



## INSTALLATION AND SERVICE MANUAL

# 7914TD MASS STORAGE SUBSYSTEM

Manual part no. 07914-90902  
Microfiche part no. 07914-90802

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### OPTIONS COVERED

This manual covers options 002, 015, 114, 236, and 240 as well as the standard subsystem.

### FOR U.S.A. ONLY

The Federal Communications Commission (in 47 CFR 15.818) has specified that the following notice be brought to the attention of the users of this product.

### FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

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

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# PRINTING HISTORY

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New editions incorporate all update material since the previous edition. Updating Supplements, which are issued between editions, contain additional and revised information to be incorporated into the manual by the user. The date on the title page changes only when a new edition is published.

Original . . . . . MAR 1983

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# UPDATING SUPPLEMENT

**15 MAR 1983****MANUAL IDENTIFICATION**

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**SUPPLEMENT DESCRIPTION**

The purpose of this supplement is to adapt the manual to equipment containing production improvements made subsequent to the printing of the manual and to correct manual errors. Enter the new information ( or the Change Number, if more convenient ) into the appropriate places in the manual, identified at left.

**CHANGE HISTORY**

Changes 1 through 5, dated 15 March 1983.

**CHANGE****DESCRIPTION**

- 1      **Page iii, Table of Contents. Change the title of paragraph 2-13 to read as follows:**  
          "AC Power Cord Installation (Option 015 Subsystems Only)"
  
- 2      **Page 1-1, paragraph 1-2. Change the last sentence to read as follows:**  
          "Standard subsystems are equipped with a power cord wired into the PDU. A power cord is not provided with option 015 subsystems; the user must supply a suitable power cord for these subsystems."
  
- 3      **Page 2-6, paragraph 2-13. Change the paragraph title to read as follows:**  
          "AC POWER CABLE INSTALLATION (OPTION 015 SUBSYSTEMS ONLY)"
  
- 4      **Page 2-6, paragraph 2-13. Change the first sentence to read as follows:**  
          "A power cord is not supplied with option 015 subsystems; a suitable power cord must be supplied by the user and installed by a qualified electrician."
  
- 5      **Page 4-4, table 4-1. Add the following part to the table:**  
          "HP Part No. 8120-2517; POWER CORD, PDU input power, standard subsystems only (not shown); Mfr Code 28480; Mfr Part No. 8120-2517; Units per Assy 1"



# CONTENTS

Section I	Page	2-13. AC Power Cable	
<b>GENERAL INFORMATION</b>		Installation.....	2-6
1-1. Introduction.....	1-1	2-14. Voltage Selection.....	2-6
1-2. General Description.....	1-1	2-15. Final Installation.....	2-8
1-3. Power Requirements.....	1-1	2-16. Repackaging.....	2-11
1-4. Documentation.....	1-1		
1-5. Available Options.....	1-2		
1-6. Characteristics.....	1-2		
		Section III	Page
Section II	Page	<b>SERVICE INFORMATION</b>	
<b>INSTALLATION</b>		3-1. Introduction.....	3-1
2-1. Introduction.....	2-1	3-2. Disconnecting Power.....	3-1
2-2. Subsystem Unpacking		3-3. Maintenance.....	3-1
and Inspection.....	2-1	3-4. Component Removal and	
2-3. Unpacking.....	2-1	Replacement.....	3-1
2-4. Inspection.....	2-3	3-5. HP 7914R.....	3-1
2-5. Manuals.....	2-3	3-6. HP 7970E.....	3-1
2-6. Claims Procedure.....	2-3	3-7. Fan Assembly.....	3-2
2-7. Installation.....	2-3	3-8. Cabinet Fan.....	3-2
2-8. Site Selection.....	2-3		
2-9. Preliminary Installation.....	2-3	Section IV	Page
2-10. Rack Mounting Procedures.....	2-3	<b>REPLACEABLE PARTS</b>	
2-11. HP 7914R Rack Mounting.....	2-3	4-1. Introduction.....	4-1
2-12. Computer Rack Mounting.....	2-6	4-2. Ordering Information.....	4-1

# ILLUSTRATIONS

---

Figure	Page	Figure	Page
1-1. Subsystems Dimensions.....	1-4	2-4. Subsystem Cable Routing.....	2-10
2-1. Subsystem Unpacking.....	2-2	3-1. HP 7970E Removal.....	3-2
2-2. HP 7914R Rack Mounting.....	2-5	4-1. Subsystem Exploded View.....	4-3
2-3. PDU Wiring Connections.....	2-7		

# TABLES

---

Table	Page	Table	Page
1-1. Available Options.....	1-2	2-1. Component Voltage Settings.....	2-8
1-2. Subsystem Characteristics.....	1-3	4-1. HP 7914TD, Replaceable Parts.....	4-2

# SAFETY CONSIDERATIONS

## KEEP WITH MANUAL

**GENERAL** - This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

### SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the product against damage.



Indicates hazardous voltages.



Indicates earth (ground) terminal (sometimes used in manual to indicate circuit common connected to grounded chassis).

### WARNING

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

### CAUTION

The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a **CAUTION** sign until the indicated conditions are fully understood and met.

**SAFETY EARTH GROUND** - This is a safety class I product and is provided with a protective earthing terminal. An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and be secured against any unintended operation.

**BEFORE APPLYING POWER** - Verify that the product is configured to match the available main power source per the input power configuration instructions provided in this manual.

If this product is to be energized via an auto-transformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the main power source.

### SERVICING

#### WARNING

**Any servicing, adjustment, maintenance, or repair of this product must be performed only by service-trained personnel.**

**Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.**

**Capacitors inside this product may still be charged even when disconnected from its power source.**

**To avoid a fire hazard, only fuses with the required current rating and of the specified type (normal blow, time delay, etc.) are to be used for replacement.**





# GENERAL INFORMATION

## 1-1. INTRODUCTION

This section contains general information about the HP 7914TD Mass Storage Subsystem. This information consists of a general description, power requirements, documentation, characteristics, and available options.

## 1-2. GENERAL DESCRIPTION

The HP 7914TD Mass Storage Subsystem, hereafter referred to as the subsystem, consists of an HP 7914R Disc/Tape Drive (less cartridge tape drive) and an HP 7970E Digital Magnetic Tape Unit mounted in an HP 2943IT subsystem cabinet. Additional space is available in the lower portion of the subsystem cabinet to accommodate a second HP 7914R (less cartridge tape drive), an A-series computer, or a 9000-series computer. The subsystem is designed for connection to the Hewlett-Packard Interface Bus (HP-IB).<sup>\*</sup> All necessary cabling is provided for connection to the system HP-IB.

The subsystem cabinet provides power, cooling, and mounting for the subsystem components. A fan assembly, which is mounted on the rear of the cabinet, provides the necessary cooling for the HP 7970E. Cooling for the HP 7914R is provided by a cooling system internal to the disc drive. Rack slides and support rails are included to facilitate installation of the subsystem components. Two full-length doors provide access to the cabinet interior through the front and rear.

The subsystem is equipped with a complete electrical system, UL approved and wired in accordance with current International Electrotechnical Commission (IEC) electrical specifications. The electrical system includes a Power Distribution Unit (PDU) which supplies power to the cabinet components and the fan assembly. Input power to the PDU is controlled by the PDU circuit breaker (CBI). Power to the lower cabinet components is supplied via two CEE-22 female receptacles

<sup>\*</sup>HP-IB: Not just IEEE-488, but the hardware, documentation, and support that delivers the shortest path to a computation system.

mounted on the top of the PDU. A power strip with six CEE-22 female receptacles supplies power to the upper cabinet components. A user-supplied power cord provides the input power to the PDU.

## 1-3. POWER REQUIREMENTS

The subsystem is available with two input power configurations: standard subsystems are configured for 120V, 60 Hz operation; option 015 subsystems are configured for 220v, 50 Hz operation. In addition, the subsystem can be configured for 240V, 50 Hz operation (refer to table 2-1). The power specification label, which is installed on the rear of the cabinet during the initial installation of the subsystem, reflects the current subsystem power configuration.

The subsystem is normally operated from single-phase ac mains power; however, a system configured for 120V can be operated from one of the following two-phase ac mains power sources: 208V, 60 Hz or 240V, 60 Hz. If two-phase power is used, the resulting phase loading is unbalanced. The PDU wiring connections are shown in figure 2-3.

## 1-4. DOCUMENTATION

The following documentation is supplied with the subsystem:

- *HP 7914TD Mass Storage Subsystem Installation and Service Manual*, part no. 07914-90902
- *HP 7911/7912/7914 Disc/Tape Drives Operator Instructions*, part no. 07912-90901
- *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, part no. 07912-90902
- *Site Environmental Requirements for Disc/Tape Drives*, part no. 5955-3456

## General Information

- *HP 7970 Series Operator's Manual*, part no. 07970-90885
- *HP 7970 HP-IB Programming and Service Manual*, part no. 07970-90919
- *CS/80 External Exerciser Manual*, part no. 5955-3462
- *7970 Service Manual*, part no. 07970-90887

The following documentation, which may be ordered from the nearest Hewlett-Packard Sales and Support Office listed at the rear of this manual, provides additional information on the operation and service of the individual components of the subsystem:

- *HP 7911, 7912, and 7914 Disc/Tape Drives Service Manual*, part no. 07912-90903
- *CS/80 Instruction Set Programming Manual*, part no. 5955-3442

## 1-5. AVAILABLE OPTIONS

A list of the available subsystem options is provided in table 1-1.

## 1-6. CHARACTERISTICS

Table 1-2 lists the subsystem characteristics. The physical dimensions of the subsystem are shown in figure 1-1.

Table 1-1. Available Options

OPTION NO.	DESCRIPTION
002	Adds a cartridge tape drive with dedicated controller to the HP 7914R. (For HP 3000 systems only.)
015	Configures the subsystem for 220V, 50 Hz operation.
114	Adds a second HP 7914R (less cartridge tape drive) to the subsystem.
236	Configures the HP 7970E with a parallel interface. (Required for use with HP 1000 E and F series computers.)
240	Adds a cartridge tape drive to the HP 7914R.

Table 1-2. Subsystem Characteristics

## Safety

- CSA certified to CSA 22.2 No. 154.
- Meets all applicable safety standards of IEC 380 and IEC 435.
- UL listed to UL 114 and UL 478.



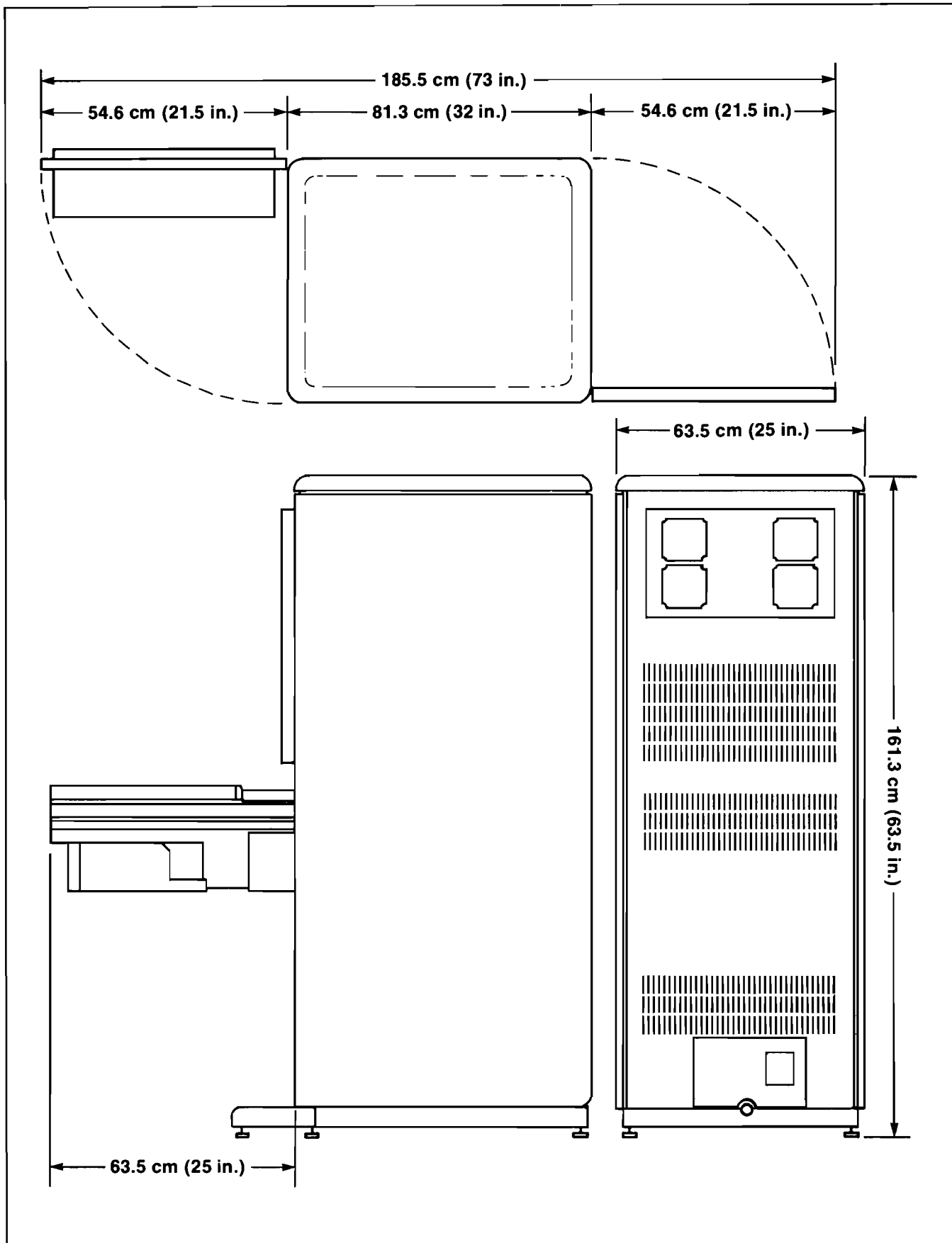
## Physical Characteristics

Overall Height:	161.3 cm. (63.5 in.)
Overall Width:	63.5 cm. (25.0 in.)
Overall Depth:	81.3 cm. (32.0 in.)
Net Weight:	
Standard	272.2 kg (600 lb)
Option 114	339.4 kg (748 lb)
Shipping Weight:	
Standard	364.7 kg (804 lb)
Option 114	454.6 kg (1002 lb)

## Power Characteristics

Voltage:	
Single phase	120/240V; +5%, -10%
	220V; +/-5%
Two phase	208/240V; +5%, -10%
Frequency:	48 to 66 Hz*
Power:	
Standard	925 watts
Option 114	1625 watts
Line dropout:	No effect on performance for dropout equal to or less than one half cycle of the ac line. Greater than one half cycle interrupt, the drive may become "not ready". Drive will return to "ready" within 60 seconds after normal power is restored.

\*The HP 7914R requires a belt and pulley change to operate over this frequency range.



7914-1

Figure 1-1. Subsystem Dimensions

# INSTALLATION

## 2-1. INTRODUCTION

This section provides information for the unpacking and installation of the subsystem. Also included in this section are repackaging instructions; therefore, retain this manual in case it is necessary to repackage the subsystem for shipment.

## 2-2. SUBSYSTEM UNPACKING AND INSPECTION

The subsystem is shipped in two reusable containers: one contains the HP 7970E mounted in the HP 29431T subsystem cabinet; the other contains the HP 7914R. When the shipment arrives, ensure that the containers have been received as specified by the carrier's bill of lading. Inspect the containers immediately upon receipt for evidence of mishandling during transit. If the containers are damaged or water-stained, request that the carrier's agent be present when the containers are unpacked. If the containers appear to be in satisfactory condition, proceed with the unpacking instructions.

Note: Do not destroy or discard the shipping containers or packaging material. These items must be used if it becomes necessary to repackage the subsystem.

## 2-3. UNPACKING

To unpack the HP 7914, refer to the *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, part no. 07912-90902. This manual, which is shipped with every subsystem, contains detailed unpacking instructions.

To unpack the subsystem cabinet, proceed as follows:

- a. Remove all the clips from around the top of the container and remove the top cover (see figure 2-1). Use a flat-blade screwdriver to pry the clips off.

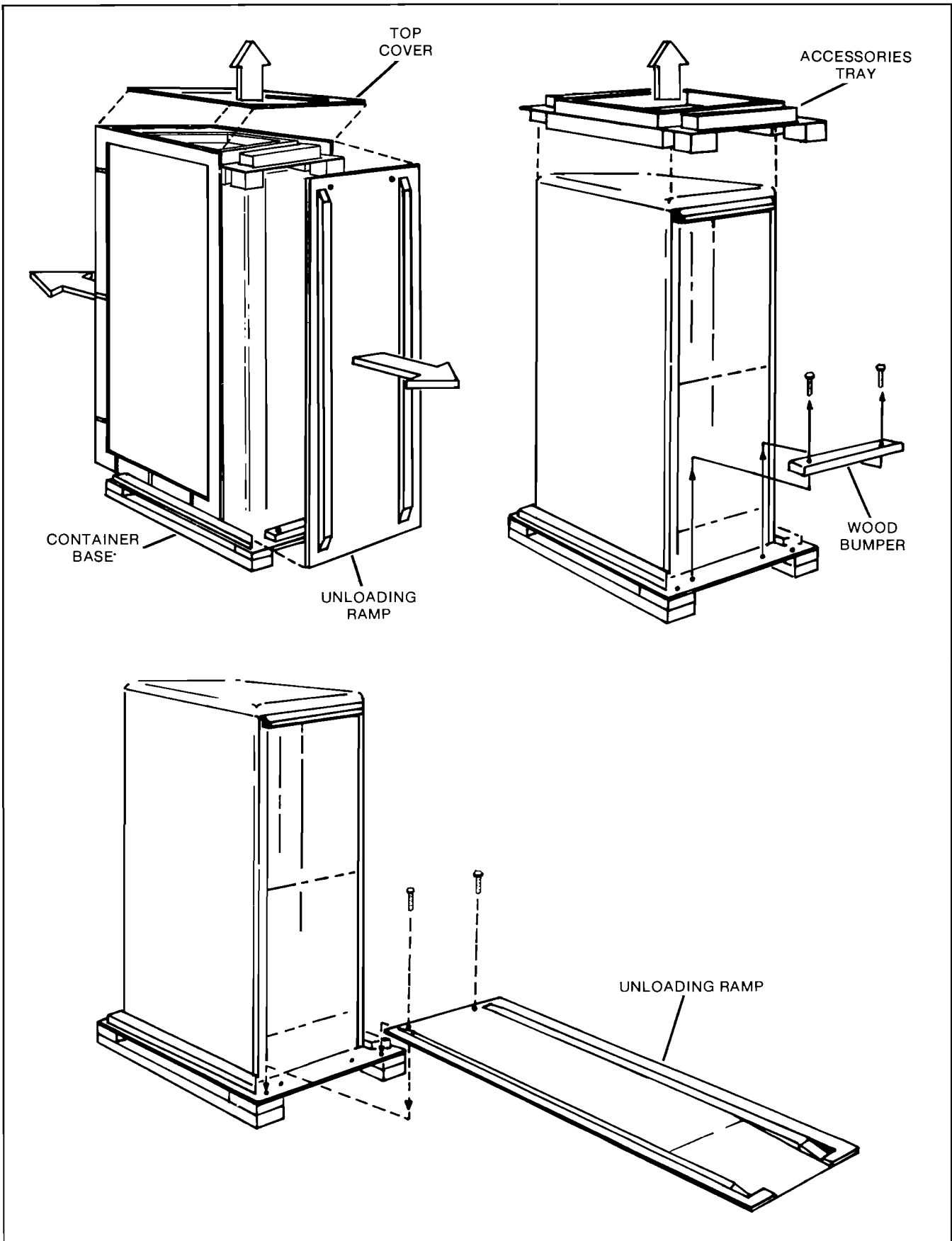
Note: The container side panel with the wood 2X4 planks attached to it doubles as an unloading ramp. The outside of this panel is the top of the ramp (see figure 2-1).

- b. Remove the wire clips which secure the ramp to the other side panels and the container base. Remove the ramp.
- c. Remove the wire clips from around the base of the three remaining side panels.
- d. As a unit, pull the three remaining side panels away from the container base.
- e. Remove the accessories tray and packaging material from the top of the cabinet.
- f. Remove the wood bumper by removing the bolts that secure the bumper to the container base. These bolts will be used to secure the ramp to the container base during unloading, so do not discard them.
- g. Place the raised end of the ramp against the side of the container base from which the bumper was removed. The ramp will overlap onto the base surface.
- h. Align the holes in the top edge of the ramp with the holes in the container base. Insert the bolts removed in step f through the ramp and container base. This prevents the ramp from slipping when unloading the subsystem cabinet.

### CAUTION

Two people are required when unloading the subsystem cabinet: one pushing and one guiding.

- i. Carefully roll the subsystem cabinet down the ramp.



7914-2

Figure 2-1. Subsystem Unpacking

## 2-4. INSPECTION

Visually inspect all elements of the subsystem for signs of physical damage. If any damage is evident, follow the claims procedure described in paragraph 2-6.

## 2-5. MANUALS

Check to ensure that all manuals on the packing list have been received.

## 2-6. CLAIMS PROCEDURE

### WARNING

To avoid dangerous electrical shock, do not apply power to the subsystem if there are signs of physical damage to any portion of the subsystem.

If the shipment is incomplete or if the equipment is damaged or fails to meet specifications, notify the nearest Hewlett-Packard Sales and Support Office listed at the rear of this manual. If damage occurred in transit, notify the carrier as well. Hewlett-Packard will arrange for replacement or repair without waiting for settlement of claims against the carrier. In the event of damage in transit, retain the shipping containers and packaging material for inspection.

## 2-7. INSTALLATION

### WARNING

To avoid injury to personnel or damage to equipment, the subsystem *must* be installed only by service-trained personnel.

The following paragraphs provide the information necessary to install the subsystem. This information includes site selection, power cable installation, voltage selection, component rack mounting, and final subsystem installation.

## 2-8. SITE SELECTION

The site must be prepared in accordance with the information provided in the *Site Environmental Requirements for Disc/Tape Drives Manual*, part no. 5955-3456, which is provided with each subsystem.

The location of the subsystem must provide enough room at the front and rear of the cabinet to allow servicing (see figure 1-1) and also to ensure an adequate flow of air through the subsystem cabinet.

## 2-9. PRELIMINARY INSTALLATION

Before rackmounting the HP 7914R in the subsystem cabinet, the subsystem should be moved to its installation site and the leveling feet lowered.

### WARNING

Move the subsystem slowly. If the subsystem is moved too rapidly and a caster becomes restricted, momentum may cause the subsystem to tip over, resulting in injury to personnel and damage to equipment.

- a. Move the subsystem to its operating site (refer to paragraph 2-8).
- b. Lower the four leveling feet until they contact the floor.
- c. Using an adjustable wrench, continue lowering the feet until the subsystem casters are raised slightly off the floor and the cabinet is stable and level.

## 2-10. RACK MOUNTING PROCEDURES

The following paragraphs explain the procedure for mounting the subsystem components in the cabinet.

**2-11. HP 7914R RACK MOUNTING.** The standard subsystem includes one HP 7914R. A second HP 7914R (optional) can be installed in the lower portion of the cabinet below the first disc drive. If



## Installation

two disc drives are installed in the cabinet, the lower one must have the cartridge tape drive deleted (device option 140); a standard HP 7914R will not fit in the lower position. The following procedure applies when rack mounting either disc drive; any differences in the rackmounting procedure for the two drives are noted in the appropriate steps.

### WARNING

The disc drive weighs approximately 67 kg (148 lb); more than one person may be required to install it in the subsystem cabinet.

Before installing the disc drive, install the anti-tip feet on the cabinet.

- a. Install the anti-tip feet on the cabinet (see figure 2-2). The anti-tip feet and the instructions for their installation are shipped with the subsystem cabinet.
- b. Loosen the two captive screws which secure the cabinet front door; open the door.
- c. Install the rack slides in the cabinet using the four 10-32 slot-head mounting screws (74, figure 4-1). The slides must be partially extended to gain access to the front mounting holes. The subsystem cabinet is fitted with mounting nuts to ensure the proper positioning of the rack slides: the upper set of rack slides are installed 63.5 cm (25.0 in.) above the floor of the cabinet; the lower set of rack slides, if required, are installed 31.1 cm (12.25 in.) above the floor of the cabinet.

Note: When installing the rack slides, ensure that the mounting pin on the top of the rack slide is pointing up (see figure 2-2, detail A). This will eliminate the possibility of installing the rack slides incorrectly (e.g., the righthand slide on the left side of the cabinet).

- d. Tighten the rack slide mounting screws to 25 inch-pounds.

Note: Perform step e only when installing a second (lower) HP 7914R in the subsystem cabinet.

- e. Remove the set of support rails (70, figure 4-1) mounted in the lower portion of the cabinet; discard the rails.
- f. Extend the rack slides until the slide lockouts engage.

### WARNING

When lowering the disc drive onto the rack slides, ensure that the mounting pins on the rack slides engage the mounting holes in the rack mount chassis (see figure 2-2, detail A). If the pins do not engage the holes properly, the drive may fall off the rack slides.

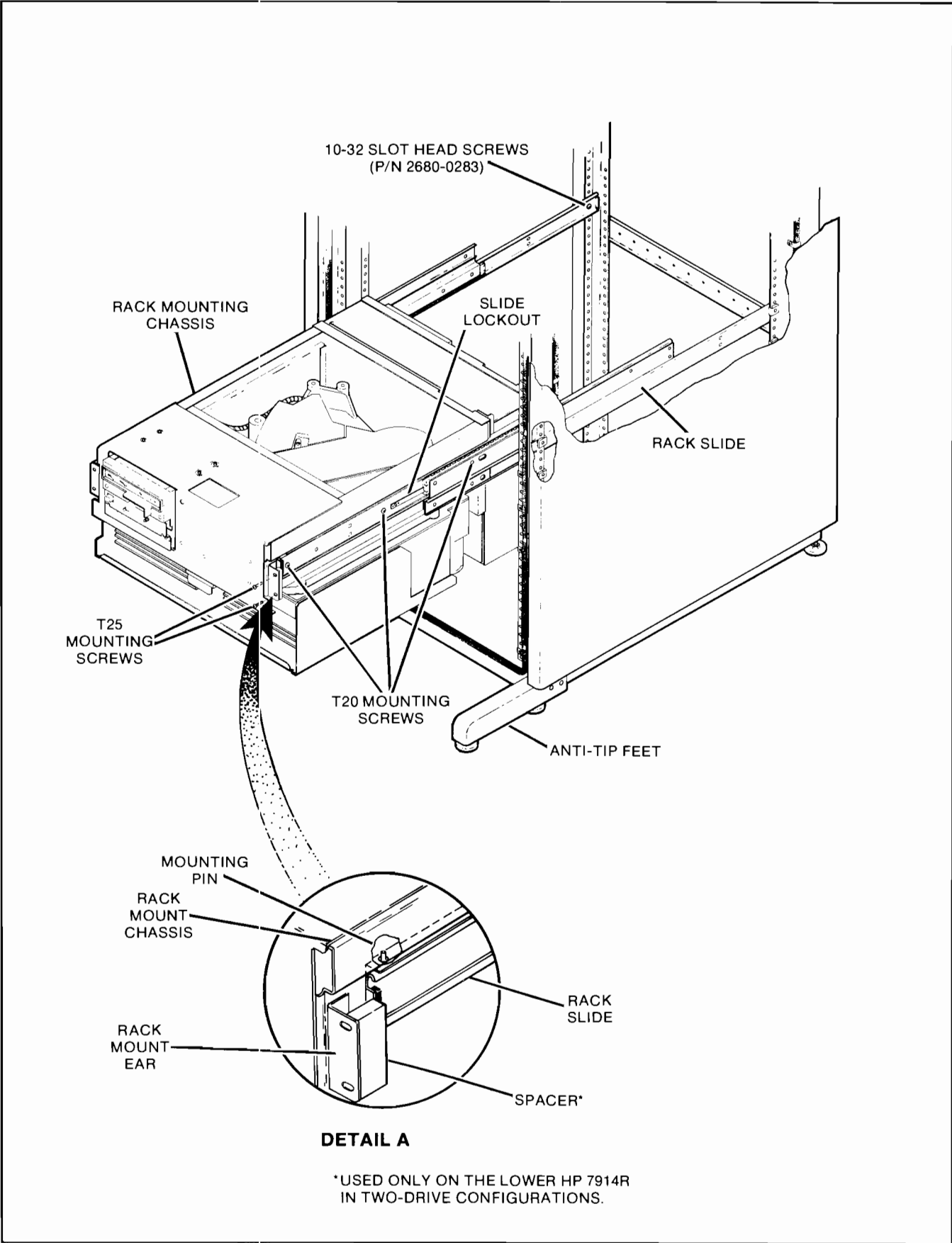
- g. Lower the disc drive onto the rack slides, being careful to ensure that the mounting pins on the rack slides engage the mounting holes in the rack mount chassis (see figure 2-2, detail A).

Note: TORX<sup>(R)</sup> \* hardware is used when installing the HP 7914R. This hardware requires the use of special drivers. Any reference to this type of hardware will be accompanied by the appropriate driver size (e.g., T15).

- h. Install the six T20 mounting screws (61, figure 4-1) in the following order:
  - (1) First, install a screw in the front mounting hole of each rack slide.
  - (2) Next, install a screw in the middle mounting hole of each rack slide.
  - (3) Last, install a screw in the rear mounting hole of each rack slide.
- i. Tighten all six mounting screws to 12 inch-pounds.

---

\*TORX<sup>(R)</sup> is a registered trademark of the Camcar Division of Textron, Inc.



7914-3

Figure 2-2. HP 7914R Rack Mounting

## Installation

- j. Perform all necessary HP 7914R installation procedures. The installation procedures are described in the *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, part no. 07912-90902.
- k. Depress the slide lockouts and push the disc drive into the cabinet.

Note: Perform step l only when installing a second (lower) HP 7914R in the subsystem cabinet.

- l. Install the rack spacers (63, figure 4-1) between the rack mount chassis ears and the cabinet (see figure 2-2, detail A). The rack spacers are packed in the accessories box that is shipped with the subsystem cabinet.
- m. Install the four T25 mounting screws (60 or 62, figure 4-1) that secure the drive to the cabinet. Tighten the four screws to 12 inch-pounds.
- n. Install the front panel by pushing it into place.

Note: If two disc drives are installed in the subsystem cabinet, do not install the front panel on the lower drive. The front panel supplied with the second drive should be retained for use as a spare for the upper disc drive.

- o. Close the cabinet front door and secure it using the two captive screws.
- p. Remove the anti-tip feet from the cabinet.

**2-12. COMPUTER RACK MOUNTING.** An optional computer system (A-series or 9000 series) may be installed in the lower portion of the subsystem cabinet below the HP 7914R. A pair of support rails are installed in the cabinet to accommodate the installation of one of these computers. For instructions on rack mounting the computer, refer to the appropriate computer installation and service manual.

## 2-13. AC POWER CABLE INSTALLATION

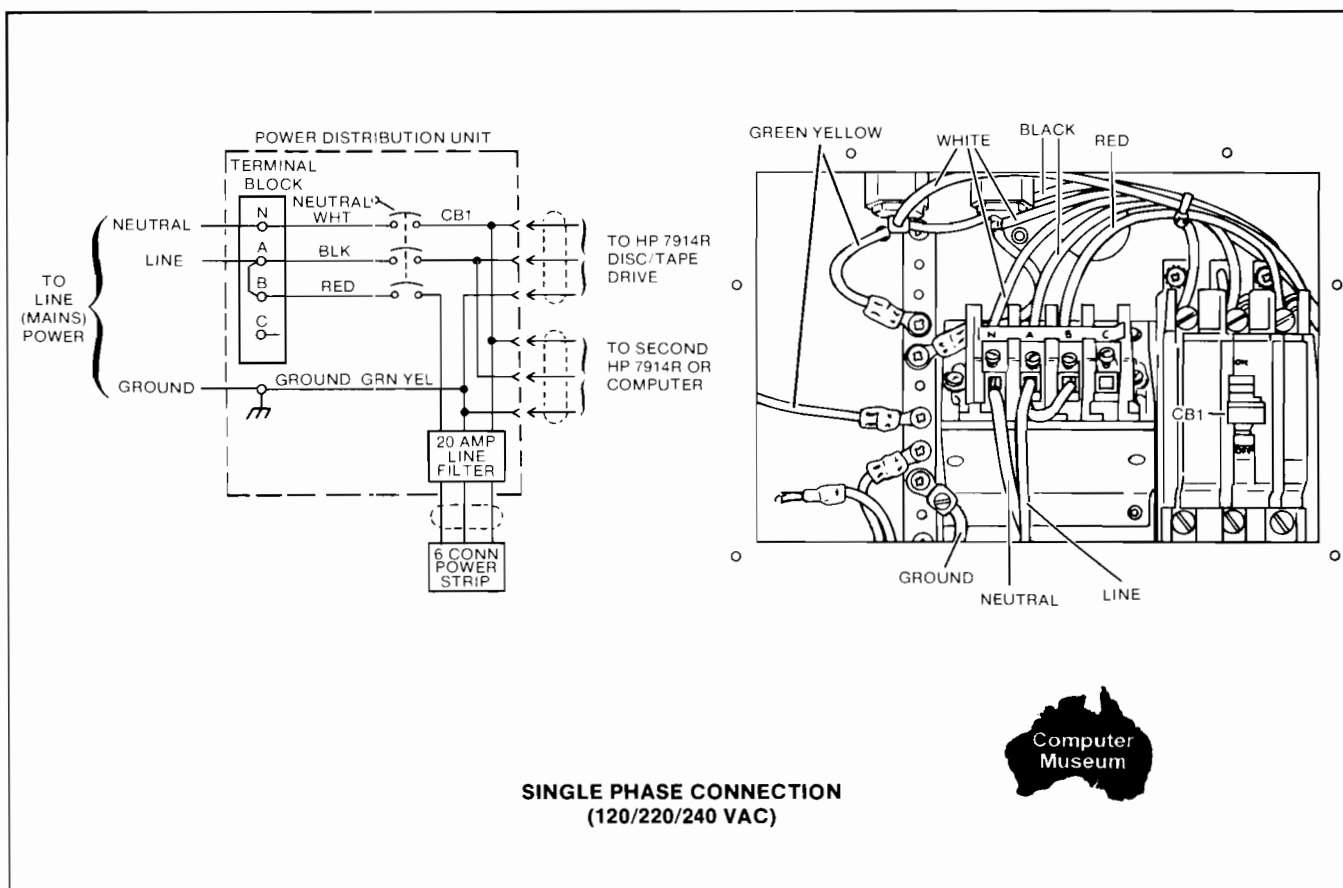
A power cord is not supplied with the subsystem; a suitable power cord must be supplied by the user and installed by a qualified electrician. The user-supplied power cord is connected to the cabinet PDU, which is mounted on the inside of the cabinet rear door. To install the power cord, proceed as follows:

- a. Set the cabinet circuit breaker to the off (0) position.
- b. Remove the six screws (28, figure 4-1) that secure the PDU inspection plate to the bottom of the cabinet rear door.
- c. Remove the inspection plate.
- d. Using a flat-blade screwdriver, connect the power cord wiring to the proper terminal block contacts (see figure 2-3).
- e. Install the PDU inspection plate using the screws removed in step b.

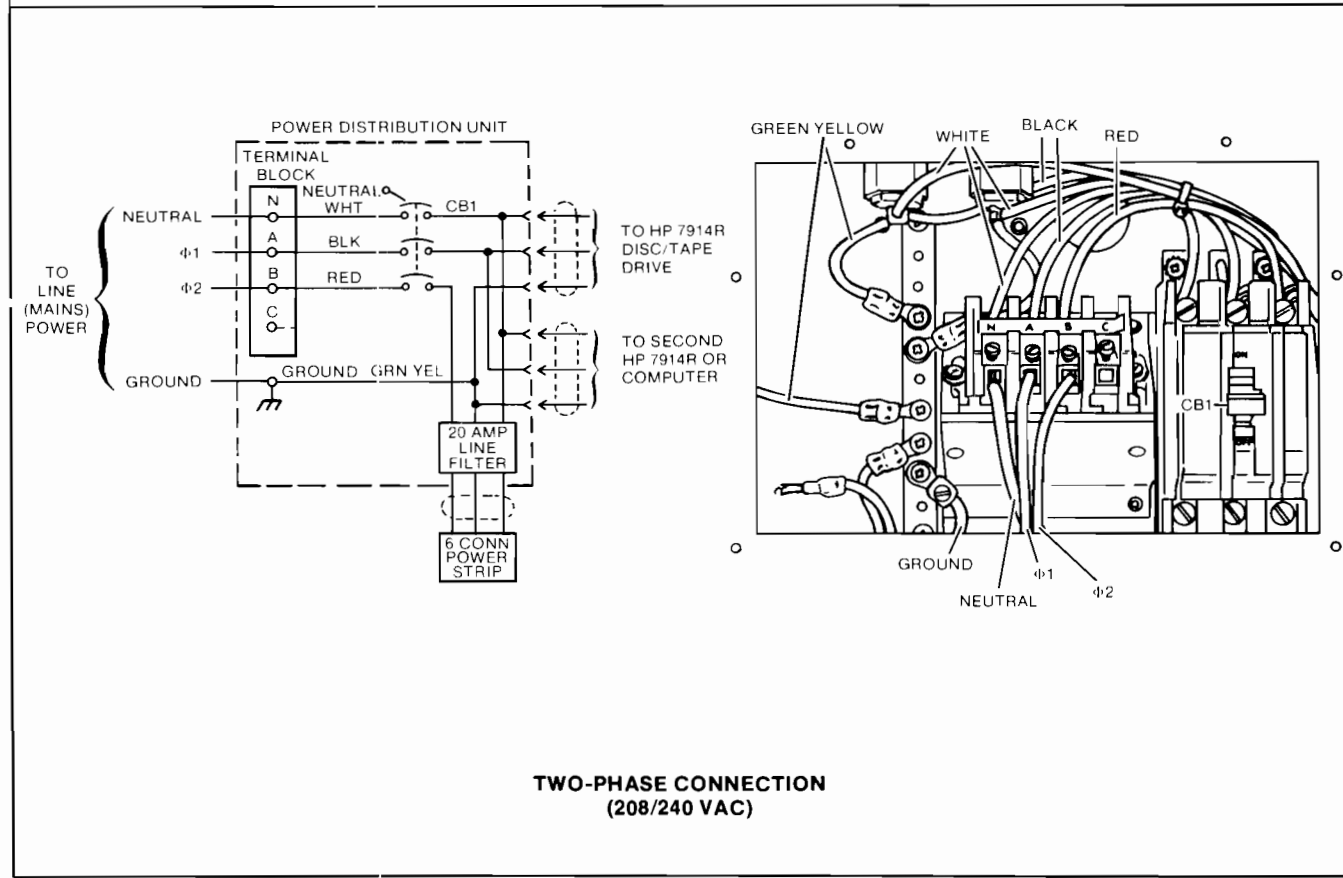
## 2-14. VOLTAGE SELECTION

The standard subsystem is configured for 120V, 60 Hz operation; option 015 configures the subsystem for 220V, 50 Hz operation. If the subsystem is not configured for the power available, check and, if necessary, change the voltage settings of the following subsystem components: the HP 7970E, the HP 7914R, and the cabinet fan assembly. The proper component voltage settings for the various input voltages are shown in table 2-1. Additionally, check the frequency setting of the HP 7914R (indicated on the HP 7914R power specification label); if the disc drive is not configured for operation on the available line frequency, perform the HP 7914R frequency conversion procedure.

For instructions on voltage selection and frequency conversion for the HP7914R, refer to the *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, part no. 07912-90902. For instructions on HP 7970E voltage selection, refer to the *HP 7970 Series Operator's Manual*, part no. 07970-90885.



**SINGLE PHASE CONNECTION**  
(120/220/240 VAC)



**TWO-PHASE CONNECTION**  
(208/240 VAC)

7914-4

Figure 2-3. PDU Wiring Connections

## Installation

To change the voltage setting of the cabinet fan assembly, proceed as follows:

- a. Disconnect power to the subsystem (refer to paragraph 3-2).
- b. Remove the fan assembly (refer to paragraph 3-7).
- c. Remove the voltage switch access plate (12, figure 4-1).
- d. Slide the voltage switch to the proper setting for the input voltage available (refer to table 2-1).
- e. Install the switch access plate.
- f. Install the fan assembly (refer to paragraph 3-7).

Table 2-1. Component Voltage Settings

INPUT VOLTAGE	COMPONENT VOLTAGE SETTING		
	7970E	7914R*	FAN ASSEMBLY
120V	115V	120V	115V
220V	230V	220V	230V
240V	230V	240V	230V
208/240V**	115V	120V	115V

NOTES:

\*The HP 7914R requires a belt and pulley change when switching from 60 Hz to 50 Hz operation or vice versa.

\*\*Two-phase power source

### 2-15. FINAL INSTALLATION

The following procedure describes the final installation of the subsystem. Included are system connection and initial power-up.

To install the subsystem, proceed as follows:

- a. Set the cabinet power switch to the OFF (0) position.
- b. Loosen the two captive screws which secure the rear door; open the door.
- c. Loosen the two screws that hold the power cord retaining clamp (19, figure 4-1) in place.
- d. Using the power cord provided (49, figure 4-1), connect the HP 7914R to one of the power receptacles on top of the PDU. If a second HP 7914R or a computer is mounted in the lower portion of the subsystem cabinet, connect it to the other power receptacle on top of the PDU.
- e. Set the power switch on the rear of the HP 7914R to the ON (1) position.

- f. Tighten the power cord retaining clamp in place.
- g. Remove the packing material that holds the cooling baffle (45, figure 4-1) in place during shipping. This packing material is positioned between the baffle and the rear of the HP 7970E. To remove the packing material, grasp and twist it while pushing up on the cooling baffle. Discard the packing material.

**CAUTION**

Do not connect (or disconnect) the subsystem components to the system bus while the bus is in an active state.

- h. Connect the HP-IB cables to the subsystem components. Consult the appropriate interface or installation manual (refer to paragraph 1-4) for detailed instructions on subsystem component interconnection.

Note: The standard subsystem represents three HP-IB equivalent loads on the system HP-IB channel.

- i. Route the HP-IB cables out the rear of the cabinet. Figure 2-4 illustrates the proper cable routing.
- j. Locate the appropriate HP 7970E/HP 29431T warranty label and fasten it to the lower-right rear corner of the subsystem cabinet. The warranty label is packed in the accessories box that is shipped with the HP 7914R.

Note: The information on this warranty label applies only to the HP 7970E and the HP 29431T. The HP 7914R has its own warranty label located on the rear of the disc drive.

- k. Locate the appropriate subsystem power specification label and fasten it to the rear of the cabinet directly below the cabinet circuit breaker. The power specification labels are packed in the accessories box that is shipped

with the subsystem cabinet. Ensure that the label selected reflects the current subsystem power configuration.

- l. Close the cabinet rear door and secure it using the two captive screws.
- m. Connect the cabinet ac power cord to the ac mains power.

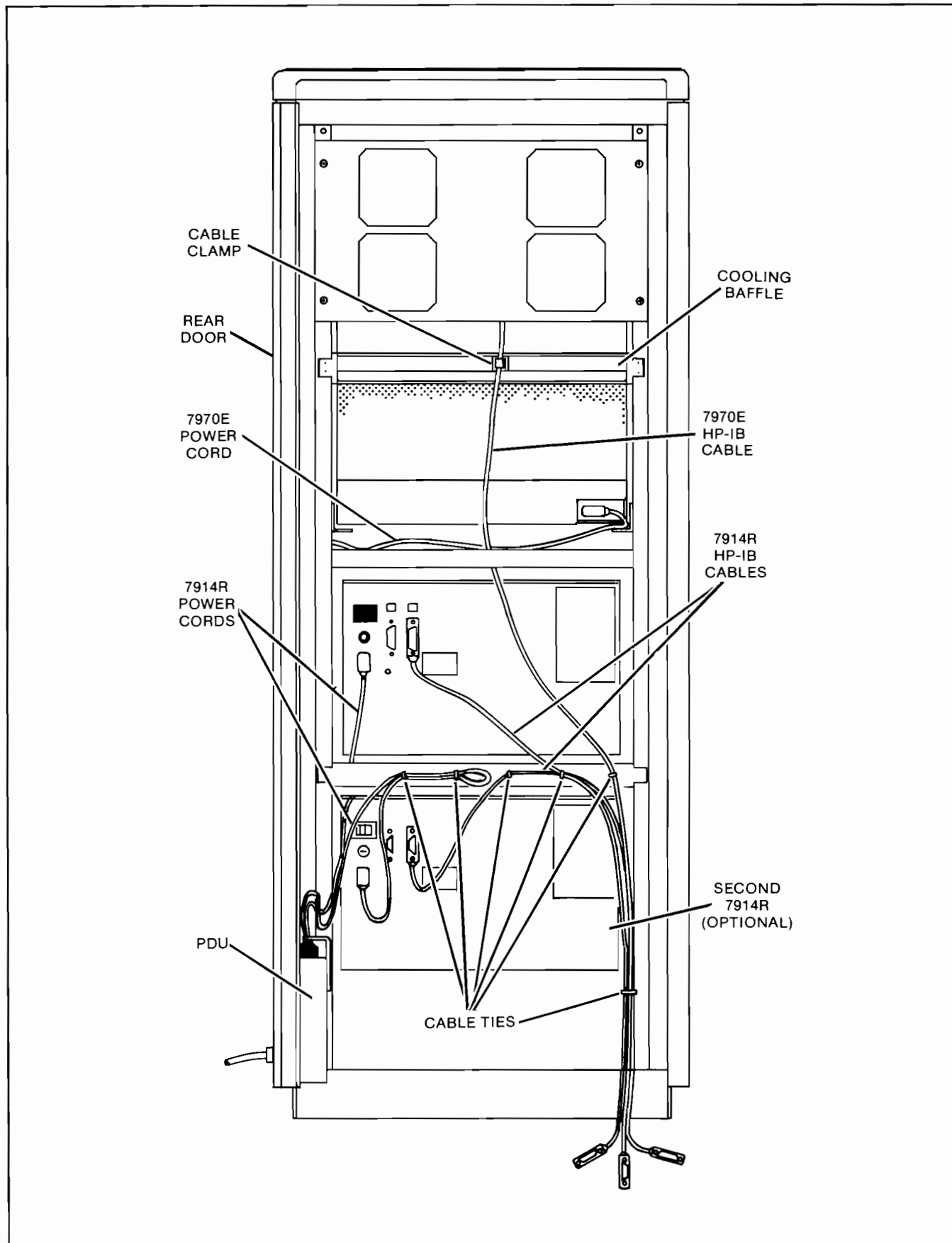
**CAUTION**

Ensure that the cooling baffle packing material has been removed before turning the subsystem power on (refer to step g).

Do not turn the subsystem power on (or off) while the system bus is in an active state.

Do not turn the subsystem power on until all necessary HP 7914R installation procedures have been performed (refer to paragraph 2-11, step j).

- n. Set the cabinet circuit breaker to the ON (I) position. The subsystem fan assembly should begin operating.
- o. Perform all necessary power-on checkout procedures for the subsystem components. These procedures are outlined in the following manuals:
  - *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, part no. 07912-90902;
  - *HP 7970 Series Operator's Manual*, part no. 07970-90885.



7914-5

Figure 2-4. Subsystem Cable Routing

## 2-16. REPACKAGING

Repackaging of the subsystem requires the use of the original shipping containers and packaging material. If the containers are not available, consult your local Hewlett-Packard Sales and Support Office regarding shipment. Sales and Support Offices are listed at the back of this manual. Before shipment, the containers should have tags identifying the owner and the service or repair to be performed. Include the equipment model number and full serial number.

To repackage the HP 7914R, refer to the *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, part no. 07912-90902. This manual, which is shipped with every subsystem, contains detailed repackaging instructions.

If a computer is installed in the subsystem cabinet, refer to the appropriate installation and service manual for instructions on the removal and repackaging of the computer.

To repackage the remainder of the subsystem, proceed as follows:

- a. Place the raised end of the loading ramp against the side of the container base where the wood bumper will be mounted. (see figure 2-1). The ramp will overlap onto the base surface.
- b. Align the holes in the top edge of the ramp with the holes in the container base. Insert the wood bumper mounting bolts through the ramp and container base. This prevents the ramp from slipping when loading the subsystem cabinet.
- c. Screw the leveling feet into the cabinet.
- d. Position the cabinet at the bottom of the ramp with the rear of the cabinet facing the container base.

### CAUTION

Two people are required when loading the subsystem cabinet: one pushing and one guiding.

- e. Carefully roll the subsystem cabinet up the ramp onto the cabinet base.
- f. Remove the ramp from the container base.
- g. Install the wood bumper on the container base using the two mounting bolts.
- h. Place the packaging material on top of the cabinet.
- i. Using the wire clips provided, secure the side panels to the container base and to each other. The loading ramp serves as the panel that covers the front of the cabinet (see figure 2-1).
- j. Position the top cover in place and, using the clips provided, secure it to the side panels.





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# SERVICE INFORMATION

## 3-1. INTRODUCTION

This section provides information for servicing the subsystem. Included is general maintenance information and instructions for removing and installing the major subsystem assemblies.

## 3-2. DISCONNECTING POWER

### WARNING

To avoid dangerous electrical shock, do not perform any service operations until the ac mains power is removed from the subsystem.

Before servicing, power must be disconnected from the subsystem. To disconnect power, proceed as follows:

### CAUTION

Do not turn the subsystem power off (or on) while the system bus is in an active state.

- a. Set the cabinet circuit breaker to the OFF (0) position.
- b. Disconnect the ac power cord from the wall outlet.

## 3-3. MAINTENANCE

The subsystem requires only minimal maintenance. The primary maintenance task involves checking and, if necessary, cleaning the cabinet air filter (1, figure 4-1). The cabinet air filter is mounted on the inside of the cabinet rear door. Clean the cabinet filter by removing it and vacuuming its intake surface. Any filters inside the subsystem components should also be checked and cleaned as necessary. Refer to the appropriate manual(s) for information concerning the location, removal, and cleaning of the component filters.

## 3-4. COMPONENT REMOVAL AND REPLACEMENT

### WARNING

The subsystem does not contain any operator-serviceable parts. To prevent electrical shock, refer all service activities to service-trained personnel.

The following paragraphs contain detailed removal and replacement procedures for the major subsystem assemblies: the HP 7970E, the HP 7914R, and the cabinet fan assembly. If a computer system is installed in the subsystem, refer to the appropriate installation and service manual for removal and replacement procedures.

### 3-5. HP 7914R

To remove the HP 7914R from the subsystem cabinet, reverse the rack mounting procedure described in paragraph 2-11.

### 3-6. HP 7970E

### WARNING

The tape unit weighs approximately 63.6 kg (140 lb); more than one person may be required to remove it from the subsystem cabinet.

- a. Disconnect power from the subsystem (refer to paragraph 3-2).
- b. Loosen the two captive screws which secure the rear door; open the door.
- c. Remove the cooling baffle (45, figure 4-1) by removing the four screws that secure it to the cabinet. Removing the baffle makes it easier to gain access to the rear of the HP 7970E.

## Service Information

- d. Disconnect the power cable and the HP-IB cable from the rear of the HP 7970E.
- e. Loosen the two captive screws which secure the cabinet front door; open the door.
- f. Remove the front door from the cabinet by lifting the door up until the hinge pins clear the door hinges.
- g. Open the cover door of the tape unit (see figure 3-1).
- h. Turn the casting latch screw (figure 3-1) counterclockwise until it is loosened (approximately five turns). Pull the casting door open.
- i. Remove the three screws (52, figure 4-1) that secure the right side of the tape unit to the cabinet.
- j. While supporting the open casting door, remove the four screws (53, figure 4-1) that secure the left side of the tape unit to the cabinet. These screws support the majority of the tape unit's weight, so a solid grasp of the unit is necessary to keep it from falling.

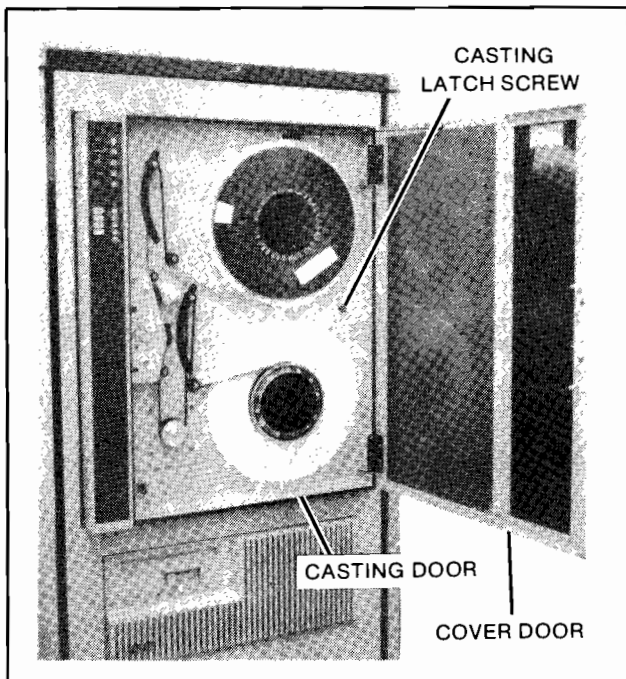


Figure 3-1. HP 7970E Removal

- k. Remove the mounting bar (58, figure 4-1) from between the right side of the tape unit and the cabinet.
- l. Slide the tape unit out along the support rails to remove it from the cabinet.

To install the tape unit, reverse the above procedure.

### 3-7. FAN ASSEMBLY

- a. Disconnect power from the subsystem (refer to paragraph 3-2).
- b. Loosen the two captive screws which secure the rear door; open the door.
- c. Disconnect the power cable from the fan assembly.
- d. Remove the fan assembly by removing the four screws (3, figure 4-1) that secure it to the cabinet.

To install the fan assembly, reverse the above procedure.

### 3-8. CABINET FAN

To replace an individual cabinet fan, proceed as follows:

- a. Remove the fan assembly (refer to paragraph 3-7).
- b. Lie the fan assembly on a flat surface with the fan cover panel (10, figure 4-1) facing up.
- c. Remove the four fan guards (9, figure 4-1) by removing the four nuts (6, figure 4-1) that secure each fan guard to the fan cover panel.
- d. Remove the fan cover panel by removing the six screws (11, figure 4-1) that secure the cover to the fan assembly.
- e. Disconnect the power cord from the defective fan and remove the fan.

**CAUTION**

When installing a fan, be sure to orient the fan so that the direction of air flow is *out* of the subsystem cabinet. Air flow

direction is indicated on the fan.

To install a new fan, reverse the above procedure.



# REPLACEABLE PARTS

## 4-1. INTRODUCTION

This section provides listings of all field-replaceable parts and an illustrated parts breakdown for the subsystem, as well as replaceable parts ordering information.

Replaceable parts for the subsystem are listed in disassembly order in table 4-1 and illustrated in figure 4-1. In the table, attaching parts are listed immediately after the item they attach. Items in the DESCRIPTION column are indented to indicate relationship to the next higher assembly. In addition, the symbol "— X —" follows the last attaching part for that item. Indentation of the items in the tables is as follows:

Major Assembly

\* Replaceable Assembly

\* Attaching Parts for Replaceable Assembly

\*\*Subassembly or Component Part

\*\*Attaching Parts for Subassembly or Component Part

The replaceable parts listings provide the following information for each part:

- a. FIG. & INDEX NO. The figure and index number which indicates where the replaceable part is illustrated.
- b. HP PART NO. The Hewlett-Packard part number for each replaceable part.
- c. DESCRIPTION. A description of each replaceable part. Refer to table 4-2 for an explanation of abbreviations used in the DESCRIPTION column.
- d. MFR CODE. The 5-digit code that denotes a typical manufacturer of a part. Refer to table 4-3 for a listing of manufacturers that correspond to the codes.
- e. MFR PART NO. The manufacturer's part number of each replaceable part.
- f. UNITS PER ASSY. The total quantity of each part used in the major assembly.

The MFR CODE and MFR PART NO. for common hardware items are listed as 00000 and OBD (order by description), respectively, because these items can usually be purchased locally.

## 4-2. ORDERING INFORMATION

To order replaceable parts for the subsystem, address the order to your local Hewlett-Packard Sales and Support Office. Sales and Support Offices are listed at the back of this manual. Specify the following information for each part ordered:

- a. Model and full serial number.
- b. Hewlett-Packard part number.
- c. Complete description for each part as provided in the replaceable parts listings.

Table 4-1. HP 7914TD, Replaceable Parts

FIG.& INDEX NO.	HP PART NO.	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY
4-1- 1	7914TD 3150-0421	MASS STORAGE SUBSYSTEM *AIR FILTER (Attaching Parts)	28480 28480	7914TD 3150-0421	REF 1
2	0624-0205	*SCREW, slftpg, pozi, 6-32, 0.188 in. - - - X - - -	00000	OBD	2
	29431-60021	*FAN ASSEMBLY (Attaching Parts)	28480	29431-60021	1
3	2680-0118	*SCREW, fh, pozi, 10-32, 0.5 in.	00000	OBD	4
4	3050-0007	*WASHER, cup, no. 10	00000	OBD	4
5	3050-0248	*WASHER, nylon, no. 10 - - - X - - -	00000	OBD	4
6	2420-0001	**NUT, hex, 6-32, w/ext lock washer	00000	OBD	16
7	3050-0228	**WASHER, flat, no. 6	00000	OBD	32
8	2360-0139	**SCREW, pnh, pozi, 6-32, 2.0 in.	00000	OBD	18
9	3160-0092	**FAN GUARD	28875	055012	8
10	29431-00037	**COVER PANEL, fan assembly (Attaching Parts)	28480	29431-00037	1
11	0624-0205	**SCREW, slftpg, pozi, 6-32, 0.187 in. - - - X - - -	00000	OBD	6
12	29431-00066	**ACCESS PLATE, voltage switch (Attaching Parts)	28480	29431-00066	1
13	2360-0115	**SCREW, pnh, pozi, 6-32, 0.312 in.	00000	OBD	2
14	3050-0228	**WASHER, flat, no. 6 - - - X - - -	00000	OBD	2
15	3160-0315	**FAN, 115 cfm, 120 Vac	23936	4606X	4
16	29431-60020	**FAN POWER PCA (Attaching Parts)	28480	29431-60020	1
17	2360-0115	**SCREW, pnh, pozi, 6-32, 0.312 in. - - - X - - -	00000	OBD	4
18	29431-00036	**HOUSING, fan assembly	28480	29431-00036	1
19	29431-00058	*CLAMP, power cord (Attaching Parts)	28480	29431-00058	1
20	2360-0117	*SCREW, pnh, pozi, 6-32, 0.375 in.	00000	OBD	2
21	3050-0100	*WASHER, flat, no. 6 - - - X - - -	00000	OBD	2
22	29431-00068	*PDU ACCESS PLATE (Attaching Parts)	28480	29431-00068	1
23	2360-0117	*SCREW, pnh, pozi, 6-32, 0.375 in.	00000	OBD	2
24	3050-0100	*WASHER, flat, no. 6 - - - X - - -	00000	OBD	2
25	0400-0086	*GROMMET, snap, plastic, 0.625 in. ID	28520	2096	1
26	0400-0085	*GROMMET, snap, plastic, 0.875 in. ID	28520	2163	1
27	29431-00063	*PDU INSPECTION PLATE (Attaching Parts)	28480	29431-00063	1
28	2360-0117	*SCREW, pnh, pozi, 6-32, 0.375 in.	00000	OBD	6
29	3050-0100	*WASHER, flat, no. 6 - - - X - - -	00000	OBD	6

Table 4-1. HP 7914TD, Replaceable Parts (continued)

FIG.& INDEX NO.	HP PART NO.	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY
30	3105-0163	*CIRCUIT BREAKER (CB1), 20A (Attaching Parts)	05684	QOU320-5375	1
31	2420-0001	*NUT, hex, 6-32, w/ext lock washer	00000	OBD	4
32	3050-0066	*WASHER, flat, no. 6 - - - X - - -	00000	OBD	4
33	0360-1755	*TERMINAL BLOCK MODULE	89020	213	4
34	0360-1094	*TERMINAL BLOCK END SECTION (Attaching Parts)	89020	230	2
35	2360-0119	*SCREW, pozi, pnh, 6-32, 0.437 in.	00000	OBD	1
36	3050-0066	*WASHER, flat, no. 6 - - - X - - -	00000	OBD	1
37	29431-20003	*GROUNDING BAR (Attaching Parts)	28480	29431-20003	1
38	2420-0001	*NUT, hex, 6-32, w/ext lock washer	00000	OBD	2
39	3050-0066	*WASHER, flat, no. 6 - - - X - - -	00000	OBD	2
40	0362-0511	*LUG, screw, grounding (Attaching Parts)	28480	0362-0511	1
41	2510-0045	*SCREW, pozi, pnh, 8-32, 0.375 in.	00000	OBD	1
42	2190-0009	*WASHER, intl lock, no. 8 - - - X - - -	00000	OBD	1
43	No Number	*PDU HOUSING	28480	NSR	1
44	29431-60037	*REAR DOOR	28480	29431-60037	1
45	07970-01345	*BAFFLE, cooling (Attaching Parts)	28480	07970-01345	1
46	2680-0055	*SCREW, pnh, pozi, 10-32, 0.5 in.	00000	OBD	4
47	3050-0019	*WASHER, flat, no. 10 - - - X - - -	00000	OBD	4
48	1400-0972	*CLIP, cable, nylon	34785	021-0500	1
49	8120-2683	*POWER CORD, fan assy, 16 AWG, 48 inch	28480	8120-2683	1
	8120-1860	*POWER CORD, HP 7970E, 18 AWG, 60 inch	28480	8120-1860	1
	8120-2683	*POWER CORD, HP 7914R, 16 AWG, 48 inch	28480	8120-2683	1
50	29431-60035	*FRONT DOOR	28480	29431-60035	1
51	7970E	*MAGNETIC TAPE UNIT, device option 546 (Attaching Parts)	28480	7970E	1
52	2680-0111	*SCREW, pnh, pozi, 10-32, 1.0 in.	00000	OBD	3
53	2680-0107	*SCREW, pnh, pozi, 10-32, 0.75 in.	00000	OBD	4
54	2190-0034	*WASHER, lock, no. 10	00000	OBD	7
55	3050-0002	*WASHER, flat, no. 10 - - - X - - -	00000	OBD	7
56	2680-0108	*SCREW, fh, pozi, 10-32, 0.75 in.	00000	OBD	4
57	07970-00580	*MOUNTING BRACKET, tape unit	28480	07970-00580	1
58	07970-20900	*MOUNTING BAR, tape unit	28480	07970-20900	2
59	7914R	*DISC/TAPE DRIVE, device option 140	28480	7914R	1
	7914R	*DISC/TAPE DRIVE, standard (subsystem option 240)	28480	7914R	REF
	7914R	*DISC/TAPE DRIVE, device option 001 (subsystem option 002) (Attaching Parts)	28480	7914R	REF
60	2680-0278	*SCREW, pnh, T25, 10-32, 0.5 in.	00000	OBD	4



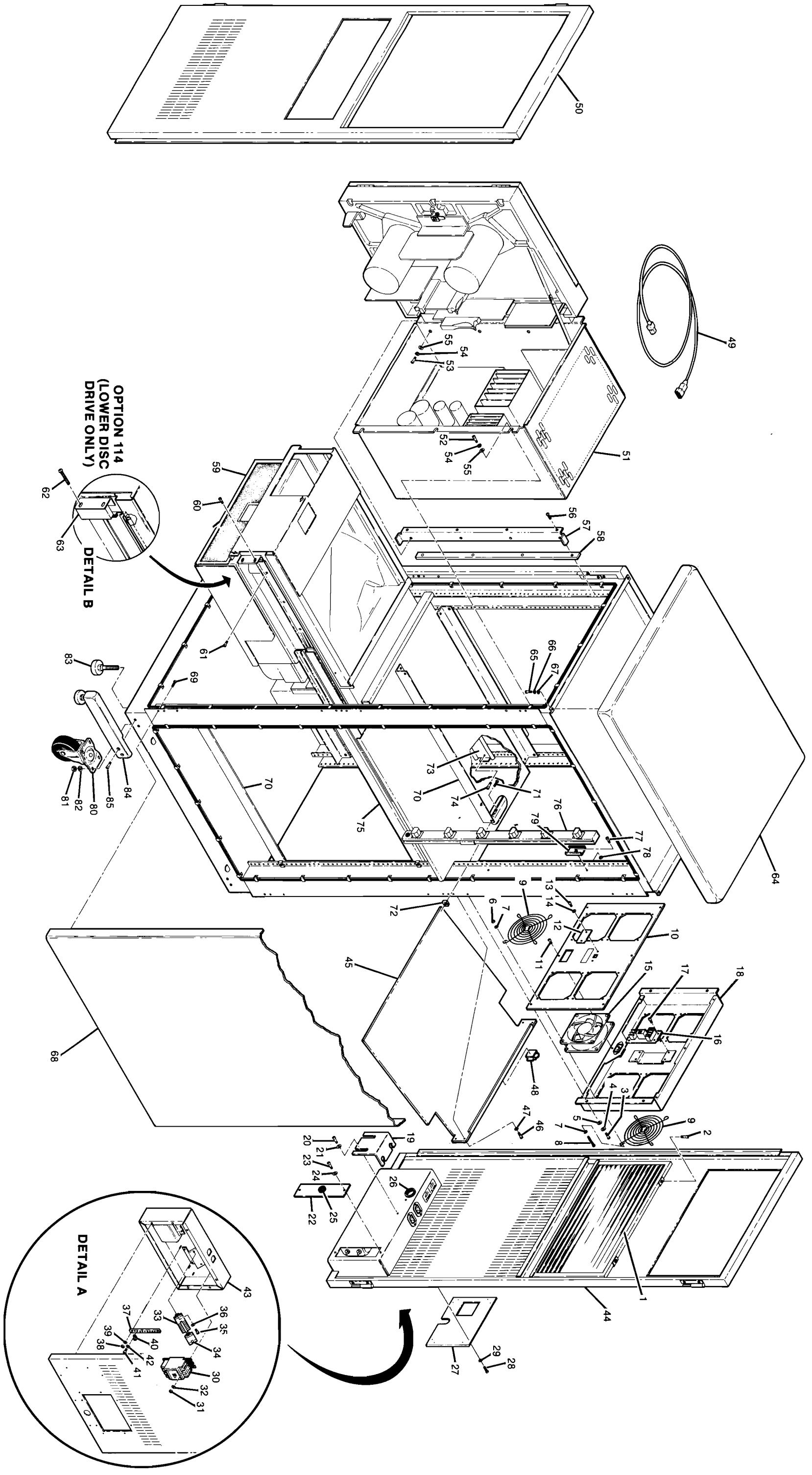


Figure 4-1. Subsystem Exploded View

Table 4-1. HP 7914TD, Replaceable Parts (continued)

FIG.& INDEX NO.	HP PART NO.	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY
61	0515-0381	*SCREW, pnh, T20, M4.0 by 0.7, 10 mm - - - X - - -	00000	OBD	6
	7914R	*DISC/TAPE DRIVE, device option 140 (not shown, second drive added by subsystem option 114) (Attaching Parts)	28480	7914R	1
62	2680-0280	*SCREW, pnh, T25, 10-32, 1.5 in.	00000	OBD	4
63	07970-20901	*SPACER - - - X - - -	28480	07970-20901	2
64	29430-00047	*CABINET CAP (Attaching Parts)	28480	29430-00047	1
65	2680-0103	*SCREW, pnh, pozi, 10-32, 0.5 in.	00000	OBD	4
66	2190-0034	*WASHER, lock, no. 10	00000	OBD	4
67	3050-0019	*WASHER, flat, no. 10 - - - X - - -	00000	OBD	4
68	29431-00016	*SIDE PANEL (Attaching Parts)	28480	29431-00016	2
69	2510-0104	*SCREW, fh, pozi, 8-32, 0.437 in. - - - X - - -	00000	OBD	6
70	29429-00015	*SUPPORT RAIL (Attaching Parts)	28480	29429-00015	4
71	2680-0118	*SCREW, fh, pozi, 10-32, 0.5 in.	00000	OBD	2
72	0590-0804	*NUT, sheetmetal, no. 10-32 - - - X - - -	00000	OBD	2
73	07912-00071	*RACK SLIDE, left (Attaching Parts)	28480	07912-00071	1
74	2680-0283	*SCREW, pnh, slot, 10-32, 0.5 in. - - - X - - -	00000	OBD	2
75	07912-00072	*RACK SLIDE, right (Attaching Parts)	28480	07912-00072	1
	2680-0283	*SCREW, pnh, slot, 10-32, 0.5 in. - - - X - - -	00000	OBD	2
76	1251-3670	*POWER STRIP, six-receptacle, CEE-22 (Attaching Parts)	79725	E33171	1
77	2510-0106	*SCREW, fh, pozi, 8-32, 0.5 in.	00000	OBD	2
78	2580-0003	*NUT, hex, 8-32	00000	OBD	2
79	1251-3969	*CLIP, power strip - - - X - - -	28480	1251-3969	2
80	1492-0087	*CASTER, swivel (Attaching Parts)	09667	95-4597	4
81	2950-0047	*NUT, hex, 5/16 in.	00000	OBD	4
82	2190-0432	*WASHER, lock, 5/16 in. ID - - - X - - -	00000	OBD	4
83	0403-0419	*LEVELING FOOT	28480	0403-0419	4
84	40024A	*ANTI-TIP FEET KIT	28480	*40024A	1
85	3030-0647	**SCREW, socket head, 10-32, 0.625 IN.	28480	3030-0647	4

Table 4-2. Abbreviations

A	= ampere(s)	ID	= inside diameter	qty	= quantity
ac	= alternating current	in.	= inch, inches	rdh	= round head
AR	= as required	incand	= incandescent	rect	= rectifier
assy	= assembly	incl	= include(s)	ref	= reference
		intl	= internal	rf	= radio frequency
		I/O	= input/output	rfl	= radio frequency interference
brkt	= bracket	k	= kilo (10 <sup>3</sup> ), kilohm	rh	= right hand
		kg	= kilogram	rpm	= revolutions per minute
c	= centi (10 <sup>-2</sup> )	lb	= pound	rwv	= reverse working voltage
C	= Celsius, centigrade	LED	= light-emitting diode		
cer	= ceramic	lh	= left hand	sb	= slow blow
cm	= centimetre	M	= mega (10 <sup>6</sup> ), megohm	SCR	= semiconductor-controlled rectifier
comp	= composition	m	= milli (10 <sup>-3</sup> )	scw	= square cone washer
conn	= connector	mach	= machine	Se	= selenium
		mb	= medium blow	Si	= silicon
d	= deci (10 <sup>-1</sup> )	met oxd	= metal oxide	slftpg	= self-tapping
dc	= direct current	mfr	= manufacturer	spdt	= single-pole, double throw
deg	= degree(s)	misc	= miscellaneous	spst	= single-pole, single throw
dia	= diameter	mm	= millimetre	sst	= stainless steel
dpdt	= double-pole, double-throw	mtg	= mounting	stl	= steel
dpst	= double-pole, single-throw	My	= Mylar	sw	= switch
		n	= nano (10 <sup>-9</sup> )	T	= TORX® screw
elctlt	= electrolytic	n.c.	= normally closed	Ta	= tantalum
encap	= encapsulated	no.	= number	tgl	= toggle
ext	= external	n.o.	= normally open	thd	= thread
		NSR	= not separately replaceable	Ti	= titanium
F	= Fahrenheit, farad	ntd	= no time delay	tol	= tolerance
fb	= fast blow	OBD	= order by description	U (μ)	= micro (10 <sup>-6</sup> )
fh	= flat head	OD	= outside diameter	V	= volt(s)
fig.	= figure	ovh	= oval head	var	= variable
filh	= fillister head	oxd	= oxide	Vdcw	= direct current working volts
ftm	= film	p	= pico (10 <sup>-12</sup> )	W	= watt(s)
fw	= full wave	PCA	= printed-circuit assembly	w/	= with
fxd	= fixed	phh	= phillips head	WIV	= inverse working volts
		pnh	= pan head	ww	= wire-wound
G	= giga (10 <sup>9</sup> )	P/O	= part of		
Ge	= germanium	pot	= potentiometer		
		pozi	= Pozidriv		
H	= henry, henries				
hd	= head				
hex	= hexagon, hexagonal				
hicl	= helical				
Hz	= Hertz				

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9/82

Table 4-3. Code List of Manufacturers

The following code numbers are from the Federal Supply Code for Manufacturers Cataloging Handbooks H4-1, and H4-2, and their supplements.		
CODE NO.	MANUFACTURER	ADDRESS
05684	Square D Co.....	Middleton, OH
09667	Bliss and Laughlin Faultless Div.....	Stratford, Ontario
23963	William J. Purdy Co. Pamotor Div.....	Burlingame, CA
28480	Hewlett-Packard Co.....	Palo Alto, CA
28520	Heyman Manufacturing.....	Kenilworth, NJ
28875	IMC Magnetics Corp.....	Rochester, NH
34785	DEK Inc.....	W. Chicago, IL
79725	Wiremold Co.....	Hartford, CT
89020	Amerace Corp.....	Union, NJ