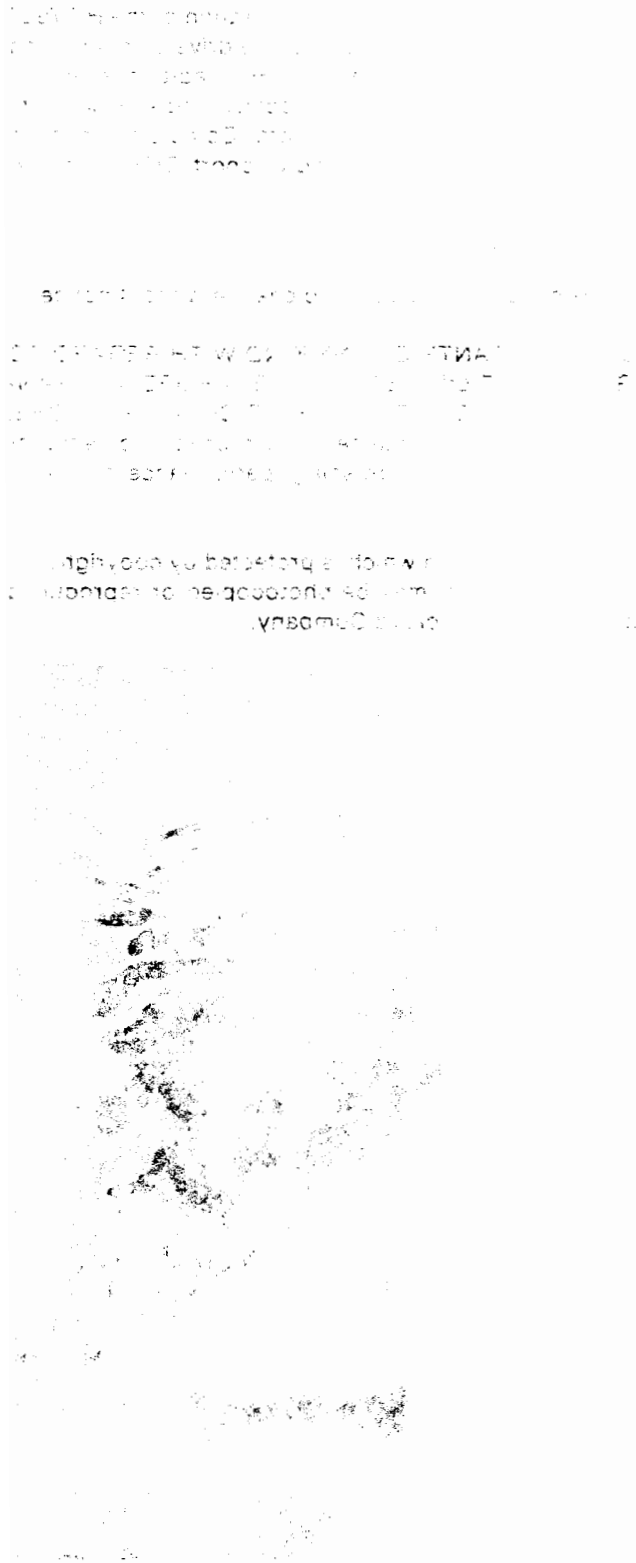
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PREFACE

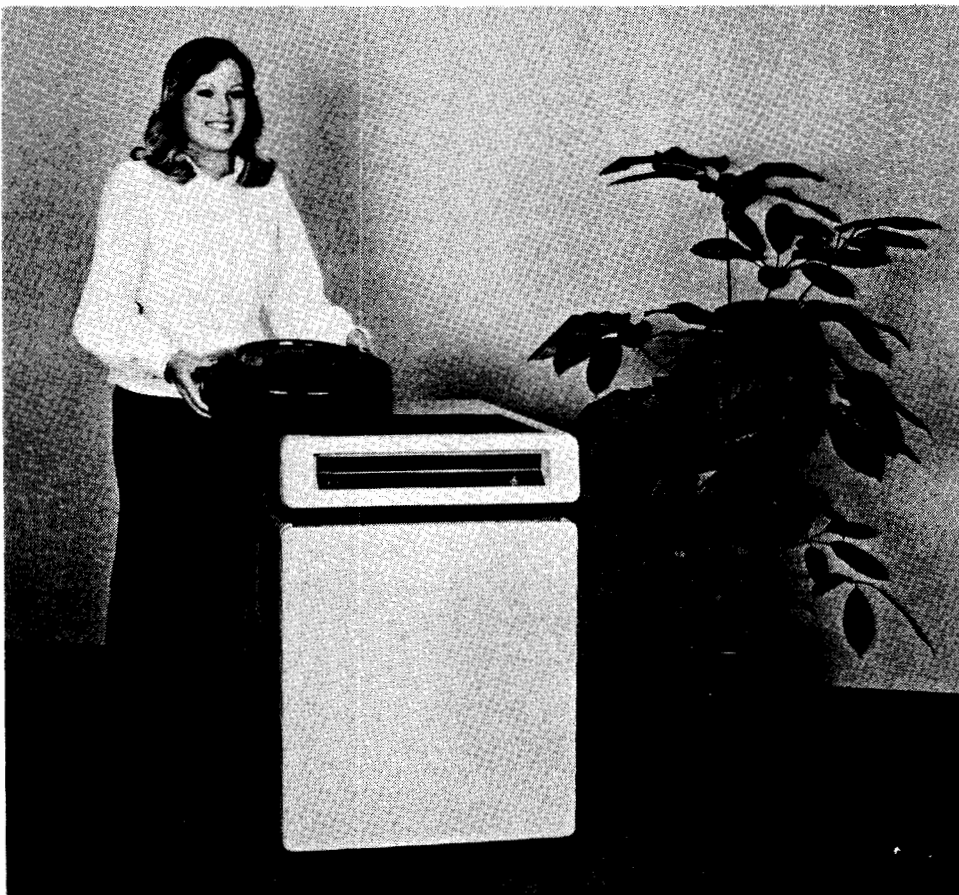
This manual contains general information pertaining to the operation of the HP 7925 Disc Drive, one of a family of controller-compatible disc storage drives. Engineering and manufacturing excellence have been emphasized in the HP tradition to ensure that the entire disc drive family exhibit the performance, reliability, and serviceability that have established HP products as a marketplace standard. Complete service is offered for the disc drive from Hewlett-Packard Sales and Support Offices around the world.

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HP 7925 Disc Drive and HP 13356A Disc Pack

INTRODUCING THE 7925

GENERAL DESCRIPTION

The HP 7925 Disc Drive is a high-performance, random-access, storage device designed for use as a peripheral unit in small and medium systems. Data is stored on five discs contained in an easily removable disc pack. The disc pack contains nine surfaces for data storage and one surface for head positioning and sector timing.

Through the use of the nine data surfaces, the HP 7925 provides access to 120 million bytes of formatted information in a single package. Separate heads are used for each data surface to retrieve existing data or to record new data. Head positioning at any one of the 823 cylinder positions is controlled by a closed-loop, track-following, servo system that derives cylinder position information from the top surface of the center disc.

The disc drive contains a sophisticated fault detection system which senses abnormal conditions and indicates the fault through a group of eight light-emitting diode indicators on the indicator panel. This advanced serviceability feature facilitates troubleshooting and reduces the overall time to diagnose and repair failures.

In addition, disc drives which contain an integrated controller have a self-test feature which further facilitates troubleshooting.

DISC MEDIA

HP seeks to provide the best possible total disc performance through extensive testing, selection, and control over all the critical components that make up an HP disc product. Because of the unique interdependence of total disc performance and the head/media interface, disc drive specifications and reliability can only be assured when using HP media products.

Undesirable alteration of the media surface environment can result from improper cleaning. The cleaning of HP media products using a nonapproved process is, therefore, *not* recommended.

Any damage sustained to the heads or media, or any consequential damage resulting from the use of non-HP media or improperly cleaned media, is excluded from warranty or service contract coverage but will be repaired subject to HP's standard time and material charges. Use of non-HP media, however, does not affect the warranty and service contract coverage of other components of the drive not associated with the head/media interface.

Extensive testing of the HP 7925 Disc Drive in conjunction with the HP 13356A Disc Pack has ensured the best possible disc media error performance and interchangeability of disc packs between HP 7925 Disc Drives (operating within the performance specifications and within environmental limits).

ENVIRONMENTAL CONSIDERATIONS

DISC DRIVE

Although the HP 7925 Disc Drive has been designed and manufactured to operate over a wide range of environmental conditions, it is important to operate the disc drive within the limits specified in table 1 to ensure proper operation of the disc drive.

DISC PACK

Special consideration must be given to storing disc packs because temperature and cleanliness of the storage area can affect disc pack interchangeability between disc drives, data integrity, and useful pack life. Refer to table 2 for operating and storage specifications.



ACCESSORIES

The following accessories may be ordered with the disc drive or separately from your local Hewlett-Packard Sales and Support Office. A list of HP Sales and Support Offices is provided at the back of this manual.

HP Order No.	Description
HP 10833B	HP-IB Interface Cable, 2 m (6.55 ft)
HP 13013B	Multi-Unit Cable, 3.66 m (12 ft)
HP 13013B-001	Multi-Unit Cable, 1.83 m (6 ft)
HP 13013B-002	Multi-Unit Cable, 5.49 m (18 ft)
HP 13013B-003	Multi-Unit Cable, 2.44 m (8 ft)
HP 13213B	Data Cable, 3.05 m (10 ft)
HP 13213B-001	Data Cable, 7.62 m (25 ft)
HP 13213B-002	Data Cable, 15.24 m (50 ft)
HP 13213B-003	Data Cable, 22.86 m (75 ft)
HP 13213B-004	Data Cable, 1.83 m (6 ft)
HP 13356A	Formatted Disc Pack

SUPPORTING DOCUMENTATION

The following documentation may be ordered from a Hewlett-Packard Sales and Support Office. Sales and Support Offices are listed at the back of this manual.

- *HP 7925 Disc Drive Installation Manual*, part no. 07925-90902
- *HP 7925 Disc Drive Service Manual*, part no. 07925-90903

USING THE 7925

OPERATING PRECAUTIONS

The operator should observe the following precautions when operating the disc drive:

WARNING

This disc drive does not contain operator-serviceable parts. To prevent electrical shock, refer all installation and maintenance activities to service-trained personnel.

- If the disc drive must be moved after it has been installed, it must be moved by service-trained personnel. Damage to the disc drive may result if it is moved by other than service-trained personnel.
- Heed all warning and caution labels affixed to the disc drive.
- The prefilter (see figure 2) should not be left out while the disc drive is operating. The longer it is out, the greater the chance of contaminants entering the disc drive.
- In normal operation the heads "fly" over the disc surfaces on a thin cushion of air. Dust or other contaminants between the head and the disc can cause the head to contact the disc and possibly damage the disc and/or the head. Operate the disc drive in a clean area to minimize the chance of this malfunction occurring.
- Cooling air is drawn into the disc drive through the front panel and is exhausted through ports located on the rear panel. Ensure that at least a 60 cm (2 ft) clearance is available at the front and rear of the enclosure to permit adequate airflow and to allow room for maintenance of the disc drive.
- Ensure that routine maintenance procedures are regularly performed.
- If the pack chamber area requires cleaning, call the nearest Hewlett-Packard Sales and Support Office.
- Whenever a disc pack is changed, the POWER switch must be in the 1 (on) position.

OPERATING PROCEDURES

The following paragraphs provide the basic operating procedures for the disc drive. Procedures are included for startup, disc pack changing, logical unit identification changing, shutdown, and disc drive fault responses. The disc drive cannot be started without a disc pack installed in the disc drive.

CAUTION

Never attempt to open the pack chamber door unless the DOOR UNLOCKED indicator is lit; damage to the disc drive may result.

STARTUP PROCEDURE

To operate the disc drive, proceed as follows:

- a. Set the RUN/STOP switch to STOP.
- b. Open the front door to gain access to the operator control panel (see figure 2).
- c. Set the READ ONLY switch as desired.
- d. Set the FORMAT switch as desired.
- e. Set the UNIT SELECT switch to correspond to the disc drive logical unit address which will permit proper operation with the system. (For disc drives with an integrated controller, the switch is labeled HP-IB DEVICE ADDRESS and selects the Hewlett-Packard Interface Bus device address of the disc drive.)
- f. At the rear of the disc drive, set the POWER switch to the 1 (on) position and observe that the Unit Select Identification and DOOR UNLOCKED indicators light. (On earlier versions of the HP 7925, a power switch labeled DISC is located on the operator control panel.) The Unit Select Identification indicator should display the same number selected with the UNIT SELECT switch.
- g. Close the front door.

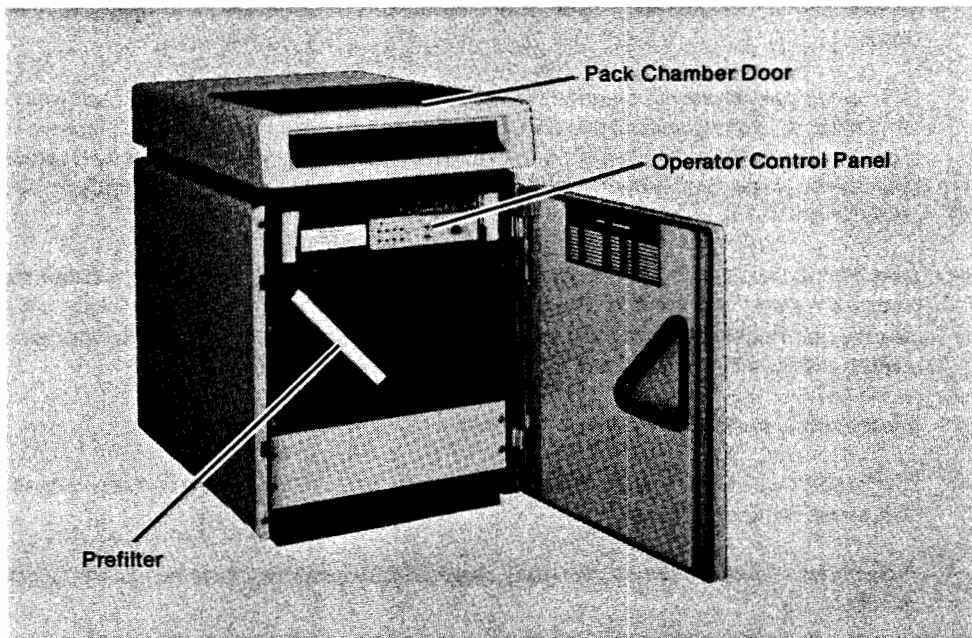


Figure 2. HP 7925 Disc Drive

CAUTION

Never attempt to open the pack chamber door unless the DOOR UNLOCKED indicator is lit; damage to the disc drive may result.

CAUTION

To avoid damage to the disc drive, a user should not install a disc pack in a disc drive unless the user has been properly trained in disc pack removal and replacement.

CAUTION

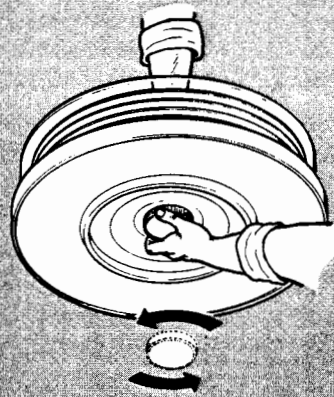
To avoid damage to the disc drive, the POWER (or DISC) switch must be in the 1 (on) position whenever the pack chamber door is open.

- h. If a disc pack (HP 13356A only) is to be installed, lift open the pack chamber door. Otherwise, proceed to step p.

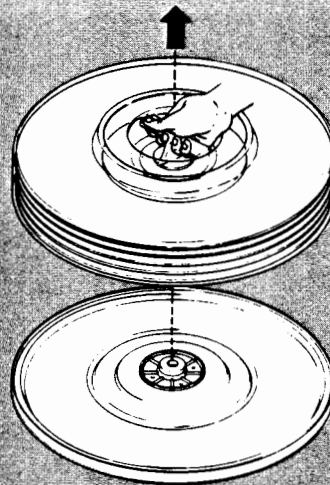
CAUTION

To avoid damage to the disc drive, if contact between a head and disc occurs as described under OPERATING PRECAUTIONS, do not attempt to retrieve data by placing a potentially damaged disc pack in another disc drive. Do not attempt to operate the disc drive until it has been checked by service-trained personnel.

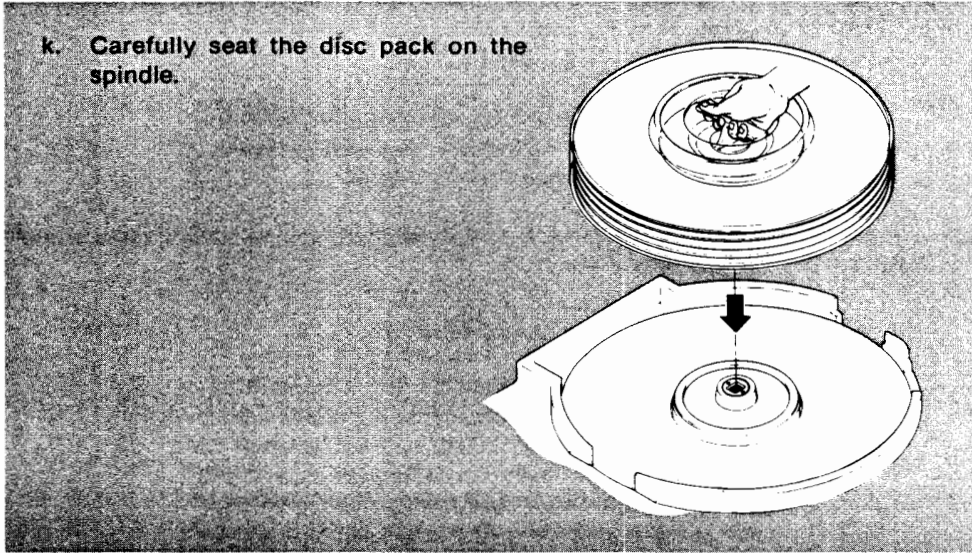
- i. On the disc pack to be installed, remove the bottom cover of the disc pack storage case by grasping the top cover handle with one hand, holding the disc pack upright. Then with the other hand, turn the knob on the bottom cover counterclockwise until the bottom cover releases.



- j. Remove the bottom cover from the disc pack.



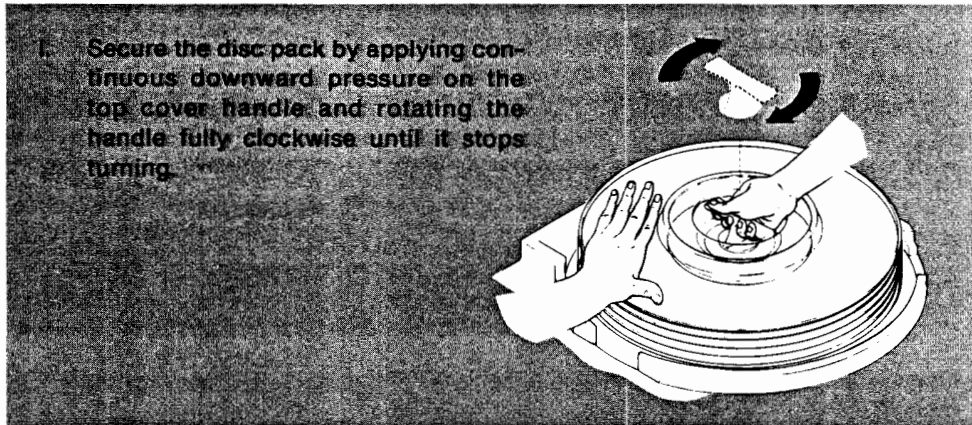
k. Carefully seat the disc pack on the spindle.



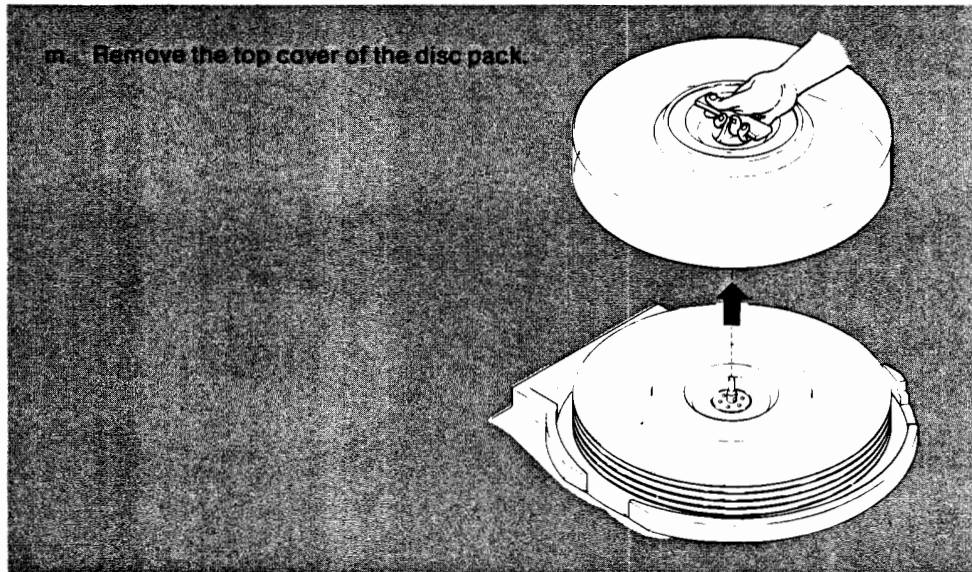
CAUTION

To avoid damage to the disc drive, ensure that the disc pack is securely attached to the spindle.

l. Secure the disc pack by applying continuous downward pressure on the top cover handle and rotating the handle fully clockwise until it stops turning.



m. Remove the top cover of the disc pack.



- n. Close the pack chamber door.
- o. Place the top cover on the bottom cover to keep the inside of the disc storage case clean.
- p. Set the RUN/STOP switch to RUN. The DOOR UNLOCKED indicator will extinguish and after a 35-second startup sequence is complete, the DRIVE READY indicator will light indicating that the spindle has reached operational speed, and the heads have been loaded at cylinder zero. The DRIVE FAULT indicator will light only if a malfunction occurs. Also, for disc drives with an integrated controller, the SELF TEST FAILED indicator will blink while the self test is running and light steady if the disc drive fails the self test.

CHANGING A DISC PACK

CAUTION

To avoid damage to the disc drive, a user should not install a disc pack in a disc drive unless the user has been properly trained in disc pack removal and replacement.

To change an HP 13356A Disc Pack, proceed as follows:

CAUTION

To avoid damage to the disc drive, if contact between a head and disc occurs as described under OPERATING PRECAUTIONS, do not attempt to retrieve data by placing a potentially damaged disc pack in another disc drive. Do not attempt to operate the disc drive until it has been checked by service-trained personnel.

- a. If the disc drive is operating, set the RUN/STOP switch to STOP. The DRIVE READY indicator will extinguish immediately. (If the disc drive is not operating, set the POWER (or DISC) switch to the 1 (on) position.)

CAUTION

Never attempt to open the pack chamber door unless the DOOR UNLOCKED indicator is lit. Damage to the disc drive may result.

- b. Allow the spindle to stop rotating (approximately 30 seconds). The DOOR UNLOCKED indicator will light indicating that the spindle has stopped and that the pack chamber door may be opened.

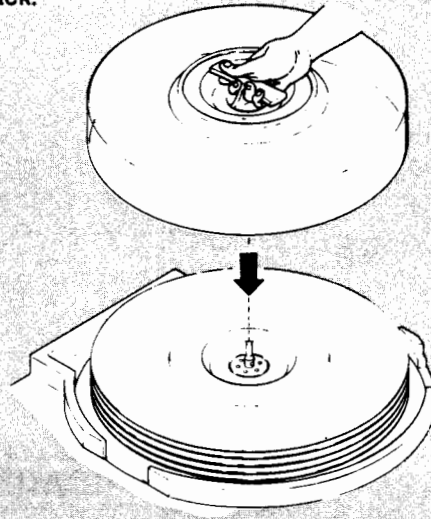
CAUTION

To avoid damage to the disc drive, the POWER (or DISC) switch must be in the 1 (on) position whenever the pack chamber door is open.

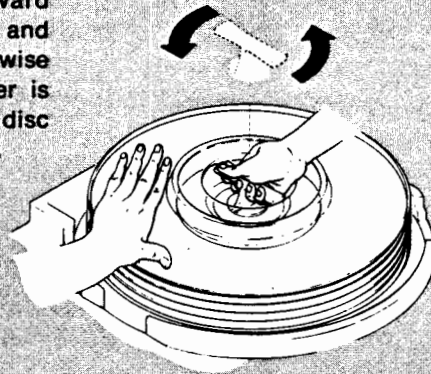
- c. Lift open the pack chamber door.

d. Place the top cover on the disc pack.

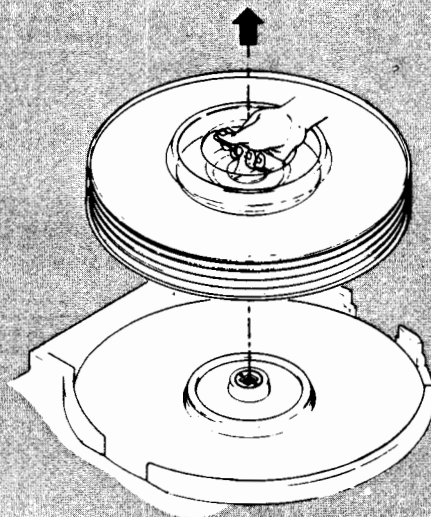
Note: An even downward motion of the disc pack top cover is required to overcome the upward flow of air out of the pack chamber.



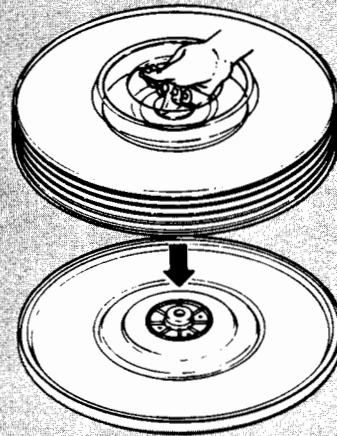
e. Secure the top cover to the disc pack by applying continuous downward pressure on the top cover handle and rotating the handle counterclockwise at least 3 turns. When the cover is secured to the disc pack, the disc pack will release from the spindle.



f. Remove the disc pack from the disc drive.



- g. Place the disc pack on the bottom cover.**



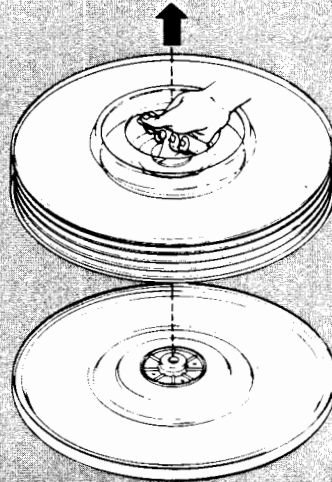
- h. Hold the disc pack upright and carefully secure the bottom cover by turning the knob on the bottom cover 1/4 turn counterclockwise, then fully clockwise.**



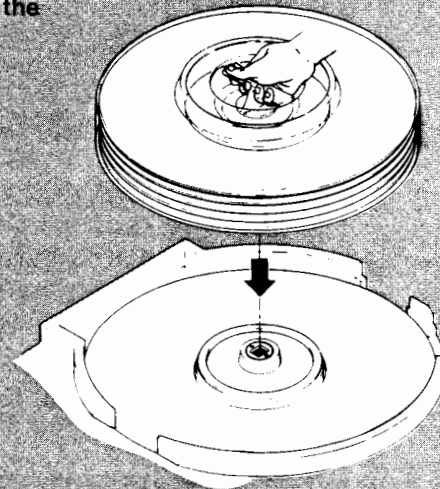
- i. On the disc pack to be installed, remove the bottom cover of the disc pack storage case by grasping the top cover handle with one hand, holding the disc pack upright. Then with the other hand, turn the knob on the bottom cover counterclockwise until the bottom cover releases.**



- j. Remove the bottom cover from the disc pack.



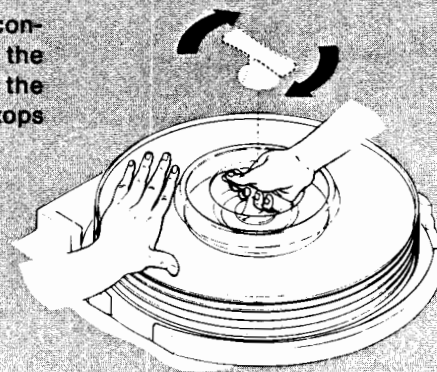
- k. Carefully seat the disc pack on the spindle.



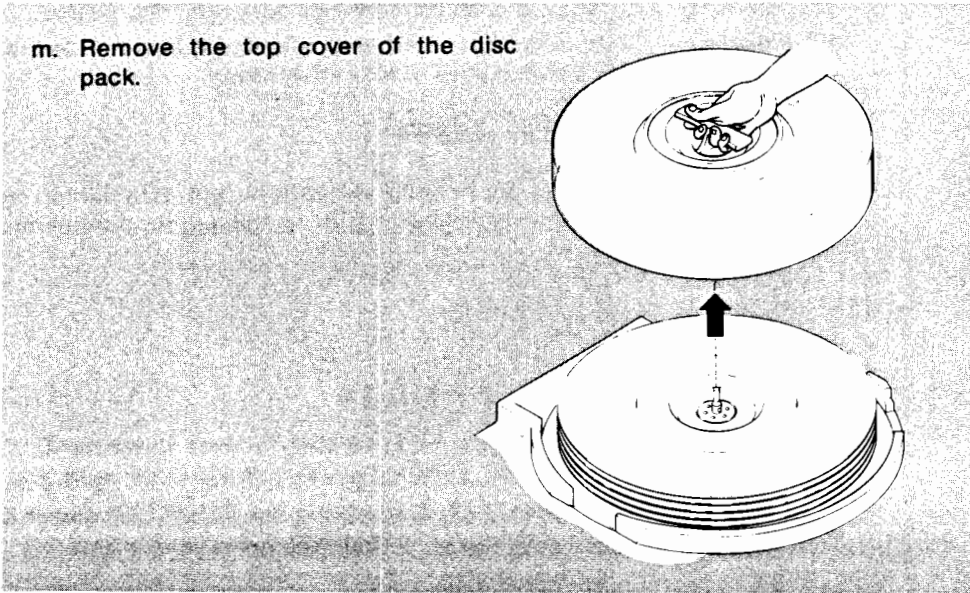
CAUTION

To avoid damage to the disc drive, ensure that the disc pack is securely fixed to the spindle.

- l. Secure the disc pack by applying continuous downward pressure on the top cover handle and rotating the handle fully clockwise until it stops turning.



- m. Remove the top cover of the disc pack.



- n. Close the pack chamber door.
- o. Place the top cover on the bottom cover to keep the inside of the disc pack storage case clean.
- p. Set the RUN/STOP switch to RUN or follow the SHUTDOWN PROCEDURE for the disc drive.

CHANGING LOGICAL UNIT IDENTIFICATION

To change the logical unit identification of the disc drive, proceed as follows:

- a. If the disc drive is operating, set the RUN/STOP switch to STOP. The DRIVE READY indicator will extinguish immediately.
- b. Open the front door to gain access to the operator controls (see figure 2).
- c. Set the UNIT SELECT switch to correspond to the disc drive logical unit address which will permit proper operation with the system. (For disc drives with an integrated controller, the switch is labeled HP-IB DEVICE ADDRESS and selects the Hewlett-Packard Interface Bus device address of the disc drive.)
- d. Close the front door.
- e. Set the RUN/STOP switch to RUN to resume operation.

SHUTDOWN PROCEDURE

To shut down the disc drive, proceed as follows:

- a. Set the RUN/STOP switch to STOP. The DRIVE READY indicator will extinguish immediately.

CAUTION

Never attempt to open the pack chamber door unless the DOOR UNLOCKED indicator is lit; damage to the disc drive may result.

- b. Allow the spindle to stop rotating (approximately 30 seconds). The DOOR UN-LOCKED indicator will light indicating that the spindle has stopped. If desired, the disc pack may be left in the disc drive or may be removed.
- c. Ensure that the pack chamber door is closed.
- d. At the rear of the disc drive, set the POWER switch to 0 (off). (On earlier versions of the HP 7925, a power switch labeled DISC is located on the operator control panel. See figure 2.)
- e. Close the front door.

RESPONDING TO DISC DRIVE FAULTS

Disc drive faults should be referred to your local Hewlett-Packard Customer Engineer or to other service-trained personnel. Conditions which define drive faults are:

- No DRIVE READY indication 35 seconds after setting the RUN/STOP switch to RUN. This indicates that the disc drive has not reached operational status.
- DRIVE FAULT indicator lights at any time.
- Any FAULT light-emitting diode indicators on the operator panel are lit.
- A red light on the spindle logic PCA is lit. (Refer to control panel diagram.)
- Unit Select Identification numerical indicator displays an eight.
- For disc drives with an integrated controller, the SELF TEST FAILED indicator lights steady at any time.

Expected operator responses to disc drive faults are as follows:

- If the DRIVE FAULT indicator is not lighted, set the RUN/STOP switch to STOP. Check for errors, such as an incorrect logical unit address, or an improperly seated disc pack.
- For disc drives with an integrated controller, if the SELF TEST FAILED indicator light blinks continuously, check that the OP/SERVICE switch on the self-test panel at the rear of the disc drive is at the OP position.
- Report all observed disc drive faults, and which fault lights are lit, to the nearest Hewlett-Packard Sales and Support Office.
- For disc drives with an integrated controller, the SELF TEST FAILED indicator will light 92 seconds after power is applied for one of the two following reasons:
 - (1) The disc drive power is applied and the RUN/STOP switch is not placed in the RUN position.
 - (2) The disc pack is not installed and the RUN/STOP switch is not placed in the RUN position.

The fail indication is a normal response. An internal signal indicates to the CPU that the disc drive is not available. If the SELF TEST FAILED indication appears during power application, do one of the following:

- (1) Place the RUN/STOP switch to RUN.
- (2) Place a disc pack in the disc drive and place the RUN/STOP switch in the RUN position.

This action re-initiates self test and starts the spindle. If the disc drive is functioning normally, the SELF TEST FAILED light will go out. If the SELF TEST FAILED indicator remains lit, the disc drive requires service.

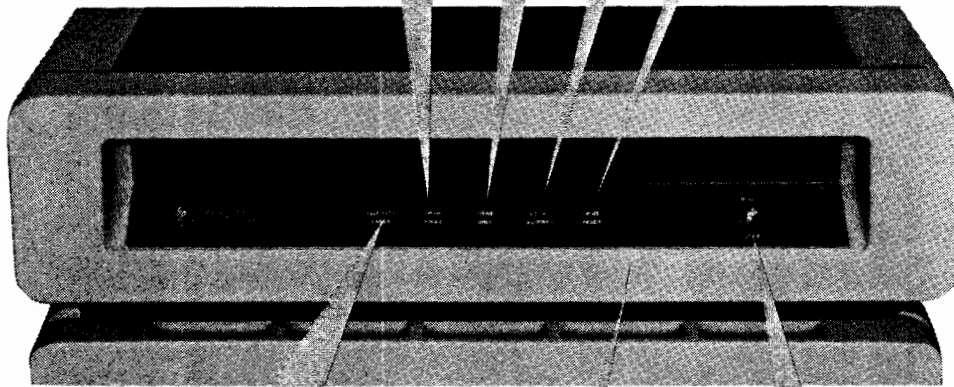
OPERATOR PANEL

Lights to indicate that the startup sequence is complete and the disc drive is ready for operation.

Lights whenever the RUN/STOP switch is set to STOP, the spindle has stopped, and the door unlock solenoid is energized. The pack chamber door may now be opened.

Lights when the READ ONLY switch is activated. When lighted, it indicates that all data surfaces are protected from any write operation.

Lights in the event a malfunction occurs in the disc drive.



For disc drives with an integrated controller, it will blink while self test is running and light steady if the disc drive fails the self test.

Unit Select (identification numerical indicator) displays the selected logical unit address of the disc drive. An eight appears if a fault occurs in the pack detector circuit. When the disc drive is selected a light-emitting diode is lighted in the upper left-hand corner of this indicator.

Initiates the startup and shutdown sequences.

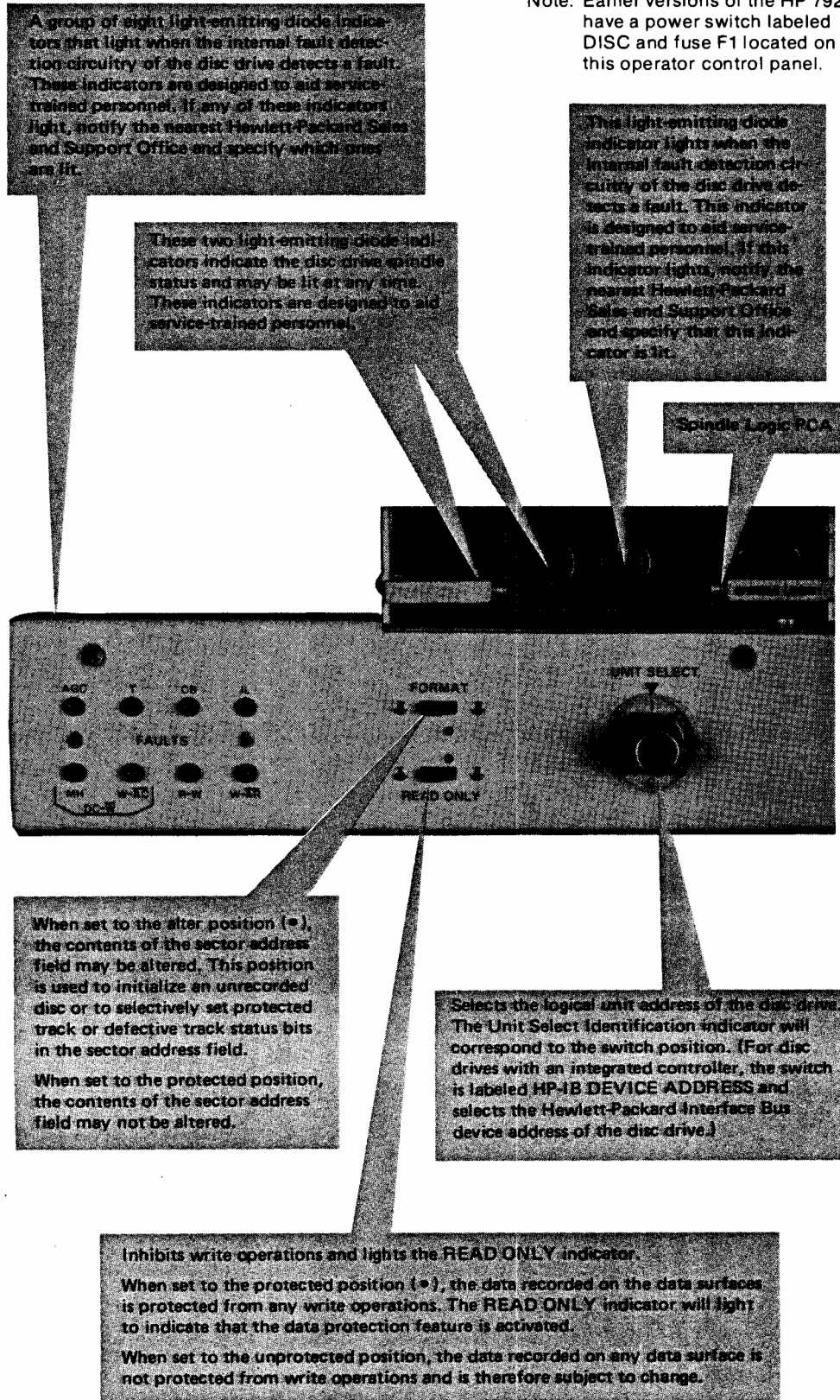
When set to RUN, the startup sequence is initiated. After the startup sequence is complete, the heads will be loaded at cylinder zero and the DRIVE READY indicator will light.

When set to STOP, the shutdown sequence is initiated. After the disc pack has stopped rotating, the DOOR UNLOCKED indicator will light to indicate that the pack chamber door may be opened.



CONTROL PANEL

Note: Earlier versions of the HP 7925 have a power switch labeled DISC and fuse F1 located on this operator control panel.

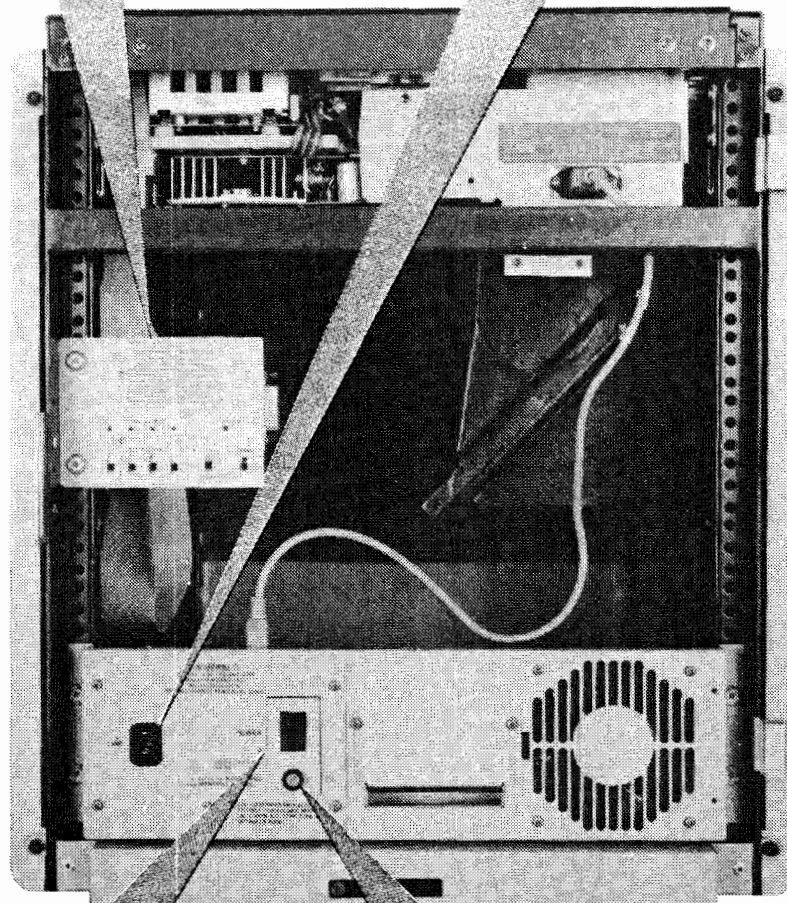


POWER PANEL

SELF-TEST PANEL

Only on disc drives with an integrated controller. A servicing aid for troubleshooting the integrated controller and disc drive. Automatically performs a self-test routine whenever power is turned on, whenever the RUN/STOP switch is set to RUN, by system command, or by activating the self-test panel START switch.

This three terminal power line connector provides the means to connect an ac power source to the disc drive.



POWER*

Controls the application of ac power to the disc drive power supplies and blower motor. Power "on" condition is with the switch in the I position. The I and O indications correspond to international symbology currently in use.

F1*

Provides protection from an ac power overload. The current and voltage ratings and the HP part numbers of the required fuse are listed below.

SOURCE VOLTAGE	REQUIRED RATING	HP PART NUMBER
100 Vac	8A SB*, 250V	2110-0383
120 Vac	8A SB*, 250V	2110-0383
220 Vac	4A SB*, 250V	2110-0366
240 Vac	4A SB*, 250V	2110-0366

* The SB indicates that a slo-blo fuse must be used.

* Earlier versions of the HP 7925 have DISC/OFF switch and fuse F1 located on the operator control panel (see figure 2).

SPECIFICATIONS

Seek time

Track-to-track:	5 ms
Average random:	25 ms
Full stroke (typical over 823 tracks):	45 ms

Rotation

Speed:	2,700 rpm
Average rotational delay:	11.1 ms

Data transfer rate

Bits/second:	7,500,000
Kilobytes/second:	937.5

Data capacity

	64 Sectors/Track -- 815 Tracks*			
	Data Bits Per	Data Bytes Per	Sectors Per	Tracks Per
Byte Sector	8			
Track	2,048	256		
Surface	131,072	16,384	64	
Drive	108,713,680	13,352,960	52,160	815
	960,423,120	120,176,640	469,440	7,335

*Total number of Tracks per surface is 823, 8 of which are utilized as spares or for defective track allocation. 815 tracks per surface (minimum) are guaranteed to be good.

Temperature

Operating: +10° to +40°C (50° to 104°F), rate of change not to exceed 20°C (36°F) per hour. Optimum interchange and data transfer requires that the disc drive be operated within ±10°C (±18°F) of the temperature at which the heads were aligned. Above 3048 m (10,000 ft) altitude maximum ambient temperature is reduced from 40° to 30°C (104° to 86°F).

Nonoperating: -40° to +75°C (-40° to +167°F), rate of change not to exceed 20°C (36°F) per hour.

Relative humidity

Operating: 8% to 80% noncondensing at wet bulb temperature not to exceed 29.4°C (85°C).

Nonoperating: 5% to 95%

Heat dissipation

7925M Master Drive: 600 Watts (2048 Btu/hr)
 7925S Add-on Drive: 400 Watts (1366 Btu/hr)
 7925H IC Drive: 410 Watts (1400 Btu/hr)

Altitude

Operating: Sea level to 4 572 m (15,000 ft)
 Nonoperating: 304.8 m (1,000 ft) below sea level to 15 240 m (50,000 ft)

Tilt

Continues to operate up to ±10 degrees about either horizontal axis.

Power requirements

100/120/220/240, +5% -10%, 47.5 to 66 Hz, single phase.

7925M master drive:

630 Watts/6.7 amperes maximum at 120V, 60 Hz. (Option 102 adds 35 Watts/0.55A at 120 VAC.)

7925S add-on drive:

410 Watts/4.4 amperes maximum at 120V, 60 Hz.

7925H IC drive:

410 Watts/4.6 amperes maximum at 120V, 60 Hz.

Dimensions

Height:	82.6 cm (32.5 in.)
Width:	55.3 cm (21.78 in.)
Depth:	81.3 cm (32 in.)

Net weight (approximate)

7925M Master Drive:	155 kg (341 lb)
7925S Add-on Drive:	138 kg (304 lb)
7925H IC Drive:	145 kg (320 lb)

