RA90/RA92/H9643 Cabinet Installation Guide

Order Number EK-RA90H-IN-002

Digital Equipment Corporation
Maynard, Massachusetts

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About This Manual

The primary purpose of this manual is to provide the user and/or Digital Customer Services engineer with a reference guide for installing an RA90/RA92 disk drive in an H9643 cabinet. Its secondary purpose is to provide assistance with installing the RA90/RA92/H9643 cabinet system.

Because this information is primarily for the user installing an RA90/RA92 add-on disk drive in an H9643 cabinet, specific procedures, such as unpacking and de-skidding the cabinet system, are not contained in this manual. Refer to the individual component's user manuals when unpacking and operating the RA90/RA92/H9643 cabinet system. Reference documentation to supplement this manual is as follows:

Document Title	Order Number
RA90/RA92 Disk Drive User Guide	EK–0RA90–UG
H9643 Cabinet System User Guide	EK–H9643–UG

1
General Information

This chapter describes the RA90/RA92/H9643 cabinet system in detail. Procedures for thermal stabilization, unpacking the RA90/RA92 add-on disk drive, and repackaging the RA90/RA92/H9643 cabinet system and RA90/RA92 add-on disk drive are presented. The contents of the RA90–NA/ RA92–NA add-on kit are also described.

The procedure for unpacking the RA90/RA92/H9643 cabinet system can be found in the *H9643 Cabinet System User Guide*.

1.1 Product Descriptions

The RA90/RA92/H9643 cabinet system is a Winchester disk drive storage product containing from one to six RA90/RA92 disk drives. Refer to Figure 1–1.

The RA90/RA92/H9643 cabinet system accommodates up to six RA90/RA92 disk drives. Using any of the eight variation part numbers (P/Ns), the customer can order the system that suits capacity needs. Refer to Table 1–1 for a list of variation P/Ns and descriptions.

Table 1–1   RA90/RA92/H9643 Cabinet System Variations

P/N	RA90/RA92 Disk Drives	H9643 Cabinet	Voltage
RA90–CA/RA92–CA	1	1	100/120
RA90–CD/RA92–CD	1	1	220/240
RA90–FA/RA92–FA	2	1	100/120
RA90–FD/RA92–FD	2	1	220/240
RA90–HA/RA92–HA	4	1	100/120
RA90–HD/RA92–HD	4	1	220/240
RA90–JA/RA92–JA	6	1	100/120
RA90–JD/RA92–JD	6	1	220/240

As capacity needs increase, an RA90/RA92 add-on disk drive (P/N RA90–NA, RA92–NA) can be added (following the prescribed add-on sequence) to any variation which is not already fully populated.

The RA90/RA92 disk drive utilizes Winchester disk technology with thin film heads and plated media. The RA90 disk drive has a formatted capacity of 1.216 gigabytes and an average seek time of 18.5 milliseconds. The RA92 disk drive has a formatted capacity of 1.506 gigabytes and an average seek time of 16.0 milliseconds. The RA90/RA92 has a data transfer rate of 2.77 megabytes per second. Each spindle is independently powered, cooled, controlled, and housed.
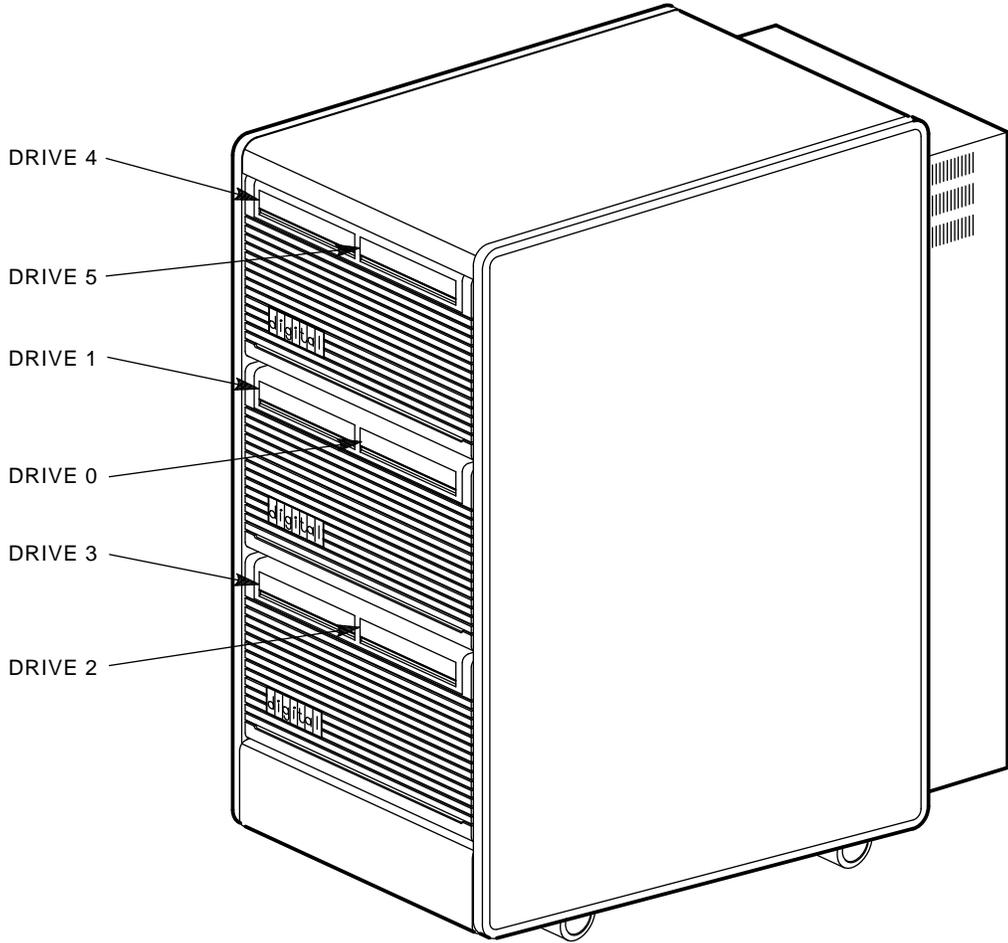
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Figure 1–1   RA90/RA92/H9643 Cabinet System

WARNING
When adding RA90/RA92 disk drives to the RA90/RA92/H9643 cabinet system, you must follow the prescribed add-on order sequence to maintain cabinet stability. Install the first add-on disk drive in disk drive position 1 (center level), the second in disk drive position 2 (bottom level), and so on.

1.2   RA90/RA92/H9643 Cabinet System Specifications

Table 1–2 lists physical specifications for the RA90/RA92/H9643 cabinet system. Detailed specifications for the RA90/RA92 disk drive are listed in the *RA90/RA92 Disk Drive User Guide*.

Table 1–2   RA90/RA92/H9643 Cabinet System Physical Specifications

Characteristic	Specification
Height*	106.68 centimeters (41.6 inches)
Width*	54.61 centimeters (21.3 inches)
Depth*	91.44 centimeters (35.7 inches)
Weight—unpacked (RA90/RA92–JA/JD)	309.09 kilograms (683.1 pounds)
Weight—unpacked (RA90/RA92–HA/HD)	236.36 kilograms (522.1 pounds)
Weight—unpacked (RA90/RA92–FA/FD)	163.63 kilograms (361.6 pounds)
Weight—unpacked (RA90/RA92–CA/CD) (includes stabilizer plate (weight))	138.63 kilograms (306.4 pounds)
Shipping weight (RA90/RA92–JA/JD)	361.36 kilograms (798.6 pounds)
Shipping cube (All variations)	106.68 x 76.2 x 168.91 centimeters (41.6 inches front-to-back x 29.7 inches wide x 25.9 inches high)

NOTE
* The height, width, and depth measurements are the same for all variations because all RA90/RA92 disk drives are housed in an H9643 cabinet with these dimensions.

Tables 1–3 and 1–4 list the environmental limits and recommended environmental operating ranges for the RA90/RA92/H9643 cabinet system.

Table 1–3   RA90/RA92/H9643 Cabinet System Environmental Limits (Maximum)

Characteristic	Specification
Temperature	
Operating	+10° to +40°C (+50° to +104°F) with a temperature gradient of +11°C/hour (+20°F/hour)
Nonoperating	−40° to +66°C (−40° to +151°F)
Relative humidity	
Operating	10% to 90% (noncondensing) with a minimum wet bulb temperature of +28°C (+82°F) and a minimum dew point of +2°C (+36°F)
Nonoperating	10% to 95%

Table 1–4   RA90/RA92/H9643 Cabinet System Recommended Environmental Operating Range Specifications

Characteristic	Specification
Temperature	+18° to +24°C (+64.4° to +75.2°F) with an average rate of change of +3°C/hour maximum and a step change of +3°C or less
Relative humidity	40% to 60% (noncondensing) with a step change of 10% or less (noncondensing)
Air quality (maximum particle count)	Not to exceed 500,000 particles (0.5 microns or larger) per cubic foot of air
Air volume (at inlet)	15.36 cubic meters per minute, average (542.5 cubic feet per minute, average)
Altitude	
Operating	Sea level to 2400 meters (7892 feet); maximum allowable operating temperatures are reduced by a factor of +1.8°C/1000 meters (+1°F/1000 feet) for operation above sea level
Nonoperating	300 meters (984 feet) below sea level to 7500 meters (24,600 feet) above sea level (actual or effective by means of cabin pressurization)

NOTE
Specifications listed in this table are recommended environmental ranges to optimize equipment performance and reliability.

Tables 1–5 and 1–6 list the electrical specifications for 120 Vac and 240 Vac RA90/RA92/H9643 cabinet systems. Table 1–7 lists the electrical specifications by model.

Table 1–5   RA90/RA92/H9643 Cabinet System Electrical Specifications for 120 Vac

Characteristic	Specification	Specification	Specification
Voltage nominal	120 Vac	50 Hz/60 Hz	
Inrush current	235 A max.		
RMS current (steady state)	Phase A	16.9 A typical	20.1 A max.
	Neutral	16.9 A typical	20.1 A max.
	Ground	2.3 mA typical	
Peak current (steady state)	Phase A	50.6 A typical	57.5 A max.
	Neutral	50.6 A typical	57.5 A max.
AC plug type	NEMA L5–30P	P/N 12–11193	874–D power controller
Power consumption	1401 watts typical	1688 watts max.	
Fuse or circuit breaker (CB) rating	30 A typical		
Power factor	0.70		

Table 1–6   RA90/RA92/H9643 Cabinet System Electrical Specifications for 240 Vac

Characteristic	Specification	Specification	Specification
Voltage nominal	240 Vac	50 Hz/60 Hz	
Inrush current	221 A max.		
RMS current (steady state)	Phase A	7.3 A typical	8.7 A max.
	Neutral	7.3 A typical	8.7 A max.
	Ground*	3.9 mA typical	
Peak current (steady state)	Phase A	18.4 A typical	21.9 A max.
	Neutral	18.4 A typical	21.9 A max.
AC plug type	IEC 309 320–P6W	P/N 12–14379–03	874–F power controller
Power consumption	1359W typical	1627 watts max.	
Fuse or CB rating	15 A typical		
Power factor	0.78		

*WARNING: High leakage current — earth connection is essential before connecting power.

Table 1–7   RA90/RA92 Disk Drive Electrical Specifications by Model

Disk Drive	Nominal Voltage[1]	Input Current (Amps)			Power Dissipation	BTUs/Hour [Kj/Hour][2]
		Start-up Current	PH1	Neutral		
RA90/RA92	120 volts	5.0	3.4	3.4	281 Watts	960
RA90/RA92	240 volts	2.35	1.45	1.45	271 Watts	[976]

[1] The RA90/RA92 disk drive is not line frequency dependent. Currents are for nominal voltages of 120 Vac phase to neutral **or** for 240 Vac phase to neutral. Nominal voltages of 101 Vac and 220 Vac will have proportionately higher phase currents, by the ratio of 120/101 or 240/220, to the currents specified in this table.

[2] Bracketed figure in this column indicates kilojoules per hour.

1.3   Thermal Stabilization

Thermal stabilization prevents temperature differences between the disk drive and its environment from damaging the disk drive's components.

CAUTION
The thermal stabilization procedure is mandatory. Do not open the moisture barrier bag until after the thermal stabilization period is complete.

Prior to installation, the RA90/RA92/H9643 cabinet system and/or RA90/RA92 add-on disk drive must be stored at a temperature of 60 degrees F (16 degrees C) or higher for a minimum of 24 hours. This equipment may be stored either in the computer room or in another storage room under controlled temperature conditions. If stored in another storage room, the equipment must remain for an additional hour in the computer room in which it will be installed.

After the thermal stabilization criteria have been met, carefully cut and remove the moisture barrier bag. Proceed with the installation.

1.4   Unpacking and De-Skidding the RA90/RA92/H9643 Cabinet System

Refer to the *H9643 Cabinet System User Guide* for RA90/RA92/H9643 cabinet system unpacking and de-skidding procedures. Procedures for adjusting the leveler feet are also contained in that manual.

After the cabinet system has been installed, refer to Chapter 3 for instructions on cabinet system power-up.

1.5   Unpacking the RA90/RA92 Add-On Disk Drive

This section describes the procedure for unpacking an RA90/RA92 add-on disk drive. Disk drive preparation and installation procedures are discussed in Chapter 2.

The part number for an RA90/RA92 add-on disk drive is RA90–NA/RA92–NA. After receiving the RA90–NA/RA92–NA add-on disk drive, check packaging for external damage. Read and save any packing information. Keep all packing material and receipts in the event of equipment damage or difficulties. Refer to Figure 1–2 and unpack the RA90–NA/RA92–NA as follows:

1. Remove the shipping straps.

2. Open the shipping container.

3. Remove (and save) the packing material surrounding the disk drive.

4. Remove the manuals.

5. Lift the disk drive from the shipping container.

> **WARNING**
> **Do not use the cardboard handles to lift the disk drive from the shipping container. Injury to personnel or damage to equipment could occur if the cardboard handles are used for this purpose.**

6. Remove the small plastic bag containing the drive-to-cabinet hardware located under the disk drive.

7. Remove the moisture barrier bag from the disk drive.

> **CAUTION**
> **It is important to adhere to the thermal stabilization procedure described in Section 1.3 prior to removing the moisture barrier bag. Failure to do so may result in damage to the equipment.**

8. Set the disk drive on an anti-static work surface.

1.5.1   RA90/RA92 Add-On Kit Contents

The contents of the RA90–NA/RA92–NA add-on shipping container are shown in Figure 1–2. Table 1–8 describes the contents of the small plastic bag in the shipping container. Verify that all hardware is present before beginning the RA90/RA92 add-on disk drive installation.

After verifying the contents of the RA90/RA92 add-on kit, turn to Chapter 2 for add-on disk drive preparation and installation procedures.

BARRIER
BAG

CONTAINER

MANUALS

PLASTIC BAG
CONTAINING
HARDWARE

RA90/RA92
DISK
DRIVE

DESICCANT

OCP
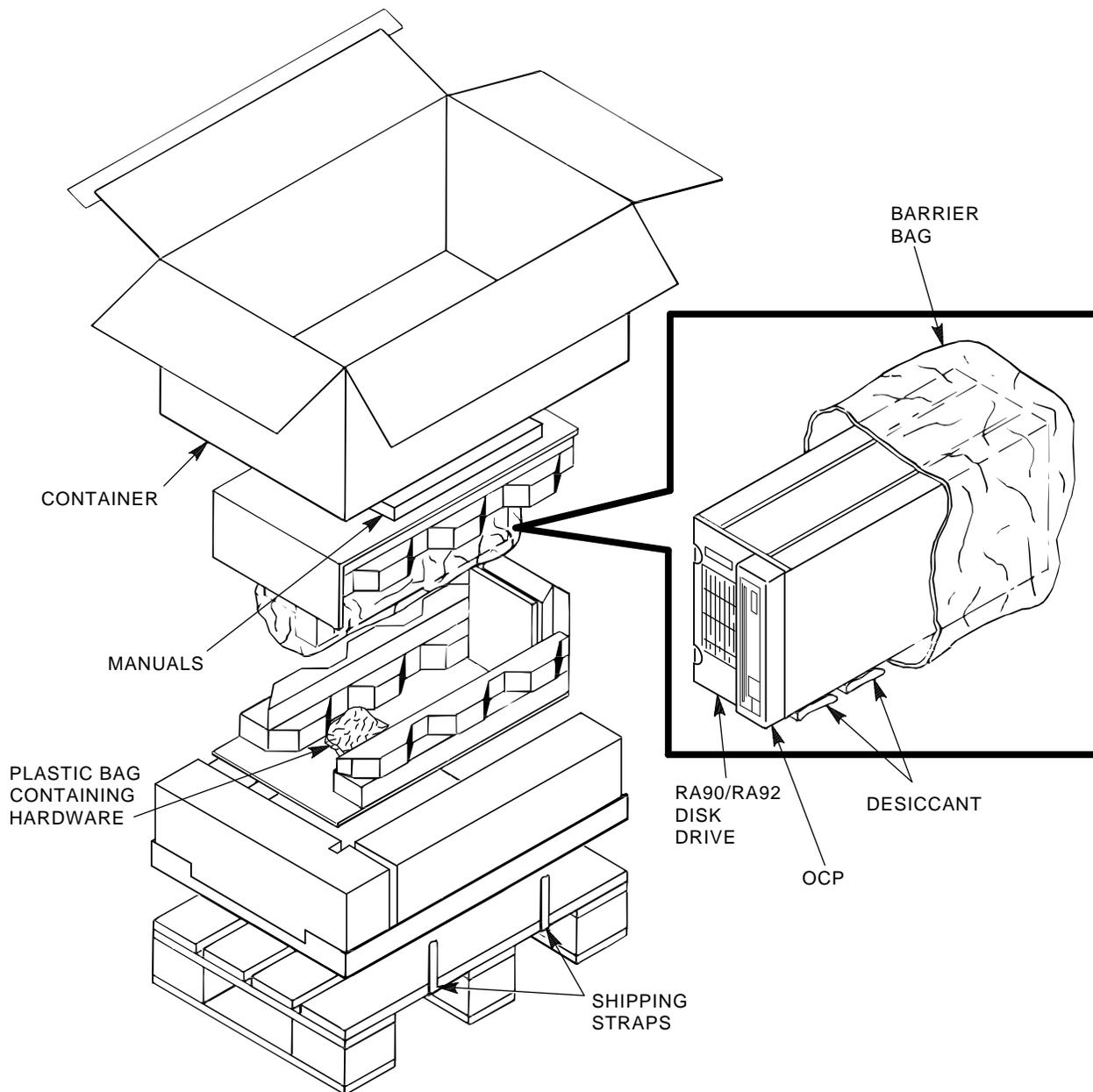
SHIPPING
STRAPS

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Figure 1–2   RA90–NA/RA92–NA Add-On Shipping Container Contents

Table 1–8   RA90–NA/RA92–NA Add-On Kit Contents

P/N	Quantity	Description
RA90–NA/RA92–NA	1	RA90/RA92 disk drive
99–06557–10	1	Plastic bag
90–00039–27	2	10–32 x 7/16 screws, flat, Phillips, for chassis stabilizer bracket holes in top of disk drive
90–00063–37	4	10–32 x 3/8 screws, pan-head, Phillips, for chassis retainer bracket side holes into disk drive
74–32804–01	1	RA90/RA92 chassis retainer bracket
90–00063–39	2	SA600–xx/SA800–xx screws (not needed for this product, discard)
EK–RA90H–IN–002	1	*RA90/RA92/H9643 Cabinet Installation Guide*

1.6 Repackaging Equipment for Storage or Shipment

Should it be necessary to repackage equipment for storage or shipment, use the original shipping containers in addition to the new materials listed in Table 1–9.

Table 1–9   Repackaging Materials

Item	RA90/RA92 Add-On Disk Drive		RA90/RA92/H9643 Cabinet System	
	Quantity	P/N	Quantity	P/N
Moisture barrier bag	1	9908507–01	1	9908191–05
Barrier laminate	N/A	N/A	1	9908190–01
Desiccant	2	9906086–21	10	9906086–21
PE bag	N/A	N/A	1	9906104–20
Waterproof tape	As req'd	9908258–01	As req'd	9908258–01

1.6.1 Repackaging the RA90/RA92 Add-On Disk Drive

Use the following procedure to repackage the RA90/RA92 add-on disk drive:

1. Insert the add-on disk drive into the moisture barrier bag.

2. Insert two bags of desiccant into the moisture barrier bag, under the add-on disk drive.

3. Fold the moisture barrier bag and seal it using the waterproof tape listed in Table 1–9.

4. Repackage the bagged add-on disk drive in the original foam and packing material, place it in the shipping container, and put the container on the original shipping pallet.

5. Obtain strapping material from the shipping department or carrier. Secure the shipping container to the pallet.

1.6.2 Repackaging the RA90/RA92/H9643 Cabinet System

Use the following procedure to repackage the RA90/RA92/H9643 cabinet system:

1. Place the barrier laminate on top of the original cushioned shipping pallet, matching front to front.

2. Using the original unloading ramps, push the cabinet onto the pallet, placing the cabinet on top of the barrier laminate, matching the front of cabinet with the front of the barrier laminate.

3. Place 10 bags of desiccant under the cabinet, between the barrier laminate and the cabinet.

4. Secure the cabinet to the original cushioned shipping pallet using the original cabinet hold-down brackets and bolts. Screw the bolts through the holes of the barrier laminate and into the T-nuts in the original pallet deck.

5. Place the anti-static bag over the top of the cabinet.

6. Place the moisture barrier bag over the top of the cabinet.

7. Fold over the moisture barrier bag and barrier laminate, then seal the bag using waterproof tape.

8. Repack the cabinet using the original carton, cover, and shipping material.

Refer to the *H9643 Cabinet System User Guide* for further details.

2
Preparation and Installation

This chapter describes the procedures for installing an RA90/RA92 disk drive in an H9643 cabinet. Procedures for using the Digital lifting device and removing and replacing the cabinet front bezels, RA90/RA92 operator control panels (OCPs), cabinet rear panel, cabinet top cover, and cabinet kick plate are described. Finally, internal Standard Disk Interface (SDI) cable and power cable routing and connections are included.

2.1 Site Preparation and Planning

Site preparation and planning are necessary before installing an RA90/RA92/H9643 cabinet system or RA90/RA92 add-on disk drive. The focus of this manual is the installation of additional RA90/RA92 disk drives in an existing H9643 cabinet system; therefore, much of the site preparation and planning should be complete. However, it will be necessary to plan for the added weight and power requirements of additional RA90/RA92 disk drives. It is recommended that ac power wiring for the computer system be checked to determine adequate capacity for expansion. The wiring used by Digital in this product conforms to Underwriter's Laboratory (UL) and Canadian Standards Association (CSA) standards.

To prevent damage to equipment and personnel, ensure power sources meet the specifications required for this equipment. For product specifications, refer to Chapter 1.

The RA90/RA92/H9643 cabinet system will arrive at the site ready for installation. Check the RA90/RA92 voltage selector switches to ensure the voltage of each RA90/RA92 is set correctly for the site's power. Refer to Chapter 3 if voltage setting changes are necessary.

WARNING
Hazardous voltages are present in this equipment. Installation and service must be performed by trained Digital Customer Services personnel. Bodily injury or equipment damage may result from incorrect servicing.

2.2 RA90/RA92/H9643 Cabinet System Installation

Refer to the *H9643 Cabinet System User Guide* for cabinet unpacking and de-skidding procedures. To install the RA90/RA92/H9643 cabinet system, use the following procedure:

1. After following the thermal stabilization procedure described in Chapter 1, move the cabinet into position within the computer room.

    CAUTION
    It is important to adhere to the thermal stabilization procedure described in Section 1.3. Failure to do so may result in damage to the equipment.

2. Before applying power to the system, ensure the RA90/RA92 voltage selector switches have been set correctly for the site's voltage requirements. Refer to Section 3.3.

3. Remove the cabinet rear access panel using the procedure described in the *H9643 Cabinet System User Guide*.

4. The internal SDI cables have already been connected to the RA90 disk drives and the cabinet I/O bulkhead panel at the factory. The disk drive power cords have also been connected to the RA90 rear panel and the 874 power controller (Section 2.5). The internal SDI cables and disk drive power cords for RA92 disk drives are shipped with the disk drives and must be connected:

    •   Install the internal SDI cables connectors to Port A and Port B connections at the rear of the RA92 disk drive and to the cabinet I/O bulkhead panel.

    •   Install the disk drive power cord to the rear of the RA92 disk drive and the 874 power controller.   Ensure all cables and power cords are seated properly.

5. Connect the external SDI cables from the cabinet I/O bulkhead panel to the host system I/O panel.

6. Plug the 874 power controller power cable into the proper wall outlet.

7. Set the 874 power controller remote/off/local bus switch (marked A/O/B on the power controller front panel) to the proper position. Refer to Chapter 3.

8. Turn on the power controller circuit breaker. Perform the power-up and acceptance testing procedures in the *RA90/RA92 Disk Drive User Guide* to complete the installation.

2.3   Required Hardware for RA90/RA92 Add-On Disk Drive Installation

The disk drive mounting guide rails have been installed at the factory for all levels in the original cabinet configuration. The RA90/RA92 disk drive mounting hardware will be located in two places: in the RA90/RA92 add-on shipping container and attached to the front of the cabinet frame. Before proceeding with the RA90/RA92 add-on installation, ensure all add-on disk drive and cabinet hardware is available. Refer to Section 2.3.1.

2.3.1   Hardware Checklist

Following is a complete list of hardware needed to install and secure the RA90/RA92 disk drive in the cabinet (Figure 2–1):

1. RA90–NA/RA92–NA hardware:

    •   Chassis retainer brackets (2), for attaching the RA90/RA92 disk drive to the cabinet frame.

    •   Short 10-32 x 3/8 pan-head Phillips sems screws (4), two screws for each chassis retainer bracket (for holes on the side of the RA90/RA92 disk drive).

    •   Short 10-32 x 7/16 flat-head Phillips screws (2), for attaching the chassis stabilizer bracket to the top of the RA90/RA92 disk drive. **Caution: It is important to use the correct screws here, to avoid damage to disk drive modules.**

2. H9643 cabinet hardware:

    •   Long 10-32 x 5/8 pan-head Phillips sems screws (2), one for each retainer bracket (for drive-to-frame connection, located on the cabinet frame).

    •   Chassis stabilizer bracket (1), one per drive for disk drive positions 2, 3, 4, and 5. This bracket will be attached to the cabinet frame with two 10-32 x 5/8 hex serrated screws.

    •   Nylon washers will be located in the bottom hole of the grille (bezel) mounting bracket hardware stack-up for disk drive positions without RA90/RA92 disk drives. The nylon washer resides between the grille mounting bracket and the cabinet frame. These nylon washers will be discarded when the RA90/RA92 chassis retainer brackets are installed.

CHASSIS
STABILIZER
BRACKET

10-32 X 7/16
FLATHEAD
PHILLIPS
SCREW

BEZEL
MOUNTING
BRACKET

10-32 X 5/8
SERRATED
HEX-HEAD
SCREW

10-32 X 5/8
PAN-HEAD
PHILLIPS
SCREWS

DRIVE
FRONT

NYLON
WASHER

10-32 X 3/8
PAN-HEAD
SCREW

BEZEL

CHASSIS
RETAINER
BRACKET

WASHER
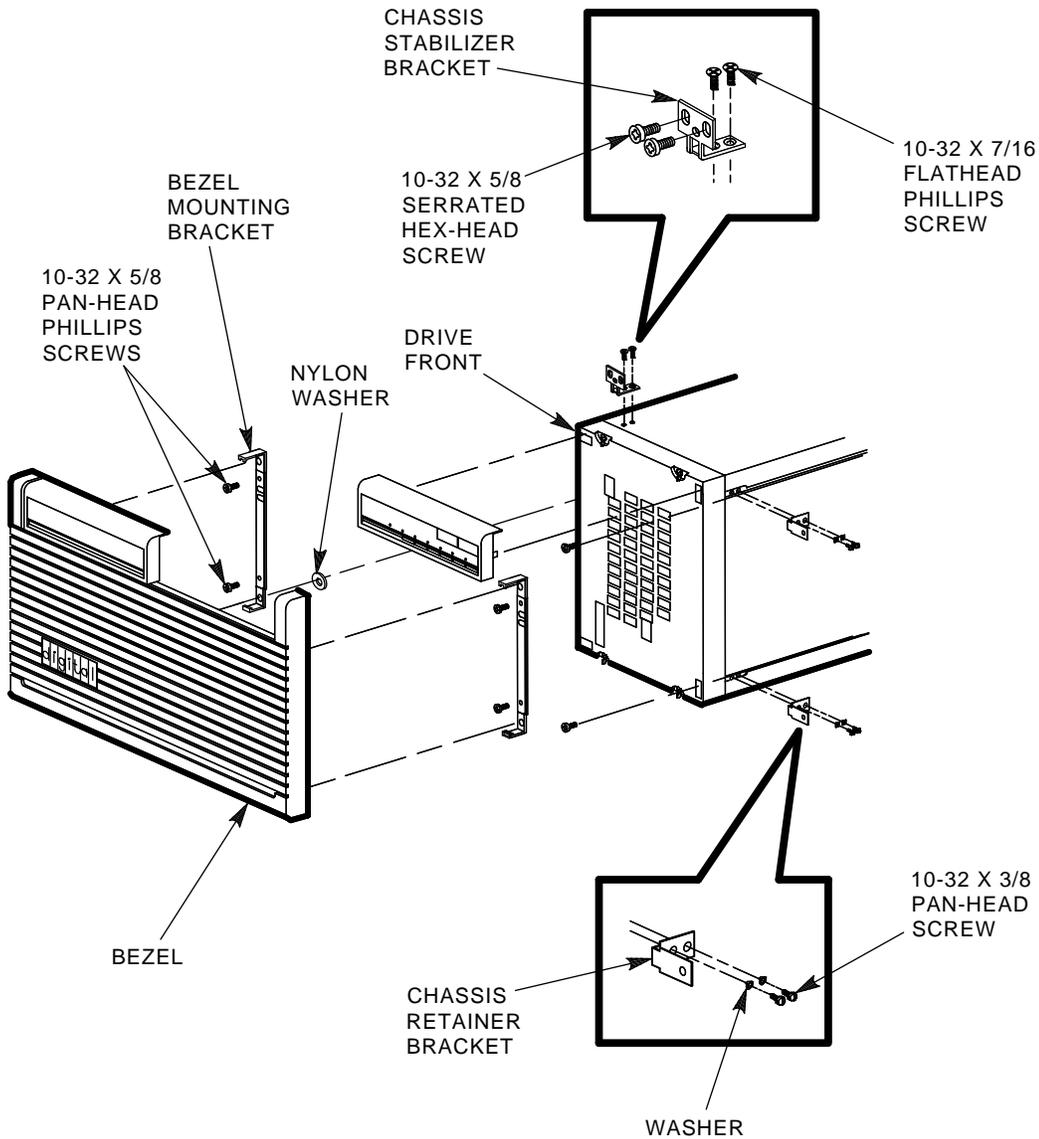
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Figure 2–1   Installing Disk Drive/Cabinet Hardware, Front View

2.4   RA90/RA92 Add-On Disk Drive Installation

Unpack the RA90/RA92 add-on disk drive and complete the thermal stabilization per the procedures in Chapter 1. Ensure all add-on disk drive and cabinet hardware is available before beginning installation procedures. Refer to Section 2.3.1.

The following sections describe the RA90/RA92 add-on disk drive installation tasks.

2.4.1 RA90/RA92 Add-On Disk Drive Order Sequence for H9643 Cabinet

When installing additional RA90/RA92 disk drives in an RA90/RA92/H9643 cabinet system, disk drives must be added in a specific sequence to ensure cabinet stability. Working from the front of the cabinet, install the first add-on disk drive in disk drive position 1 (center level), the second in disk drive position 2 (bottom level), and so on. Refer to Figure 2–2.

WARNING
Failure to adhere to the disk drive add-on order sequence can cause cabinet instability, resulting in damage to equipment and/or personnel.
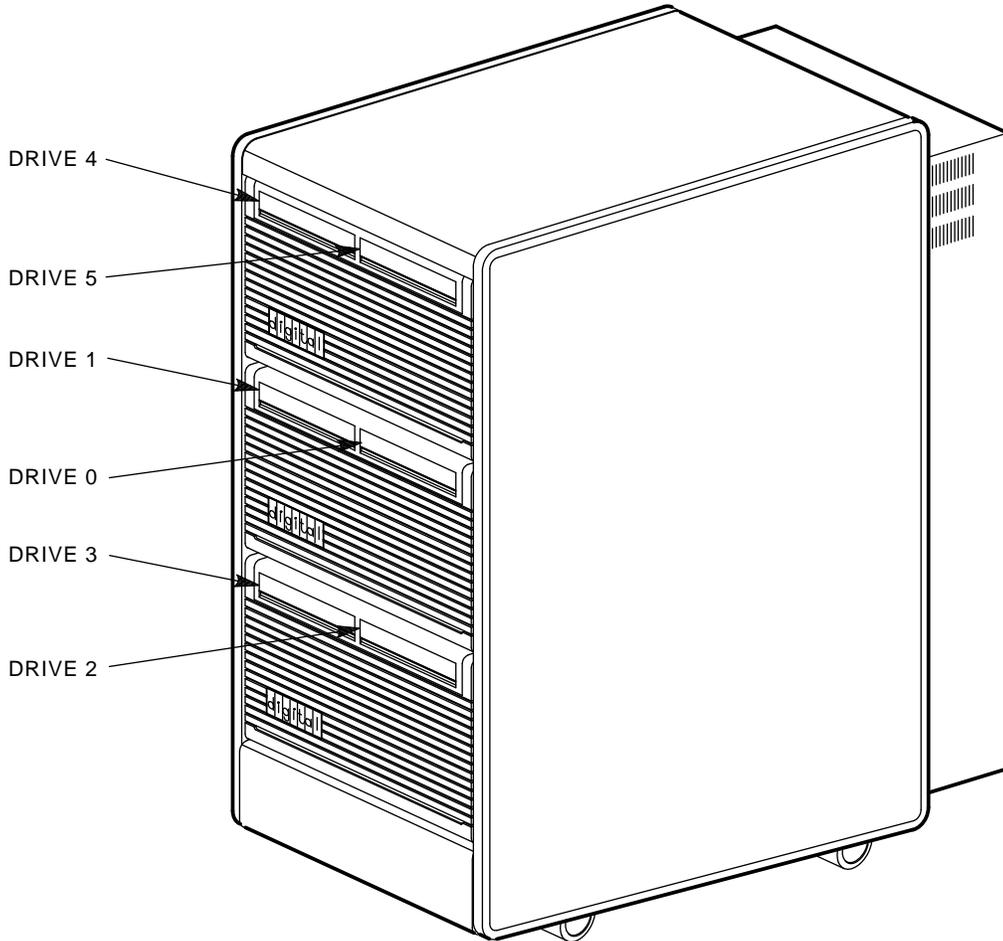

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Figure 2–2   RA90/RA92/H9643 Cabinet System

The procedures for installing an RA90/RA92 add-on disk drive depend on the disk drive position and cabinet level in which the RA90/RA92 add-on disk drive is being installed. The hardware differences are discussed in the following list. In all cases, the disk drive installation procedures describe installation from the front of the cabinet.

1. **Upper Level Disk Drive Installation**

   When installing an RA90/RA92 add-on disk drive in the left-hand, disk drive position 4 of the cabinet, it is necessary to remove the cabinet top cover. The drive chassis stabilizer bracket cannot be removed from the frame and attached to the upper level disk drives without first removing the cabinet top cover (refer to Section 2.4.6).

   Each upper level disk drive is supported by two chassis retainer brackets (top and bottom), one chassis stabilizer bracket, and two (top and bottom) factory-installed rear lock-down brackets with one U-clip each. Detailed instructions for removing/installing this hardware are found in Sections 2.4.9 and 2.4.10.

   NOTE
   An RA90/RA92/H9643 cabinet system with only one RA90/RA92 disk drive in disk drive position 5 will have a 25-pound stabilizer plate (weight) attached to the underside of the upper cabinet H-stiffener.

2. **Center Level Disk Drive Installation**

   When installing an RA90/RA92 add-on disk drive in the center level of the cabinet (disk drive position 0 or 1), each disk drive is supported by two chassis retainer brackets (top and bottom), and two factory-installed rear lock-down brackets (top and bottom) with one U-clip each. Detailed instructions for removing/installing this hardware are in Sections 2.4.9 and 2.4.10.

   Chassis stabilizer brackets are not used for center level disk drive support in this cabinet.

3. **Lower Level Disk Drive Installation**

   Before installing an RA90/RA92 add-on disk drive in the lower level of the cabinet (disk drive position 2 or 3), it will be necessary to remove the cabinet kick plate (Section 2.4.7). Each lower level disk drive is supported by two chassis retainer brackets (top and bottom), one chassis stabilizer bracket, and two (top and bottom) factory-installed rear lock-down brackets with one U-clip each. Detailed instructions for removing/installing this hardware are in Sections 2.4.9 and 2.4.10.

2.4.2 Electrostatic Discharge

The electrostatic discharge (ESD) grounding strap for the RA90/RA92/H9643 cabinet system is attached to the rear bustle inside the rear panel of the cabinet.

WARNING
Do not attempt the following procedures unless you have taken proper precautions against ESD. Wear an ESD grounding strap with the clip end securely connected to a known grounding point while removing the RA90/RA92 OCP or other ESD-sensitive components.

2.4.3 Removing and Replacing the Cabinet Front Bezels

Remove the cabinet front bezel as follows (Figure 2–3):

1. Grasp the lower edge of the bezel, and place your fingers in the finger cutouts (lower edge).

2. Lift up and pull forward. The top of the bezel should rock against the two rubber bezel bumpers attached to the cabinet frame.

NOTE
Take care not to push the adjacent OCP out of place with the top edge of the bezel during bezel removal. The operating RA90/RA92 disk drive may power down if this occurs.
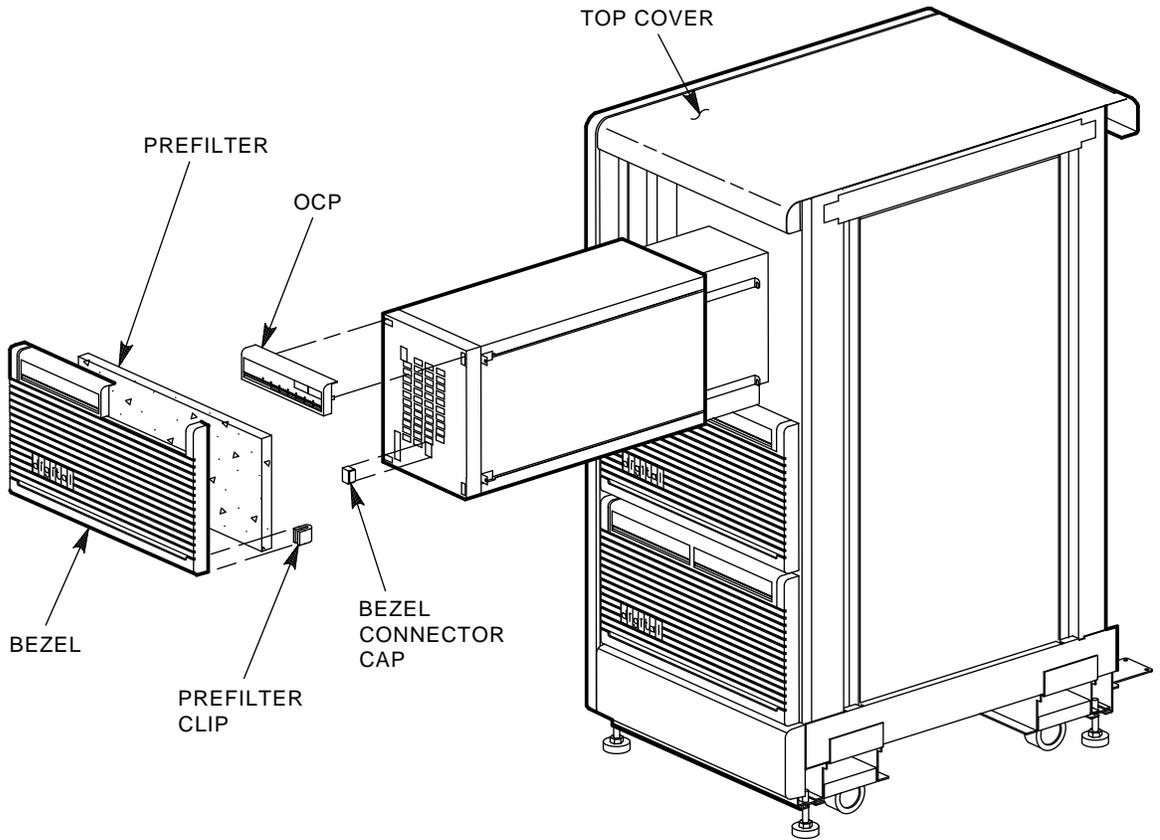

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Figure 2–3   Removing Bezel, OCP, Bezel Connector Cap

To replace the cabinet front bezel (Figures 2–1 and 2–3):

1. Set the lower edge of the bezel in place, aligning the slots in each bottom corner of the bezel over the bottom tabs of the clear plastic grille mounting brackets.

2. Snap the upper portion of the bezel in place, pushing the bezel top into the top tabs of the clear plastic grille mounting brackets.

The bezel contains a prefilter (P/N 12–13121–33) held in place with six prefilter clips (P/N 90–09748–00). Ensure prefilter clips are properly seated before reinstalling the bezel after disk drive installation.

2.4.4 Removing and Replacing the RA90/RA92 OCP

To remove the RA90/RA92 OCP:

1. Grasp both sides of the OCP and pull straight out.

2. Set OCP aside until disk drive installation is complete.

To replace the RA90/RA92 OCP:

1. Grasp both sides of the OCP.

2. Align the connector on the back of the OCP with the socket on the RA90/RA92 disk drive.

3. Push the OCP gently into place, ensuring that the plastic tabs and spring clip on the OCP are seated in the bezel casting slots on the RA90/RA92 disk drive.

> **NOTE**
> **The OCP should be at the top of the disk drive. If it is at the bottom, remove the OCP by gently pulling it straight out. Turn the OCP around and replace it in the top position. (There may be a bezel connector cap over the top OCP connector slot. If so, remove the cap before trying to replace the OCP. Move the cap to the bottom connector slot, as shown in Figure 2–3).**

2.4.5 Removing and Replacing the Cabinet Rear Access Panel

Refer to the *H9643 Cabinet System User Guide* for cabinet rear access panel removal and replacement procedures.

2.4.6 Removing and Replacing the Cabinet Top Cover

Remove the cabinet top cover using the following procedure:

1. At the rear of the cabinet, remove the two serrated, truss-head, Phillips screws from the under side of the rear bustle. Save these screws.

2. Lift the cabinet top cover up, then slide it back approximately 1 to 1–1/2 inches. This will enable the metal tabs on the cover to clear the cabinet H-stiffener slots.

3. Carefully remove the top cover from the cabinet and store in a safe place to avoid damage to the painted finish.

Replace the cabinet top cover using the following procedure:

1. Lift the top cover over the cabinet and rest it on the H-stiffener.

2. Align the top cover metal tabs with the two slots in the top of the cabinet H-stiffener.

3. Slide the metal tabs into the slots.

4. Push the top cover forward until the screw holes in the top cover align with the holes in the rear bustle. The top cover should now be flush with the cabinet side panel profiles (top and front).

5. Insert and secure the two previously removed truss-head screws.

2.4.7 Removing and Replacing the Cabinet Kick Plate

When installing or removing RA90/RA92 disk drives in the two lower disk drive positions (positions 2 and 3), you must remove the cabinet front kick plate to install the chassis stabilizer brackets.

Remove the cabinet kick plate using the following procedure (Figure 2–4):

1. Remove the two 10/32 pan-head Phillips sems screws that secure the kick plate to the cabinet frame. Hold the kick plate with one hand after removing the second screw, or it will fall to the floor.

2. Place the kick plate and its hardware in a safe place.

Replace the cabinet kick plate using the following procedure (Figure 2–4):

1. Slide the pointed tabs on the back of the kick plate into the cabinet mounting bracket holes at the base of the frame. Note the kick plate tabs slide up into the holes, as opposed to seating down into the holes.

2. Push the kick plate flush to the frame, then reinsert the two 10/32 pan-head Phillips sems screws.

3. Tighten the screws.

2.4.8 Stabilizer Plate (Weight)

To ensure the stability of a cabinet that contains a single RA90/RA92 disk drive (RA90–CA/RA92–CA or RA90–CD/RA92–CD) in disk drive position 5, a 25-pound stabilizer plate has been installed at the factory. The stabilizer plate is attached to the underside of the upper cabinet H-stiffener, and is fastened to the upper front and rear cabinet crossbars. It is not necessary to remove the stabilizer plate after installing additional RA90/RA92 add-on disk drives.

2.4.9 Installing Cabinet Hardware

After removing the bezel, OCP, and cabinet rear panel, prepare the cabinet hardware for disk drive installation as follows:

1. Remove the two clear plastic grille mounting brackets. The brackets are designated as left-hand (P/N 74–37919–02) and right-hand (P/N 74–37919–01). Each bracket is secured with two 10-32 x 5/8 pan-head Phillips sems screws. Save these brackets and screws.

    NOTE
    A nylon washer is located in the hardware stack-up of the bottom hole of the clear plastic grille mounting bracket. The nylon washer resides between the grille mounting bracket and the cabinet frame. The nylon washer maintains spacing for bezel alignment until the add-on disk drive retainer bracket is installed. The nylon washer can be discarded after the RA90–NA/RA92–NA installation.

2. If installing an upper-level disk drive, remove the cabinet top cover. Refer to Section 2.4.6.

3. Remove the two 10-32 x 5/8 hex serrated screws of the associated cabinet stabilizer bracket from the cabinet frame.

GUIDE RAIL

DRIVE
REAR

RIGHT SIDE
MOUNTING
RAIL

CABINET
FRONT

RA90/RA92
DRIVE
CHASSIS

CHASSIS
STABILIZER
BRACKET

KICK
PLATE

10-32 X 5/8
PAN-HEAD
PHILLIPS
SEMS SCREWS

MOUNTING
BRACKET HOLE
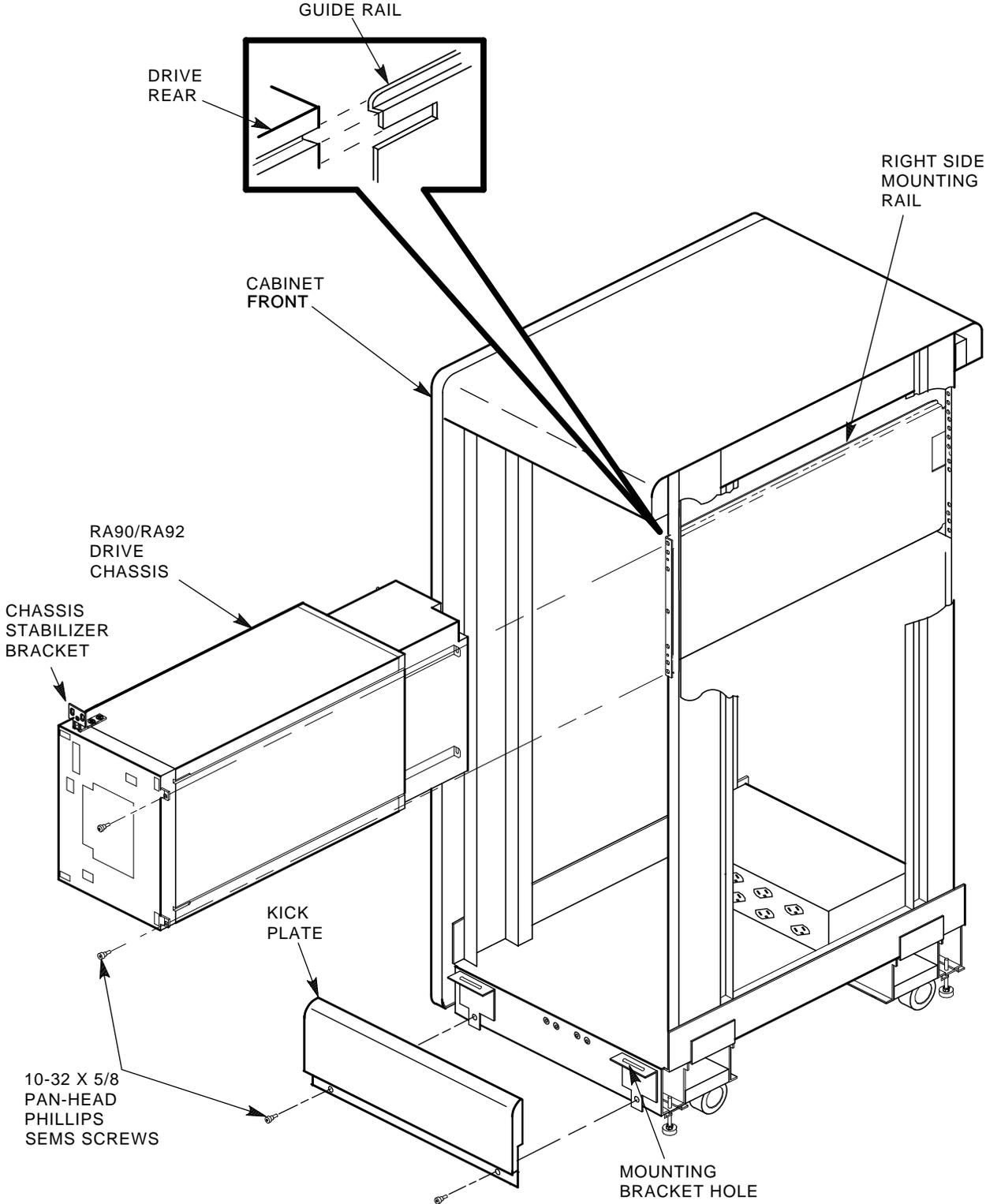
CXO-2728B

Figure 2–4   Cabinet Rails and Kick Plate (Front)

4. Attach the cabinet stabilizer bracket to the top of the add-on disk drive with two 10/32 x 7/16 flat-head Phillips screws (from the plastic bag that came with the RA90–NA/RA92–NA disk drive add-on kit).

    NOTE
    The chassis stabilizer bracket position corresponds to the disk drive position and level the disk drive will occupy. The chassis stabilizer brackets for disk drive positions 4 and 5 attach to the cabinet frame crossbar above the disk drives. The chassis stabilizer brackets for disk drive positions 2 and 3 attach to the cabinet frame crossbar below the disk drives. Disk drive positions 0 and 1 do not require chassis stabilizer brackets.

5. Attach the top and bottom chassis retainer brackets (L-shaped brackets) to the side of the disk drive using the short 10-32 x 3/8 pan-head Phillips sems screws (from the plastic bag that is part of the RA90/RA92 disk drive add-on kit). Two screws will be used for each retainer bracket.

2.4.10 Placing the RA90/RA92 Add-On Disk Drive Into the Cabinet

The RA90/RA92 add-on disk drive and the H9643 cabinet system hardware are now ready for disk drive installation. Refer to Figure 2–4 while performing the installation procedure.

1. Turn the disk drive so the side grooves are facing toward the cabinet guide rails. (The disk drive may look upside down at this point; this will be rectified when the OCP is reinstalled to correspond with the disk drive orientation.)

2. Lift and move the disk drive into place using a Digital lifting device (P/N FC–10117–AC), and the following procedure:

    CAUTION
    If a lifting device is not available, two people are needed to install the RA90/RA92 disk drive into the cabinet. The RA90/RA92 disk drive weighs 31.8 kilograms (70.1 pounds) and must be handled with care. Manual installation is not recommended.

    a. Place the lifting device in an upright position with the lift platform facing away from the operator.

    b. Ensure sufficient open space for extending the lift platform.

    c. Support the top of the lifting device with one hand. With the other hand, raise the lift platform holding latch from the cross bar to release it.

    d. Lower the lift platform to its service position.

    e. Check the hinges at the base of the lift platform to ensure they are fully extended and locked.

    f. Release the safety strap and move it to one side so it will not become tangled.

    g. Move the lifting device to the disk drive and center the lift platform under the disk drive. Slide the disk drive to the back of the lift platform.

    h. Secure the safety strap around the disk drive.

    i. Lower the lift platform to no more than 12 inches off the floor.

    j. Transport the disk drive to the cabinet.

k. Crank the lift platform up to the disk drive installation level in front of the cabinet.

> **NOTE**
> **Ensure the internal SDI cables and drive power cables are clear for disk drive installation.**

l. Remove the safety strap from the disk drive and slide the drive into the cabinet, ensuring that the grooves on the side of the disk drive align with the cabinet guide rails.

m. Move the lifting device away from the cabinet. The cabinet guide rails will support the weight of the disk drive.

n. Slide the disk drive completely into the cabinet until the chassis stabilizer bracket on the drive meets with the holes in the cabinet frame.

3. Align the hole in the upper chassis retainer bracket with the hole in the cabinet frame (Figure 2–1).

4. Insert the 10-32 x 5/8 pan-head Phillips sems screw (from the add-on kit bag) through the upper chassis retainer bracket hole and into the frame. Screw down, but do not tighten at this time.

5. Align the previously removed, clear plastic grille mounting bracket(s) to the frame. Loosely secure the bracket to the frame by placing the pan-head screw into the top bracket hole.

6. Align the holes in the lower chassis retainer bracket (L-shaped bracket) and the clear plastic grille mounting bracket with the hole in the cabinet frame (Figure 2–1). Insert the 10-32 x 5/8 pan-head Phillips sems screw (previously removed) through both parts (clear plastic grille mounting bracket and the chassis retainer bracket) and secure, but do not tighten, to the cabinet frame.

7. If installing disk drives in upper or lower levels, align the two holes in the chassis stabilizer bracket with the threaded holes in the cabinet (H-stiffener) frame (above drives 4 and 5, below drives 2 and 3).

8. Insert the two 10-32 x 5/8 hex serrated screws through the chassis stabilizer bracket and into the frame.

9. Tighten all screws.

2.5   SDI Cable and Power Cord Routing and Connections

The internal SDI cables and disk drive power cords have been factory-installed and routed for all disk drive positions. The SDI cables have been connected to the cabinet I/O bulkhead panel. The power cords have been connected to the rear panel of the 874 power controller. Refer to Figures 2–5 and 2–6.

Use the following procedure to connect the internal SDI cables and power cords at the rear of the cabinet:

1. Go to the rear of the cabinet. The disk drive connections for both internal SDI cables and power cords are coiled and tie-wrapped at the factory. Carefully cut the cable tie, then connect the SDI cable connectors to the Port A and Port B connections on the rear of the RA90/RA92 disk drive.

> **NOTE**
> **An RA90/RA92 I/O bulkhead port label is affixed to the rear panel of the cabinet. The port label indicates the positions for SDI cable connections.**
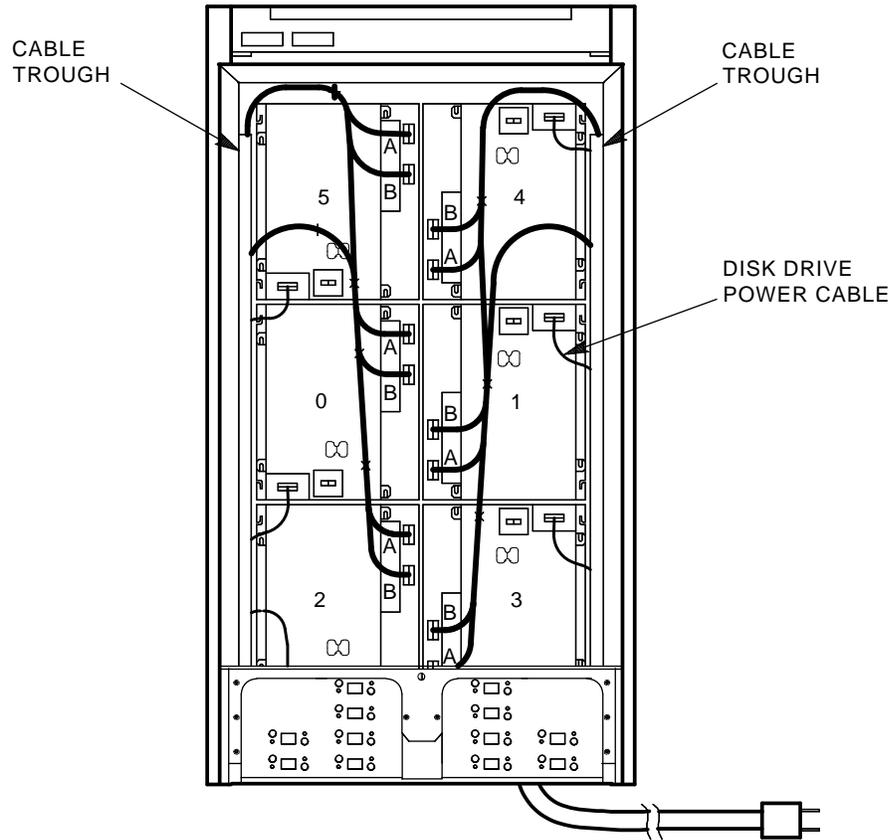
NOTE: HEAVY LINES INDICATE INTERNAL SDI CABLES.

CXO-2729A

Figure 2–5   SDI Cables and Power Cords Routing, Rear View

INTERNAL
SDI CABLE

DISK DRIVE
POWER CORD

CXO-2730A
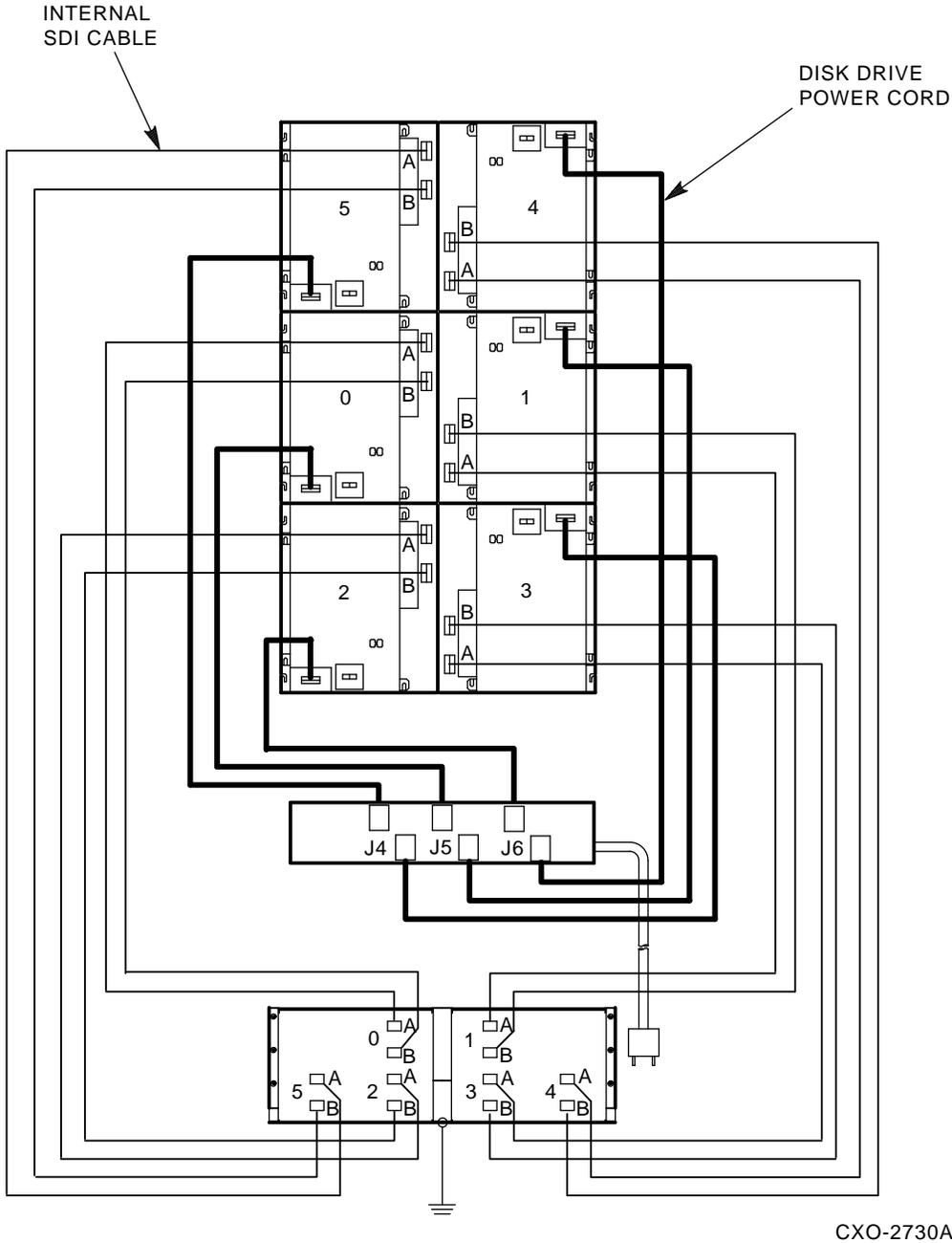
Figure 2–6   SDI Cables and Power Cords Connections, Rear View

2. Connect each disk drive power cord to the ac power input on the rear of the RA90/RA92 disk
    drive, near the RA90/RA92 circuit breaker. Refer to Figure 2–7.

3. Before applying power to the cabinet, turn to Chapter 3 for information about the 874 power
    controller switches, RA90/RA92 voltage selector switch, and the RA90/RA92 circuit breaker.
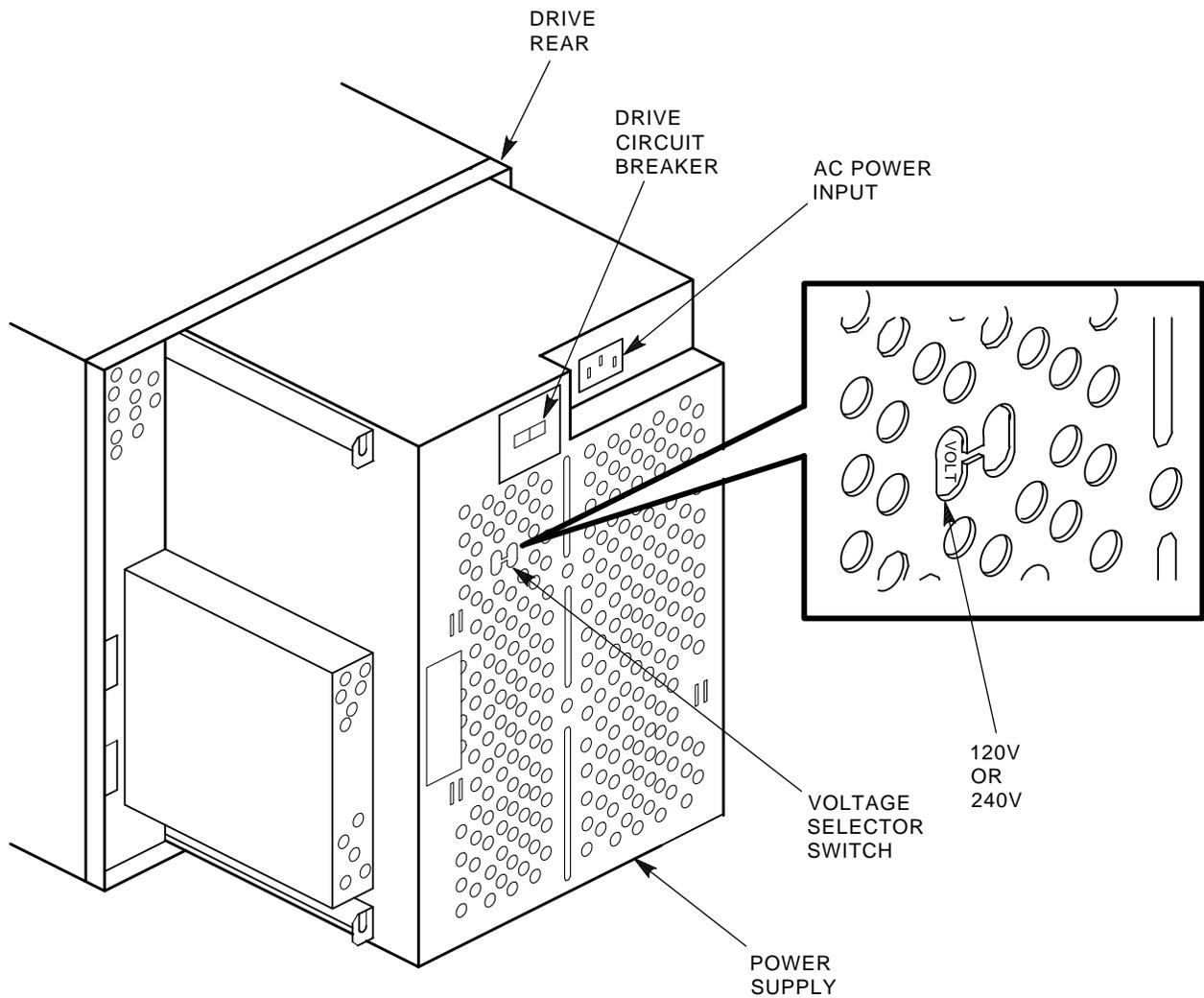
Figure 2–7   RA90/RA92 Voltage Selector Switch/Circuit Breaker

3
Applying Power

This chapter describes the RA90/RA92 disk drive switches and 874-series power controller power connector configurations encountered when installing an RA90/RA92 disk drive in an H9643 cabinet. Brief descriptions of the 874–D/F power controller switches, the RA90/RA92 voltage selector switch, and the RA90/RA92 circuit breaker are included.

This chapter does not discuss fault codes or error conditions incurred at power-up. Please reference RA90/RA92 disk drive specific manuals for such information.

3.1 Power Connector Configurations

During RA90/RA92 add-on disk drive installation, several power connector configurations will be encountered. Power connector configurations from the RA90/RA92 disk drive to the power controller and from the power controller to the wall outlet are shown in Figure 3–1.

3.2 874–D/F Power Controller

The 874-series power controller has three switched duplex outlets and one unswitched duplex outlet (a total of eight outlets). All variations include an ac line filter. The 874 power controller is 19-inch rack-mountable.

The 874-series power controller serves four functions:

a. Controls large amounts of power from a remote source

b. Provides a convenient ac power distribution point for multiple units

c. Protects equipment from some electrical disturbances

d. Disconnects power (in case of overload) and provides circuit breaker protection

WARNING
High leakage current — earth connection is essential before connecting power. Verify the integrity of the earth ground terminal of the power receptacle before attaching the cabinet power controller cable and applying power. If the continuity of the terminal-to-ground cannot be verified, provide supplemental grounding to the cabinet system.

Figures 3–2 and 3–3 show the front and rear views of the 874-series power controller. The RA90/RA92/H9643 cabinet system utilizes the 874–D and 874–F models.

POWER CORDS GOING TO 874 POWER CONTROLLER

120V 50-60HZ POWER CORD DEC NO. A-PS-1700083-23 PLUG - POWER CONTROLLER END	
220/240V 50-60HZ POWER CORD DEC NO. A-PS-1700083-24 PLUG - POWER CONTROLLER END	
120/240V 47-63HZ 10A/6A POWER CORD DEC NO. A-PS-1700442-18 OR A-PS-1700442-19 RECEPTACLE - DRIVE END	

PLUGS GOING TO WALL OUTLET (FROM 874 CONTROLLER)

120V 60HZ 24A 1-PHASE		NEMA NO. L5-30P DEC NO. 12-11193 (874-D)
220/240V 50-60HZ 16A 1-PHASE		IEC 309 320-P6W DEC NO. 12-14379-03 (874-F)
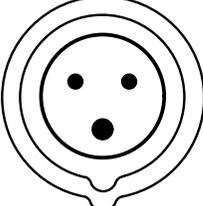
CXO-2731B

Figure 3–1   Power Connector Configurations
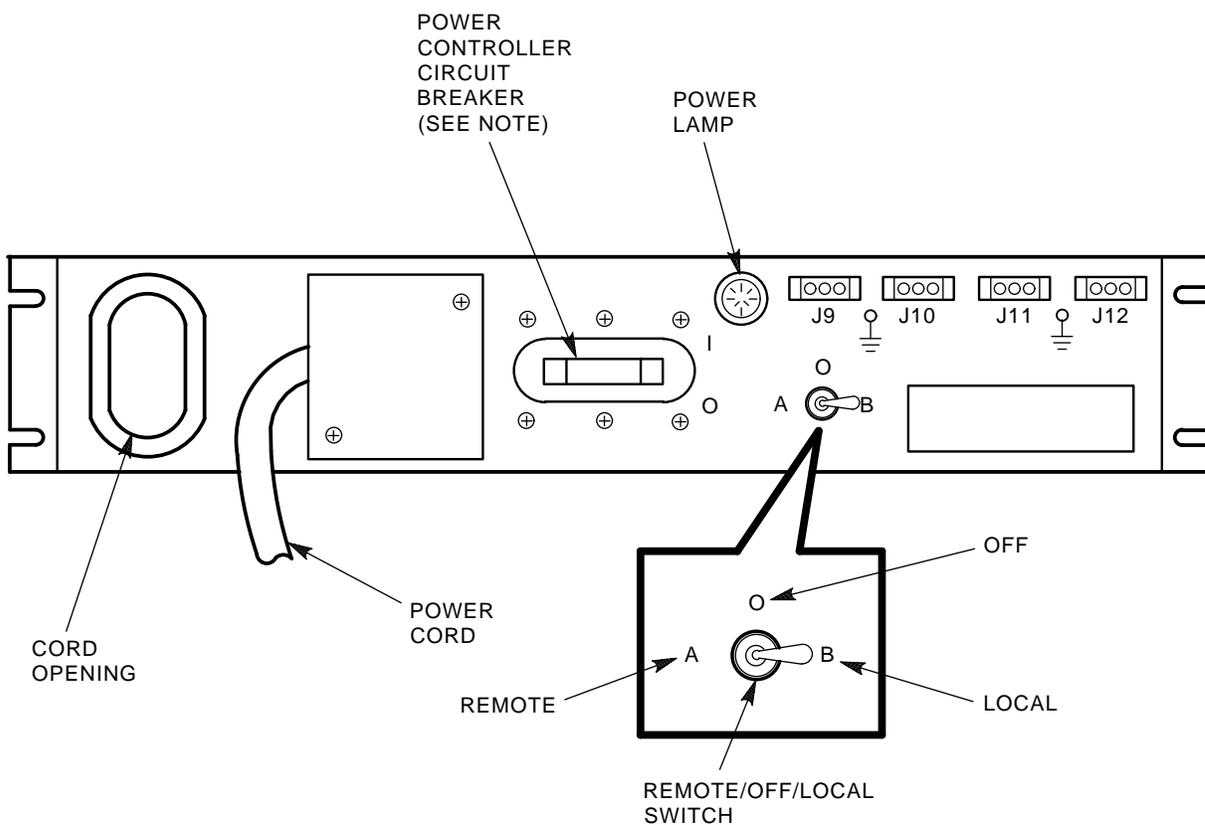
NOTE: CIRCUIT BREAKER OFF POSITION (0) IS DOWN, ON POSITION (1) IS UP.

CXO-2732A

Figure 3–2   874 Power Controller, Front View
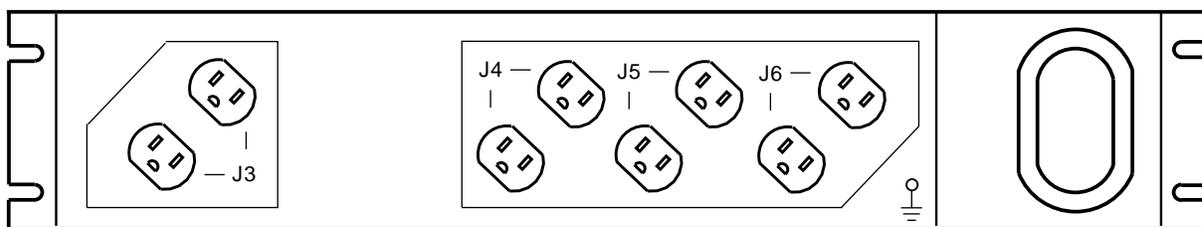
CXO-2733A

Figure 3–3   874 Power Controller, Rear View

3.2.1 874 Power Controller Circuit Breaker

The 874 power controller circuit breaker has two positions: **0** and **1**. The **0** position represents OFF and the **1** position represents ON.

3.2.2 874 Power Controller Remote/Off/Local Switch

The remote/off/local switch provides a means for controlling the power state of the 874-series power controller and/or RA90/RA92/H9643 cabinet system. The remote/off/local switch is used to turn the switched power on and off in a predictable manner.

WARNING
The remote/off/local switch is not to be used as an emergency power off function, or as an off device for the purpose of servicing equipment. It does not prevent fire, electric shock, or injury, and does not function as a safety interlock. The remote/off/local switch does not remove power from all of the output receptacles. Voltage may be present at the unswitched receptacles, and equipment connected to the unswitched receptacles may remain energized.

The remote/off/local bus switch is marked **A, O,** and **B** on the power controller front panel, where **A** is remote on, **O** is off, and **B** is local. Refer to Figure 3–2.

The site power control bus can be connected, via cables, using the four parallel-connected, three-pin connectors (J9, J10, J11, and J12) located on the front panel of the 874 power controller. These cables are not provided with the 874-series power controller; they must be ordered separately.

3.2.3 874–F Power Controller Cable (Cordage)

The 874–F power controller requires power connector cable replacement to accommodate international power requirements and power connector plug configurations. Table 3–1 lists the cable (cordage) part numbers for some countries using 220/240 Vac power applications.

Table 3–1 874–F Power Controller 220/240 Vac Power Cable Variations

P/N	Country
17–01255–01	Europe, U.S., Japan (IEC 309 plug and cordage)
17–00199–10	Central Europe (Schuko-plug)
17–00198–05	Australia
17–00364–06	Italy
17–00209–05	United Kingdom

NOTE
All 874–F power controllers are shipped with P/N 17–01255–01 power cables. If the supplied cable requires replacement, the installation team will order a suitable version prior to equipment arrival. The original cable may then be replaced and discarded.

3.3   RA90/RA92 Voltage Selector Switch

Before applying power to the RA90/RA92 disk drive(s), ensure the proper operating voltage (100/120V or 220/240V) has been selected for your area of operation. Refer to Figure 3–4. Use the following procedure to select the proper RA90/RA92 disk drive operating voltage:

1. Locate the line voltage selector switch. (The line voltage selector switch is located on the RA90/RA92 rear panel, to the right of the circuit breaker, when facing the rear of the drive. This switch can be seen through holes in the RA90/RA92 rear power supply panel.)

2. Using a non-conductive pointed object, slide the switch into the voltage selection position applicable to your site.
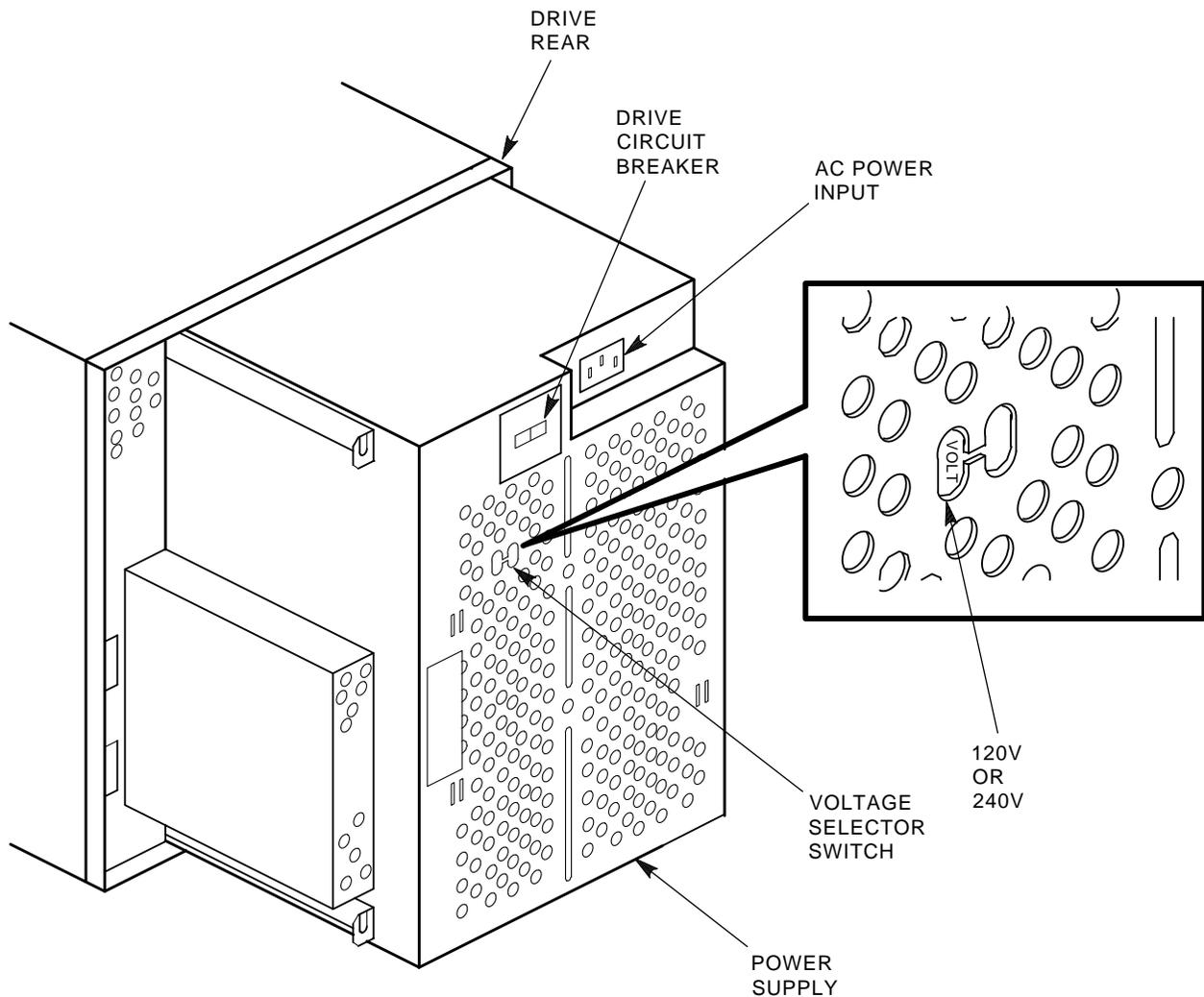
CXO-2135C

Figure 3–4   RA90/RA92 Voltage Selector Switch/Circuit Breaker

3.4   RA90/RA92 Circuit Breaker

The RA90/RA92 circuit breaker is located at the rear of the RA90/RA92 disk drive, near the center, on the RA90/RA92 power supply. Refer to Figure 3–4.

3.5   Applying Power to the RA90/RA92/H9643 Cabinet System

After all RA90/RA92 disk drives have been installed in the cabinet, and all cabling has been connected, use the following procedure to apply power to the cabinet and its components:

1.   Ensure all RA90/RA92 disk drives are switched to the proper voltage for your site (RA90/RA92 voltage selector switches).

2.   Set the remote/off/local bus switch on the 874 power controller (marked A/O/B on the front panel) to the proper position (Figure 3–2).

3.   Ensure the disk drive and power controller circuit breakers are in the OFF position.

4.   Plug the cabinet power cable into the wall outlet.

5.   Turn the 874 power controller circuit breaker to the ON (up) position.

6.   Turn the circuit breaker for each RA90/RA92 disk drive to the ON position.

7.   Using the *RA90/RA92 Disk Drive User Guide*, perform the disk drive power-up sequence and checkout procedures.

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