

7012 Model G02 Rack Expansion Drawer
Installation and Service Guide

Second Edition (June 1997)

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Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying manuals.

Federal Communications Commission (FCC) Statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Neither the provider nor the manufacturer can accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards not supplied by the manufacturer.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Canadian Department of Communications Compliance Statement

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

電波障害自主規制 届出装置の記述

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをしてください。

VCCI Statement

The following is a summary of the VCCI Japanese statement in the box above.

This equipment is in the Class 1 category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc.

Read the instructions for correct handling. VCCI-1.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese Klasse von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Hinweis:

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

Safety Notices

Note: For a translation of these notices, see *System Unit Safety Information*, order number SA23-2652.

Definitions of Safety Notices

A *danger* notice indicates the presence of a hazard that has the potential of causing death or serious personal injury.

A danger notice appears on the following pages:

3-1
3-1
3-9

A *caution* notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.

A caution notice appears on the following pages:

2-6
2-11
2-12
3-1
3-5
3-19

An *attention* notice indicates an action that could cause damage to a program, device, system, or data.

Laser Safety Information

Note: The Optical Link Card (OLC) referred to in this information is part of the Serial Optic Channel Converter assembly.

This system contains a laser product called the Optical Link Card (OLC). In the U.S., the OLC is certified as a Class 1 laser product that conforms to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR Subchapter J. Internationally, the OLC is certified as a Class 1 laser product that conforms to the requirements contained in the International Electrotechnical Commission (IEC) standard 825 (1984), the Verband Deutscher Elektrotechniker (VDE) standard 0837 (1986), and the CENELEC (European Committee for Electrotechnical Standardization) Harmonization Document HD 482 S1 (1988). The German testing institute VDE assigned a certificate of conformity to DIN IEC 825/VDE 0837/02.86 and CENELEC HD 482 S1/03.88; the certificate registration number is 3642.

In addition, Statens Provningsanstalt (Swedish National Testing Institute) tested and approved the OLC for use in Sweden as a Class 1 laser product and assigned the approval number SP LA 89:184. The CDRH certification label and the VDE certificate of conformity mark are located on the plastic retainer of the OLC product. Figure 1 shows the system Class 1 information label required by IEC 825.

Class 1 laser products are not considered to be hazardous. The OLC internally contains a gallium aluminum arsenide (GaAlAs) semiconductor laser diode emitting in the wavelength range of 770 to 800 nanometers. This laser diode is a Class 3B laser that is rated at 5.0 milliwatts. The design of the OLC is such that access to laser radiation above a Class 1 level during operation, user maintenance, or service conditions is prevented.

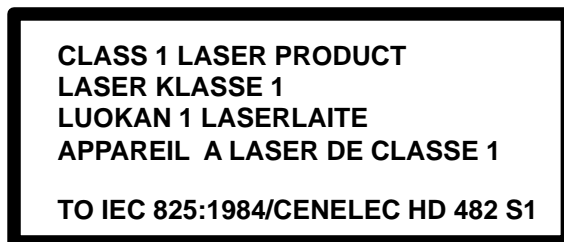


Figure 1. Class 1 System Information Label Required by the IEC 825 Standard

The Optical Link Card (OLC) must only be connected to another OLC or a compatible laser product. Any compatible laser product must contain the open fiber link detection and laser control safety system used in OLC. This is a requirement for correct operation of the optical link. In addition, the OLC product is designed and certified for use in applications with point-to-point optical links only. Using this product in any other type of optical link configuration (for example, links containing optical splitters or star couplers) is considered as not using the product correctly and may require that the user certify the laser product again for conformance to the laser safety regulations.

About This Book

This book provides maintenance information that is specific to the 7012 Model G02 rack expansion units.

MAPs that are common to all systems are contained in *Diagnostic Information For Micro Channel Bus Systems*.

This book is used by the service technician for initial installation and to repair system failures. This book assumes that the service technician has had training on the 7012 Model G02 rack expansion units.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

Related Information

The *Diagnostic Information For Micro Channel Bus Systems*, order number SA23-2765, contains the maintenance information and procedures that are common to all systems. The information and procedures in this book apply to any system unit that uses the diagnostic programs.

Adapters, Devices, and Cable Information, order number SA23-2764, contains reference information about adapters, devices, and cabling for the system units. This manual also contains the removal and replacement procedures for the logic boards on the disk drives. This manual provides the service representative pin-out lists and cabling information to use in isolating problems with customer cabling.

System Unit Safety Information, order number SA23-2652, contains translated versions of the danger and caution notices.

The *7015 Model R30, R40, and R50 CPU Enclosure Operator Guide*, order number SA23-2742, provides information about the controls and features of the 7015 Model R30 CPU Enclosure.

The *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*, order number SA23-2743, provides maintenance information that is specific to the 7015 Model R30 CPU Enclosure. It also contains Maintenance Analysis Procedures (MAPs) that are not common to other systems.

Each attached device has a *Setup and Operator Guide* and a *Service Guide* that provides the information needed for that device.

Chapter 1. Reference Information

Use the following views of the system unit to locate the feature positions, connectors, and system board slot positions.

Expansion Unit System Unit Locations

Description of the Disk Expansion Unit

The disk expansion unit is used to increase the number of media devices and/or disk drives.

All hardware components inside the disk expansion unit are accessible from the top side after the unit cover is removed.

From the top of the disk expansion unit, the following modules are accessible:

- Maximum of two 5.25-inch half height media devices (optional). Maximum of two 3.5-inch half height disk drive can be installed instead.
- The operator panel (required)
- The key mode switch (required)
- The ECB card (required)
- Maximum of two disk drives (optional) in the bottom tray
- Maximum of two disk drives (optional) in the upper tray
- One external cooling fan (required)
- The power supply (required).

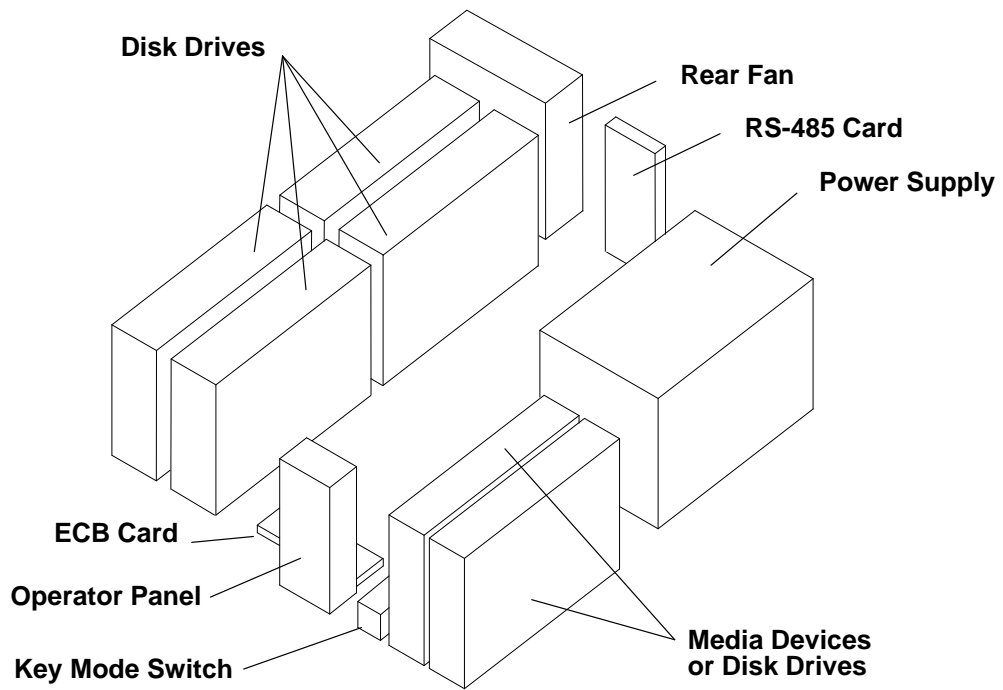
Disk Expansion Unit SCSI Bus

The disk expansion unit is equipped with one internal SCSI bus. It is driven by a SCSI-2 single-ended controller through an external connection.

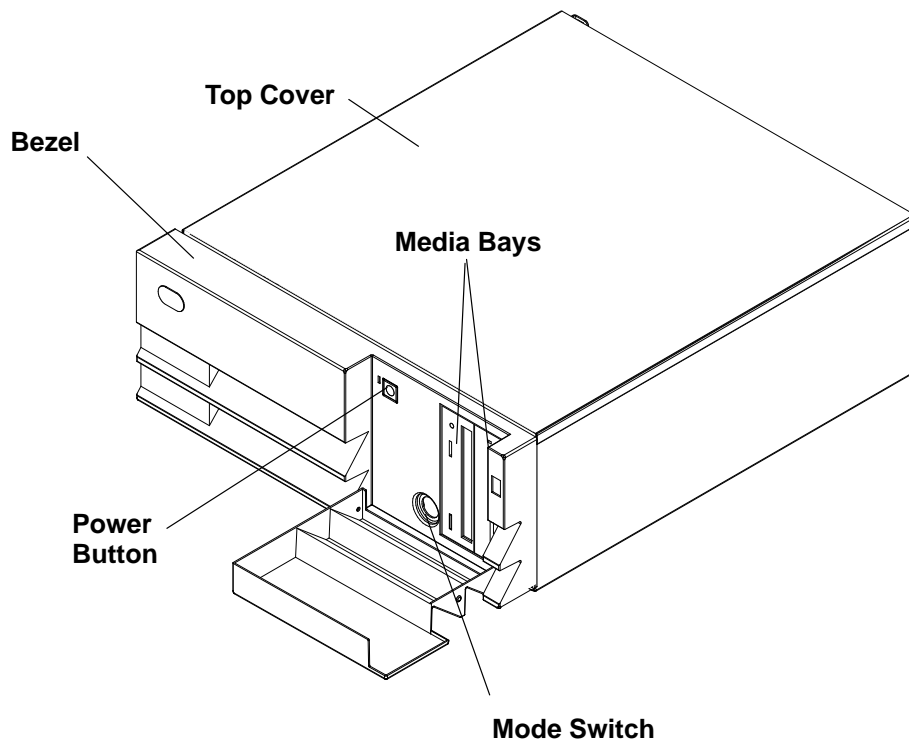
The SCSI bus features the following characteristics:

- SCSI-2 single-ended
- 16-bit wide data bus
- Support for single-ended devices (8/16 bits)
- 8 bits and 16 bits SCSI devices mixable on the same bus
- Fast data transfer (10MB per second for 8 bits, 20MB per second for 16 bits)
- Synchronous/Asynchronous data interchange.

Top View without Covers

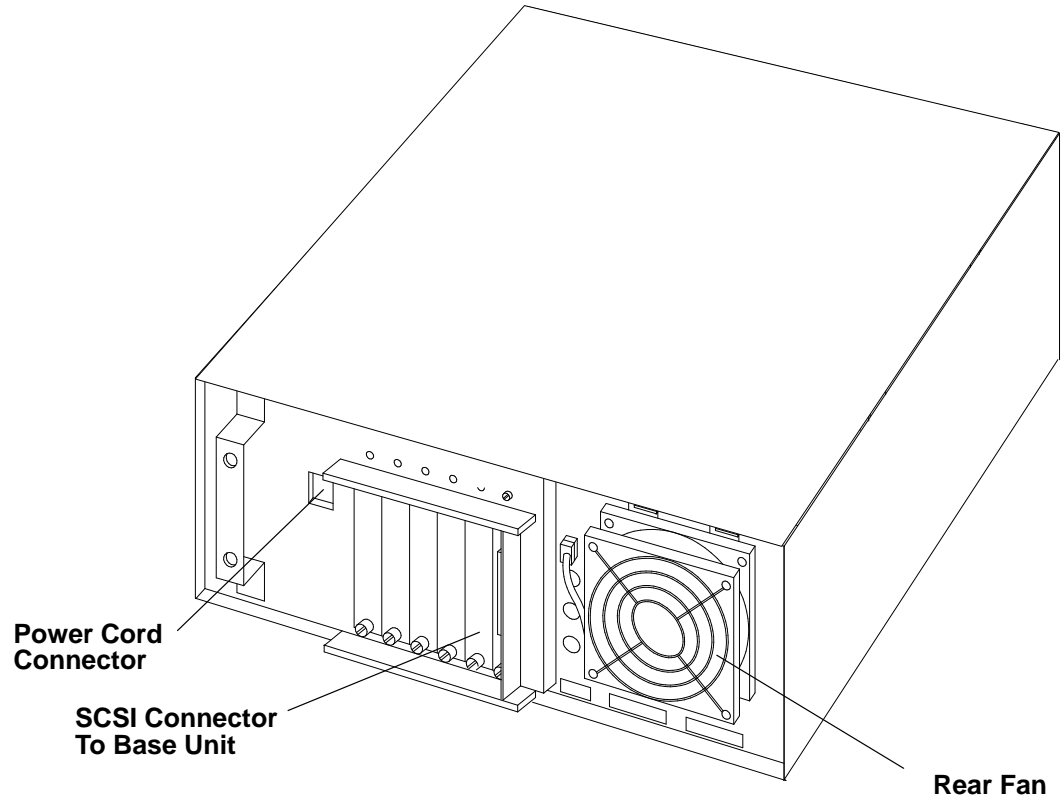


Front View with Cover



Rear View

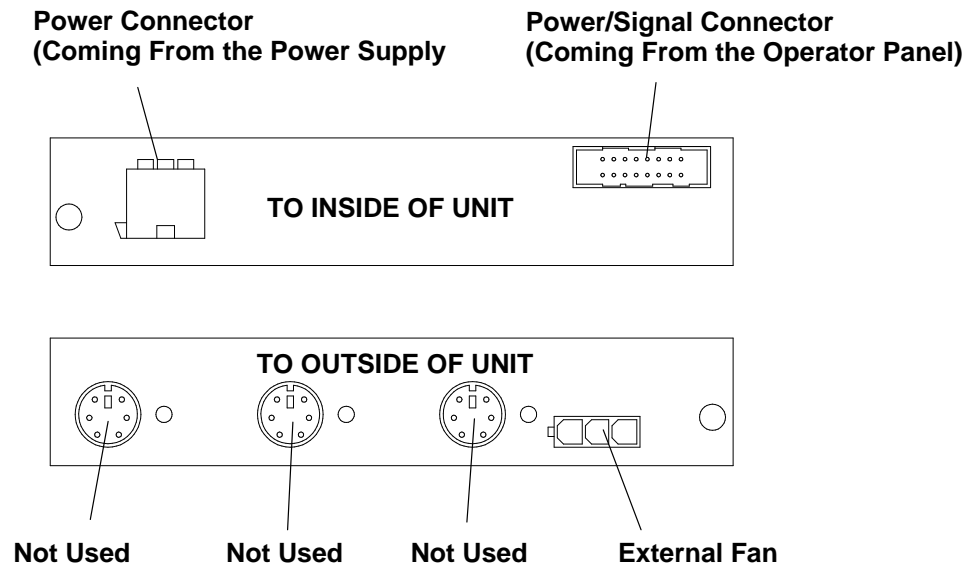
The following figure shows the rear side of the disk expansion unit.



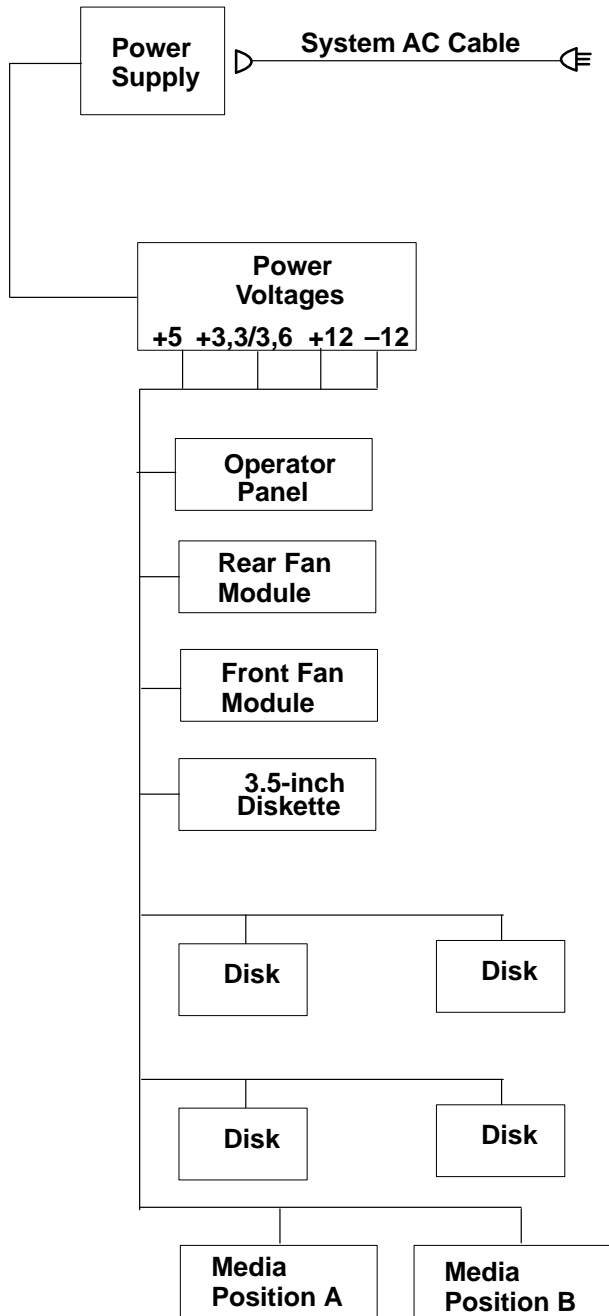
RS-485 Card

The RS-485 card is installed in the rear of the disk expansion units.

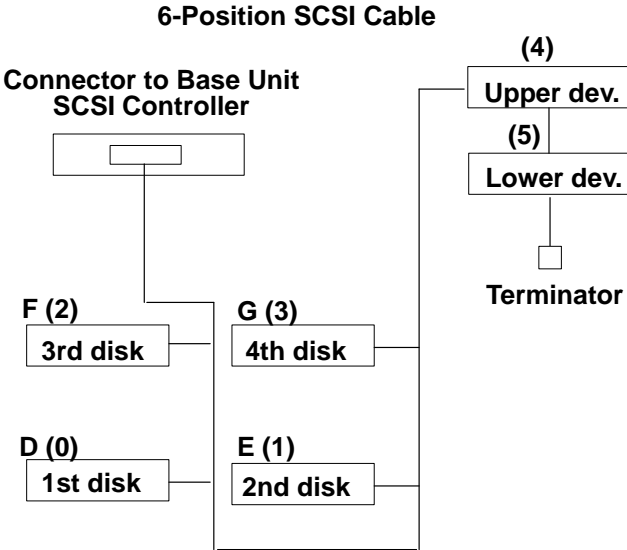
It is provided with a variety of connectors, whose functions are explained in the following figures.



Power Flow



SCSI Cable Routing



Specifications

Dimensions (Vertical Position)

Height: 173mm (6.9 inches)

Depth: 613mm (28.2 inches)

Width: 450mm (17.5 inches)

Weight (Maximum)

19 kg to 25 kg (43 to 55 pounds)

Operating Environment – Class C

Temperature: 16° to 40° C (60° to 104° F)

Humidity: 8% to 80%

Maximum Wet Bulb: 23° C (60° F)

Maximum Altitude: 2133 m (7000 feet)

Operating Environment With Tape Drive

Temperature: 16° to 32° C (60° to 90° F)

Humidity: 20% to 80%

Maximum Wet Bulb: 26° C (79° F)

Power Source Loading

0.34 kVA

Power Supply

275 watts

Operating Voltage

100 V ac to 125 V ac; 50 to 60 Hz

200 V ac to 240 V ac; 50 to 60 Hz

Heat Output

1380 BTU per hour

Power Cables

Note: Refer to the Parts Information section of this publication to find the power cables that are available.

To avoid electrical shock, a power cable with a grounded attachment plug is provided. Use only properly grounded outlets.

Power cables used in the U.S.A. and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). These power cords consist of:

- Electrical cables, Type SVT or SJT.
- Attachment plugs complying with National Electrical Manufacturers Association (NEMA) 5-15P. That is:

“For 115 V operation, use a UL-listed cable set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cord a maximum of 15 feet in length and a parallel blade, grounding type attachment plug rated at 15 A, 125 V.”

“For 230 V operation in the U.S.A. use a UL-listed cable set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cable a maximum of 15 feet in length, and a tandem blade, grounding type attachment plug rated at 15 A, 250 V.”

- Appliance couplers complying with International Electrotechnical Commission (IEC) Standard 320, Sheet C13.

Power cables used in other countries consist of the following:

- Electrical cables, type HD21.
- Attachment plugs approved by the appropriate testing organization for the specific countries where they are used.

“For units set at 230 V (outside U.S.A.): use a cable set consisting of a minimum 18 AWG cable and grounding type attachment plug rated 15 A, 250 V. The cable set should have the appropriate safety approvals for the country in which the equipment will be installed and should be marked 'HAR'.”

Service Inspection Guide

Perform a service inspection on the system when:

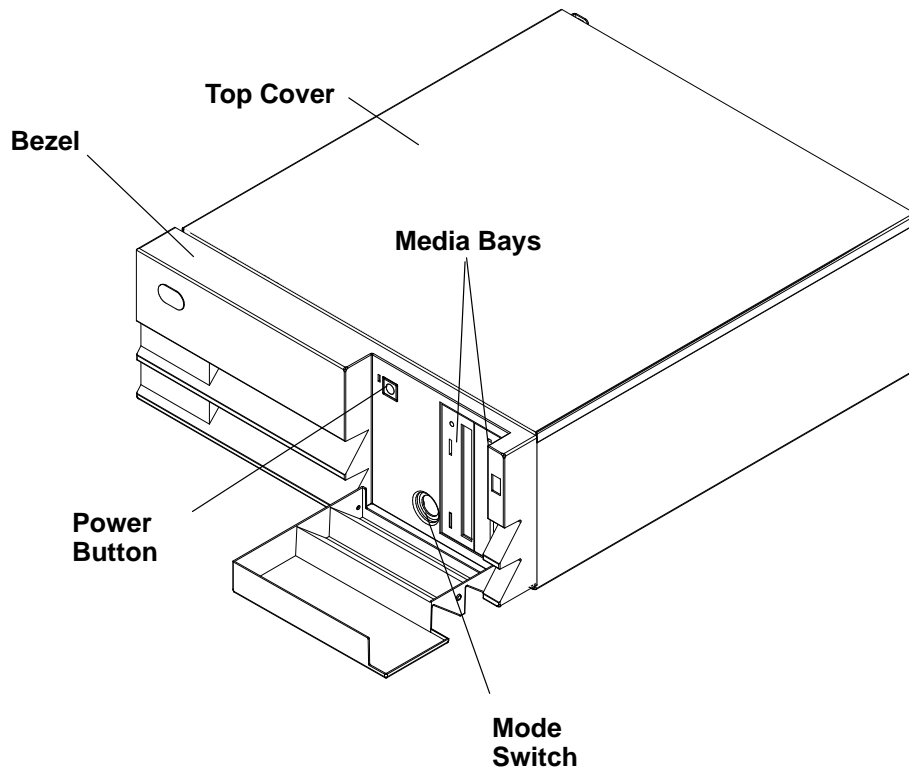
- The system is inspected for a maintenance agreement.
- Service is requested and service has not recently been performed.
- An alterations and attachments review is performed.
- Changes have been made to the equipment that may affect the safe operation of the equipment.
- External devices that have their own power cable are added.

If the inspection indicates an unacceptable safety condition, the condition must be corrected before servicing the machine.

Note: The correction of any unsafe condition is the responsibility of the owner of the system.

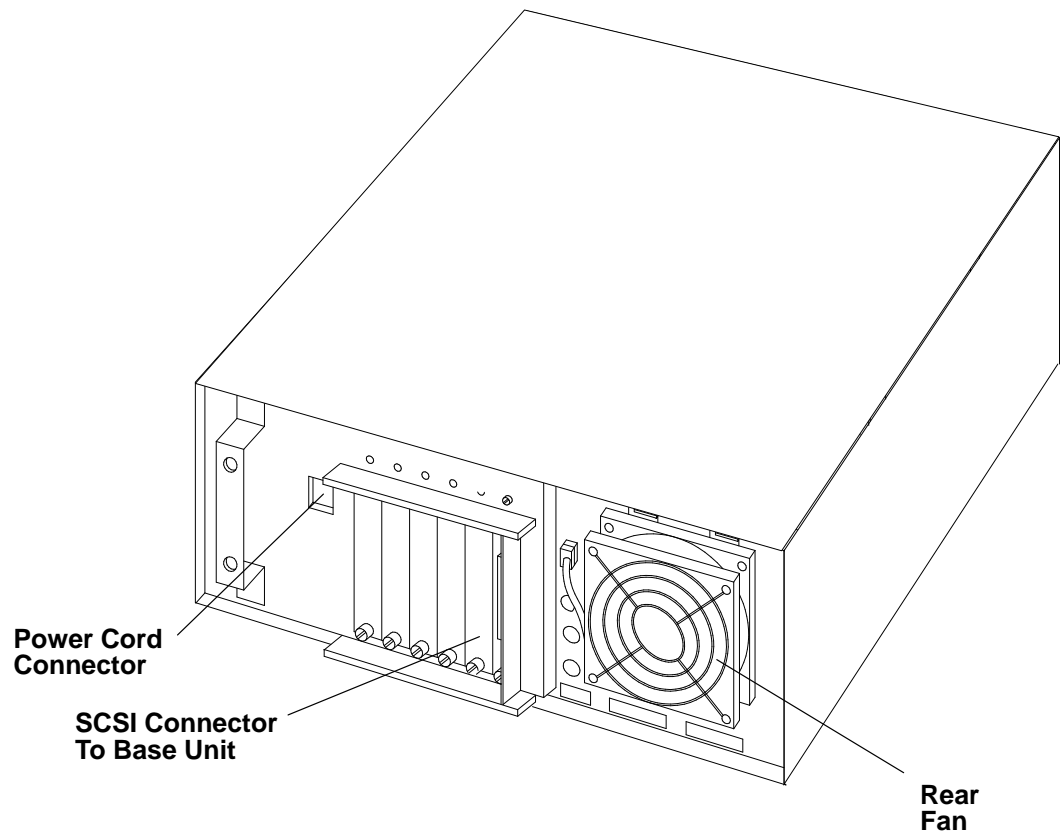
Do the following:

1. Check the covers for sharp edges and for damage or alterations that expose the internal parts of the system unit.
2. Check the covers for proper fit to the system unit. They should be in place and secure with the screws tight.



3. Power down the system.
4. Set the power switch of the system unit to Off.
5. Unplug the power cord.

6. Remove the covers.
7. Check for alterations or attachments. Check for obvious safety hazards such as broken wires, sharp edges, or broken insulation.
8. Check the internal cables for damage.
9. Check for dirt, water, and any other contamination within the system unit.
10. Check the voltage label on the back of the system unit to ensure that it matches the voltage at the outlet.
11. Check the external power cable for damage.
12. With the external power cable connected to the system unit, check for 0.1 ohm or less resistance between the ground lug on the external power cable plug and a jack screw on the parallel port connector.



13. If the system unit passes the test in the previous step, install the covers.
14. Check each external device that has its own power cable:
 - a. For damage to the power cord.
 - b. For the correct grounded power cable.
 - c. With the external power cable connected to the device, check for 0.1 ohm or less resistance between the ground lug on the external power cable plug and the metal frame of the device.

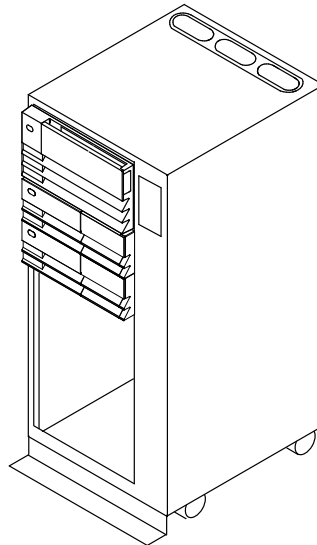
Chapter 2. 7012 Model G02 Rack Installation

The 7012 Model G02 expansion unit can be installed in the 7015 Model R00 rack to provide additional disk drives for 7015 R Series CPU Enclosures.

Installing The 7012 Model G02 Expansion Unit In the R00 Rack

For additional information regarding the installation of this unit, refer to the following additional documentation:

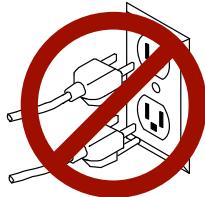
- *7015 Model R00 Installation and Service Guide*
- *7015 Model R30, R40, and R50 CPU Enclosure Operator Guide*



Step 1: Read the Safety Notices

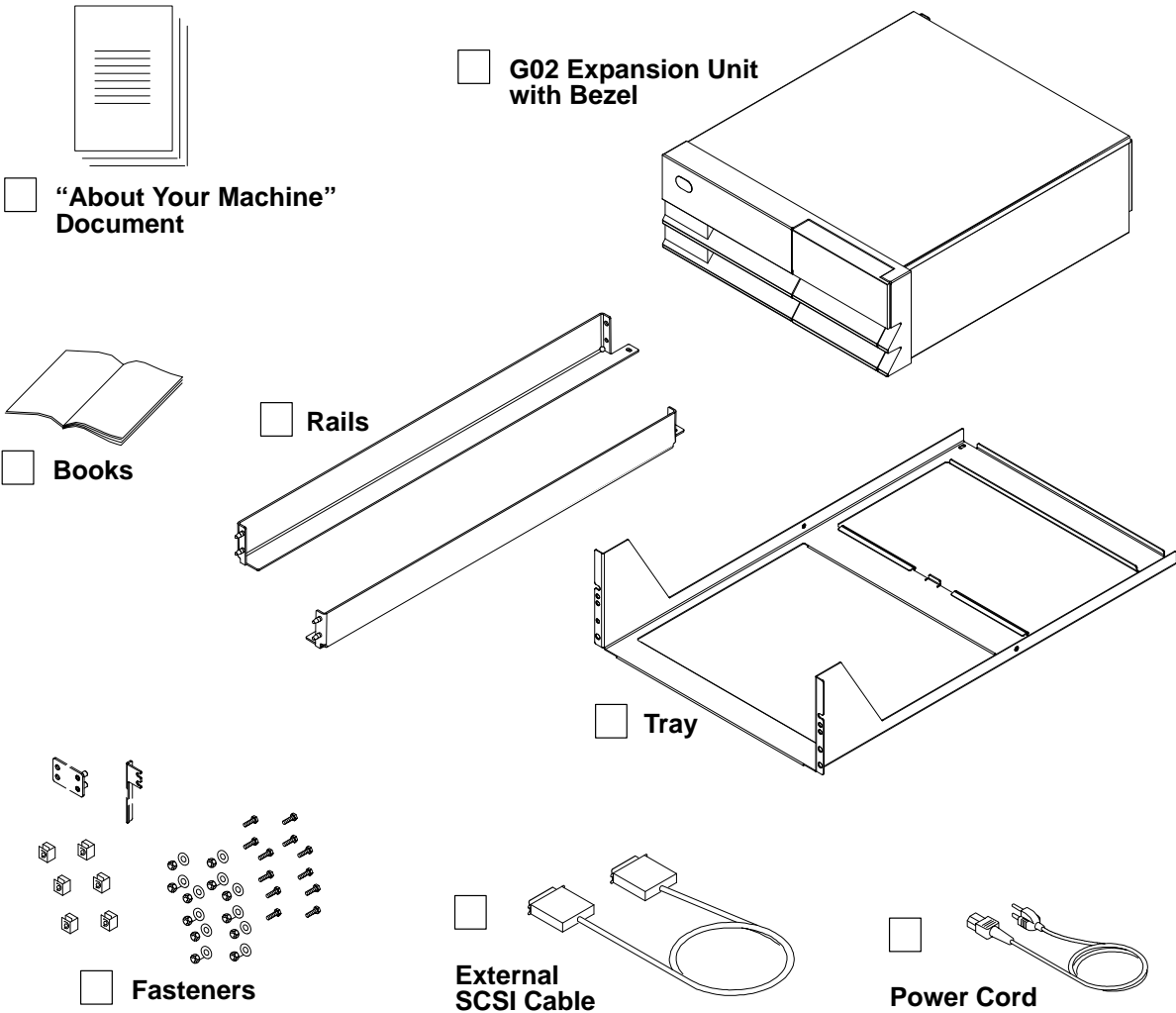
SAFETY NOTE: Before performing this hardware setup procedure, read the safety notices in the Preface of the *7015 Model R00 Installation and Service Guide*.

Note: Before continuing, make sure that no power cords are connected to this unit, any devices or to any electrical outlets.

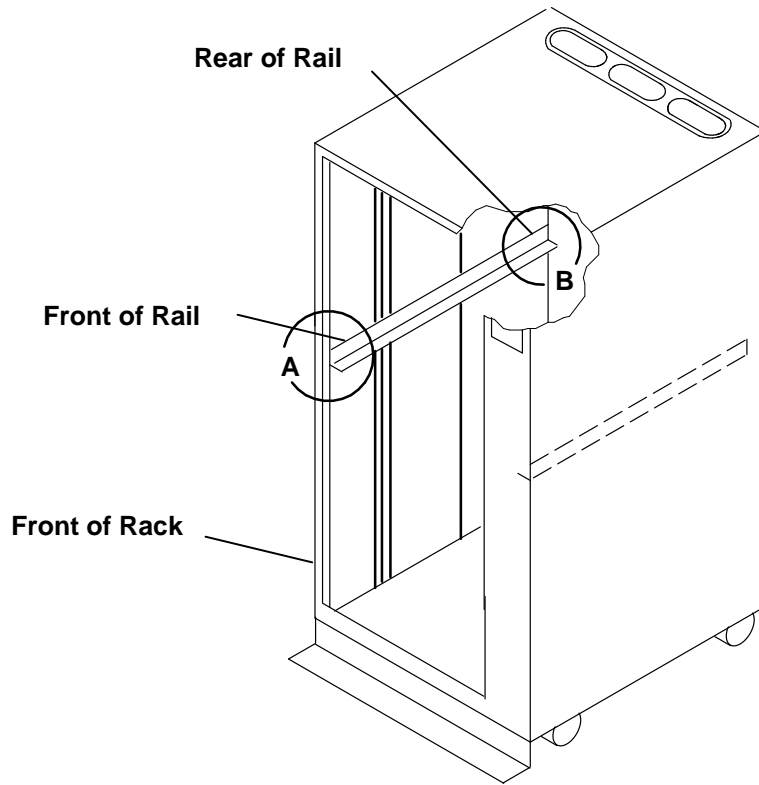


Step 2: Check Your Inventory

For a complete list of items shipped with your system, refer to the *About Your Machine* document which is taped to the box containing your expansion unit.

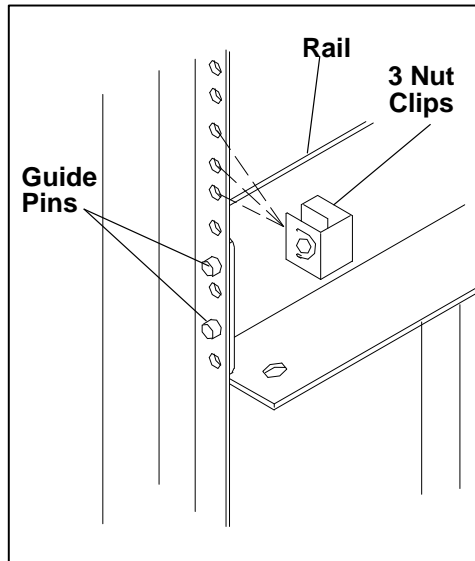


Step 3: Install Rails In Rack Unit

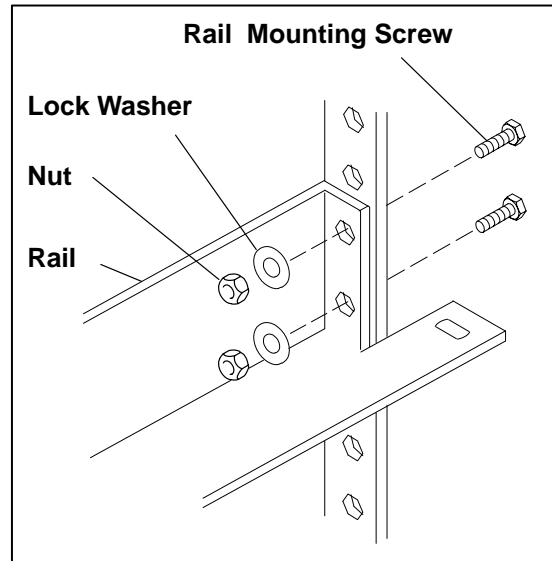


Mounting Hardware For 7012 Model G02 Rack Expansion Drawer

Detail A – Front of Rail

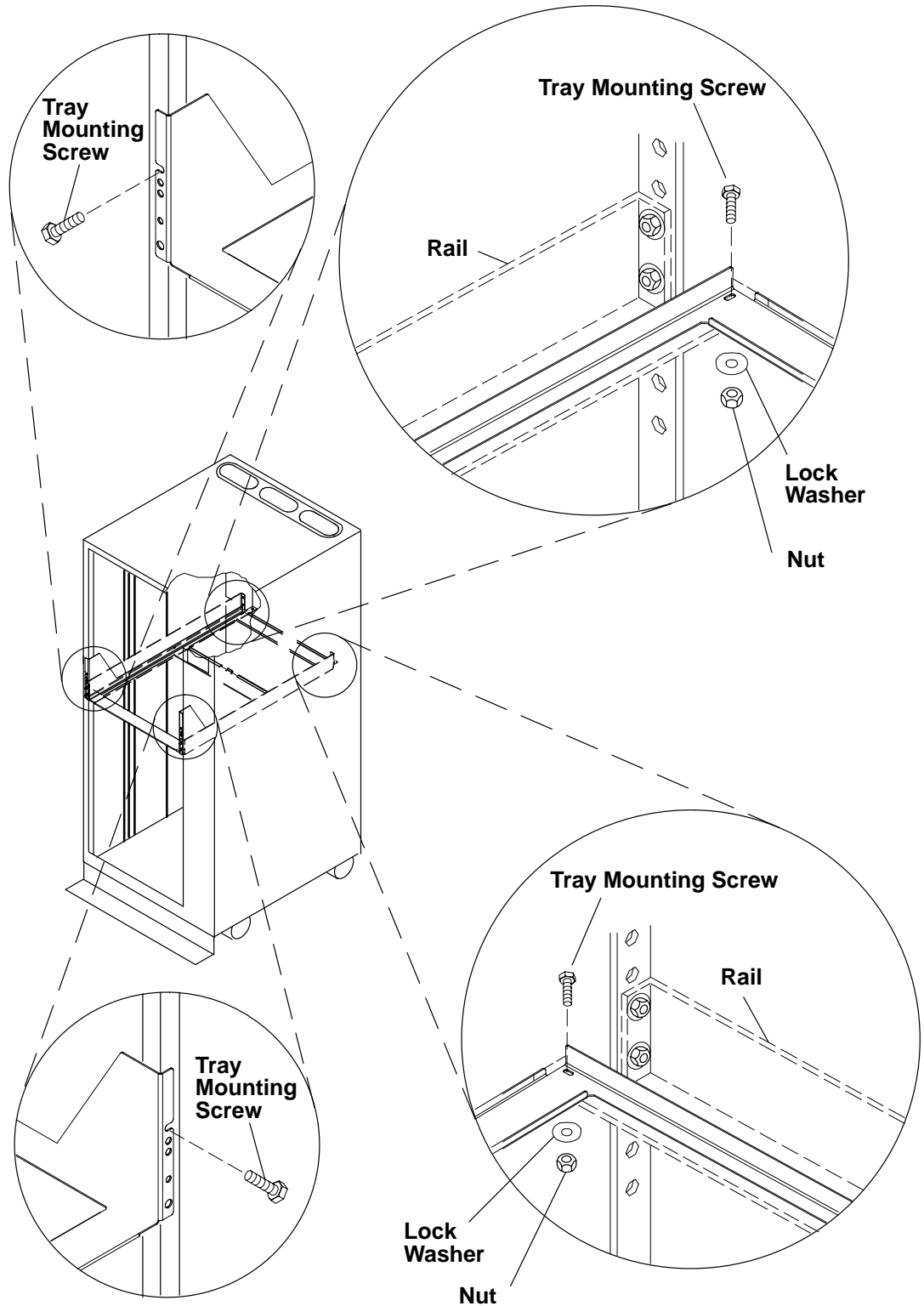


Detail B – Rear of Rail

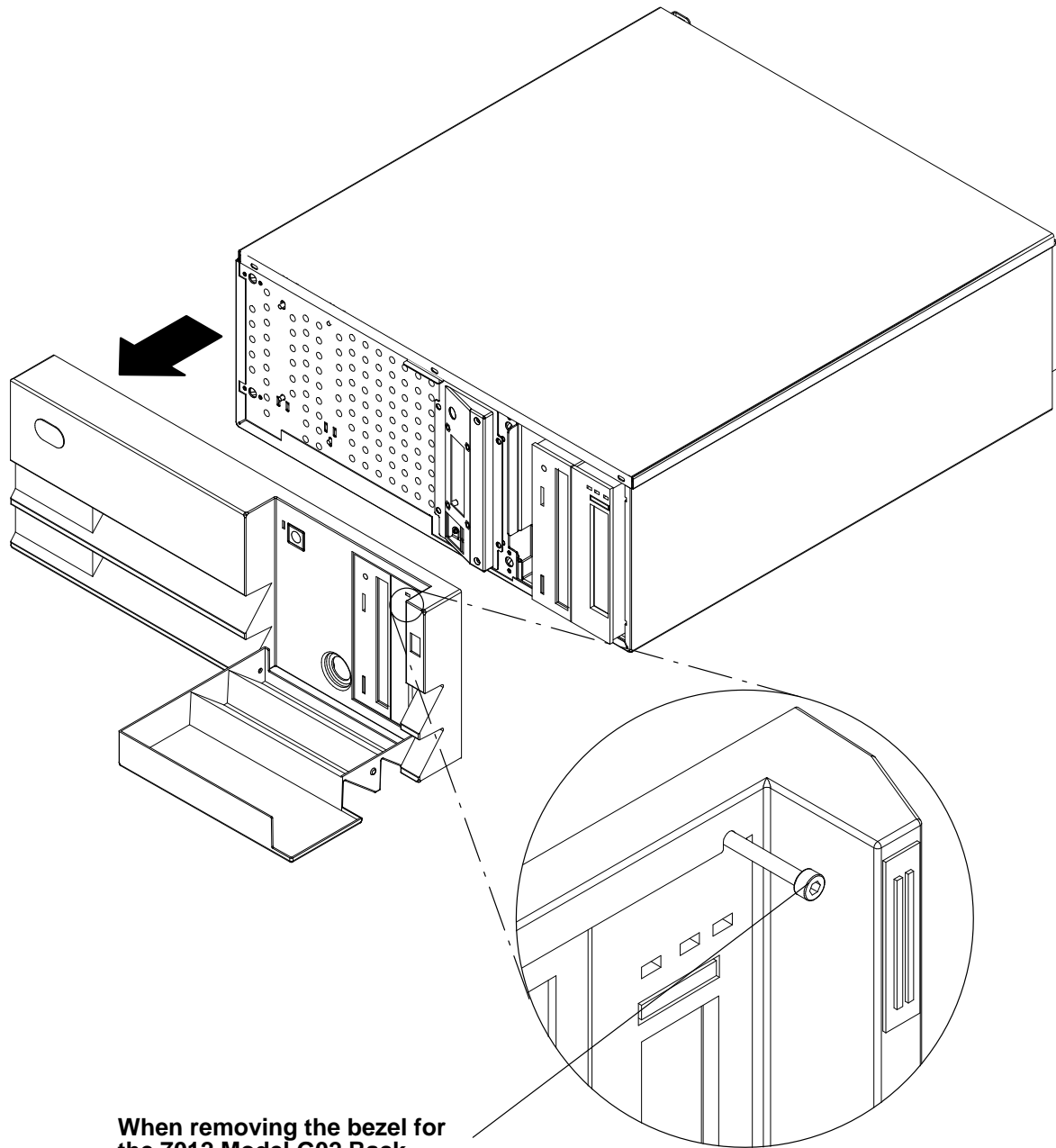


Step 4: Set the Tray on the Rails

Bolt the tray to the rails.



Step 5: Remove Bezel from the Expansion Unit



When removing the bezel for the 7012 Model G02 Rack Expansion Drawer, be sure to loosen the bezel retaining screw shown here.

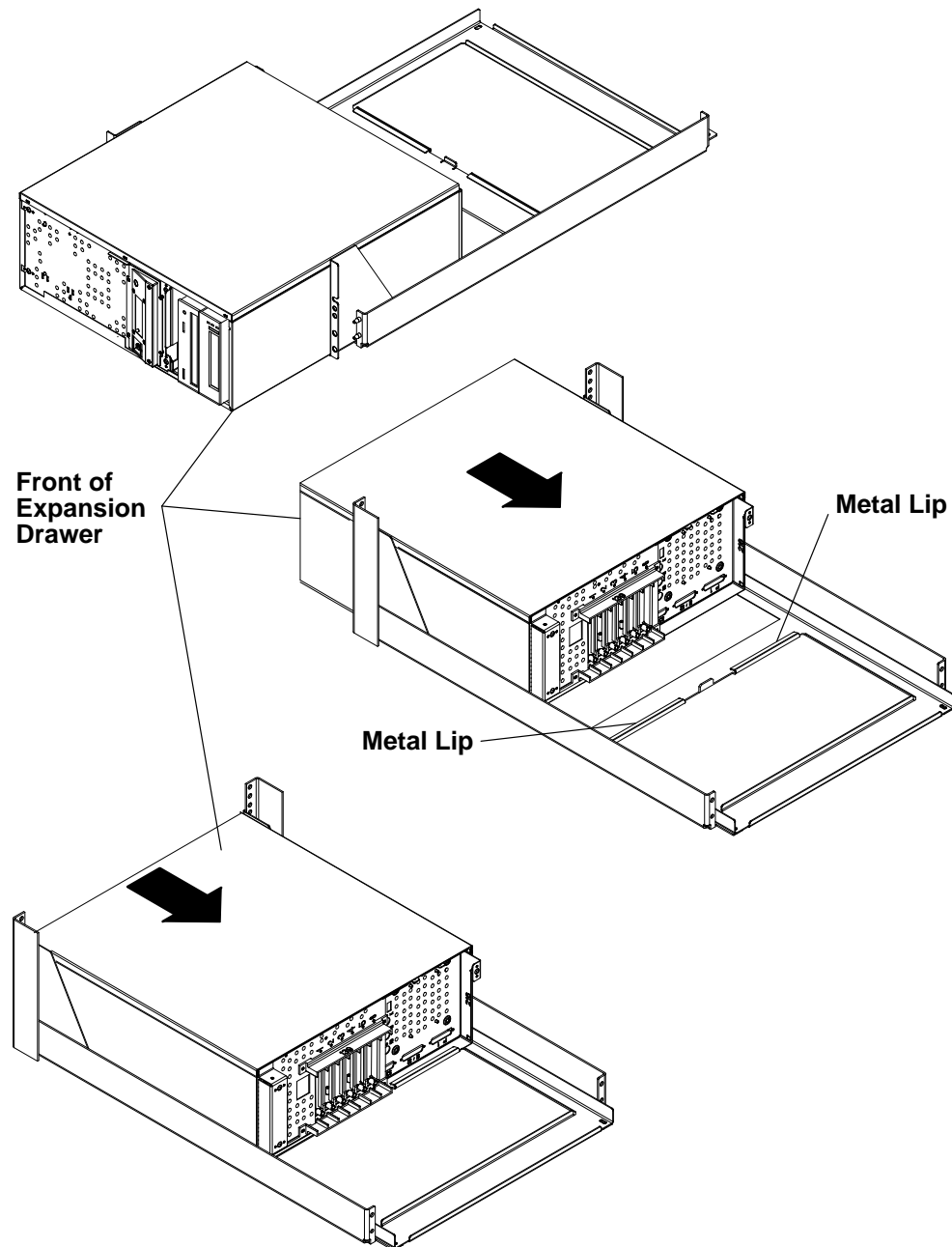
Step 6: Set the Expansion Unit on the Tray

Set the expansion unit on the tray and push it to the rear until it is engaged by the metal lip on the cross member of the tray.

Note: For a translation of the following notices, see *System Unit Safety Information*.

CAUTION:

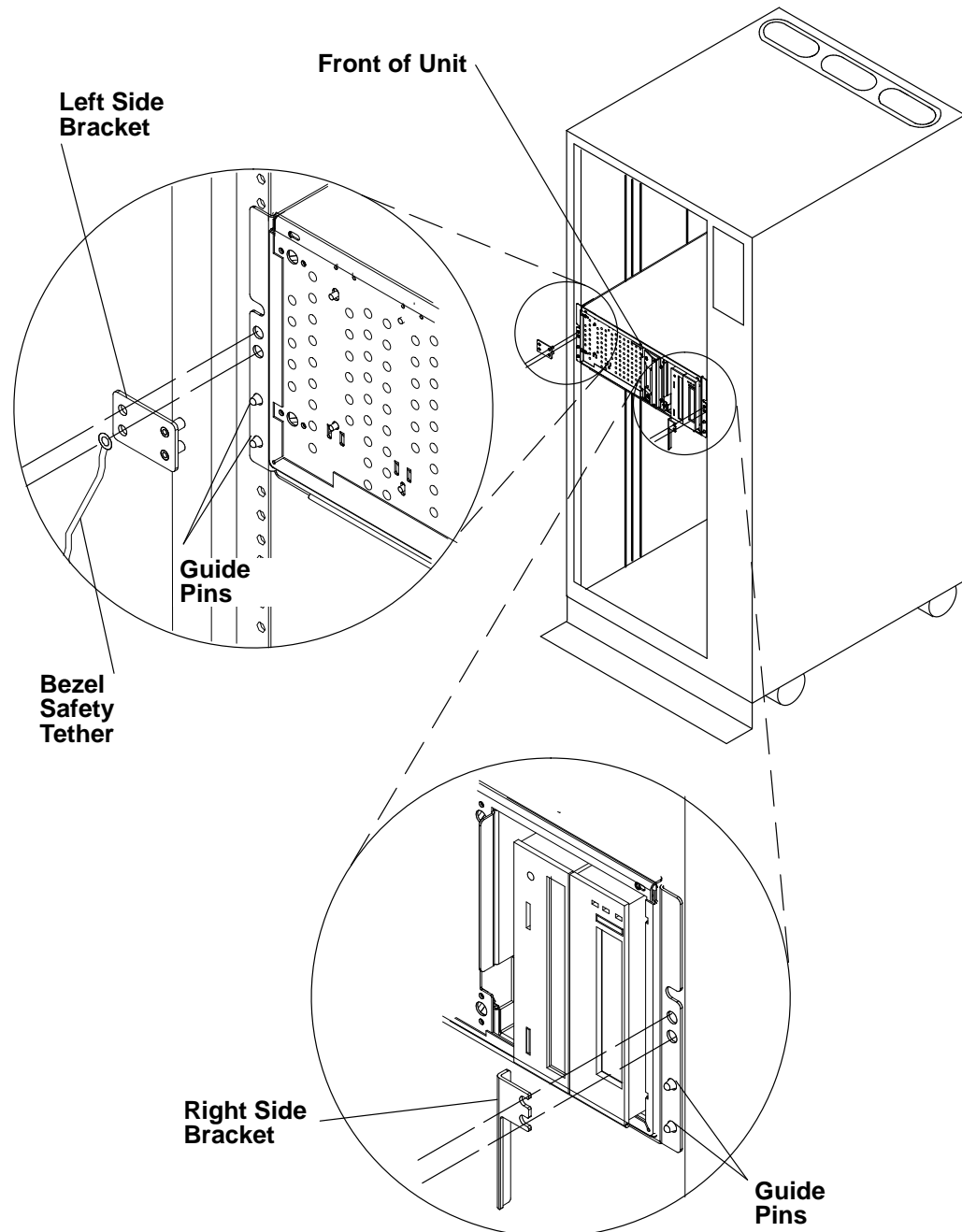
This unit weighs between 18 kg (39.7 pounds) and 32 kg (70.5 pounds). Two persons are required to safely move it. Using less than two persons to move it can result in injury.



Step 7: Secure The Expansion Unit

Secure the expansion unit to the front of the tray, using the supplied brackets and screws.

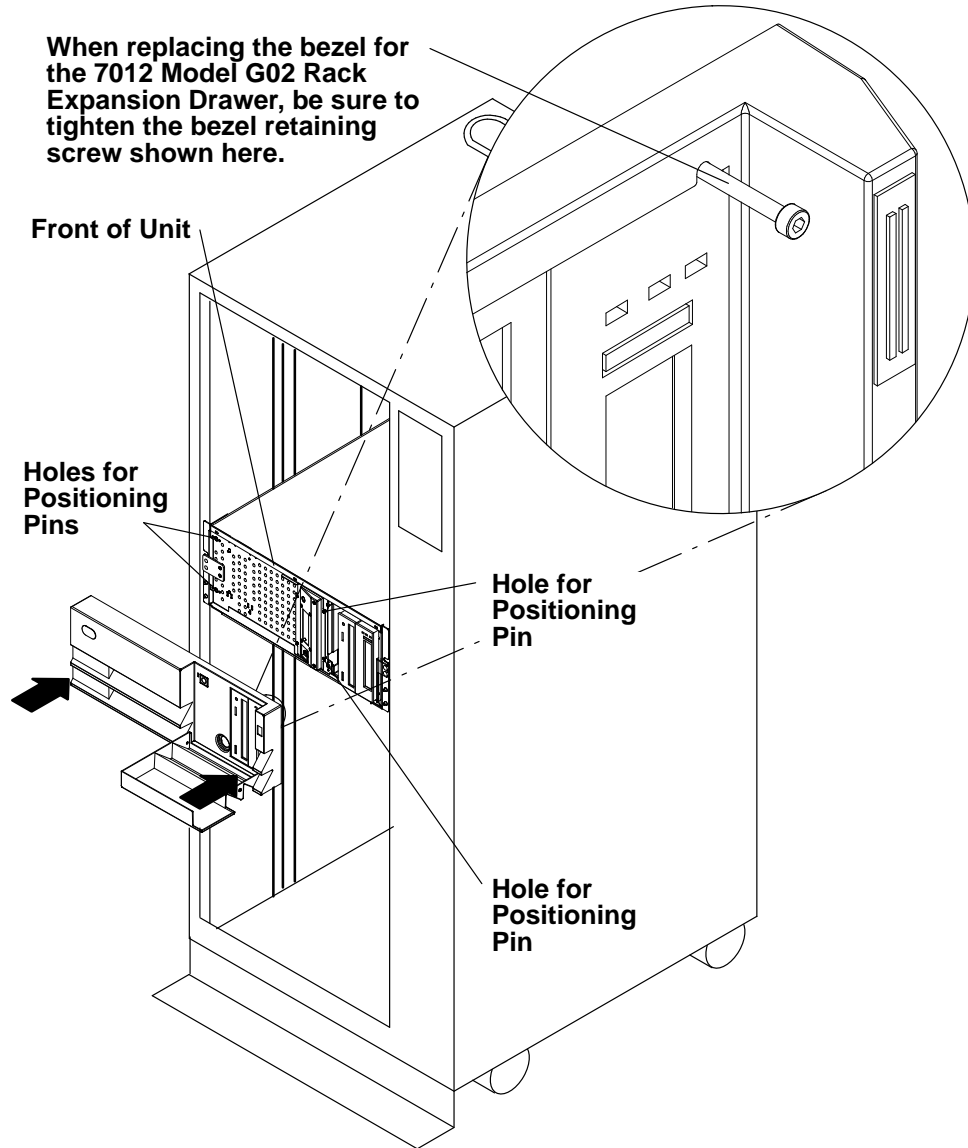
- Secure bezel safety tether with lower left screw.



Step 8: Replace Bezel on the Front of the Expansion Unit

Insert the positioning pins located on the inside of the bezel into the corresponding holes on the unit frame, and push the bezel toward the frame to snap the cover into place.

- Ensure that the bezel safety tether is secured to the left bracket (see Step 7).



Step 9: Connect the Adapter Cables

Connect the adapter cables between the base unit and the expansion unit.

Note: You can connect up to two expansion units to each base unit. Each expansion unit requires its own dedicated SCSI controller adapter card. The maximum configuration is shown below.

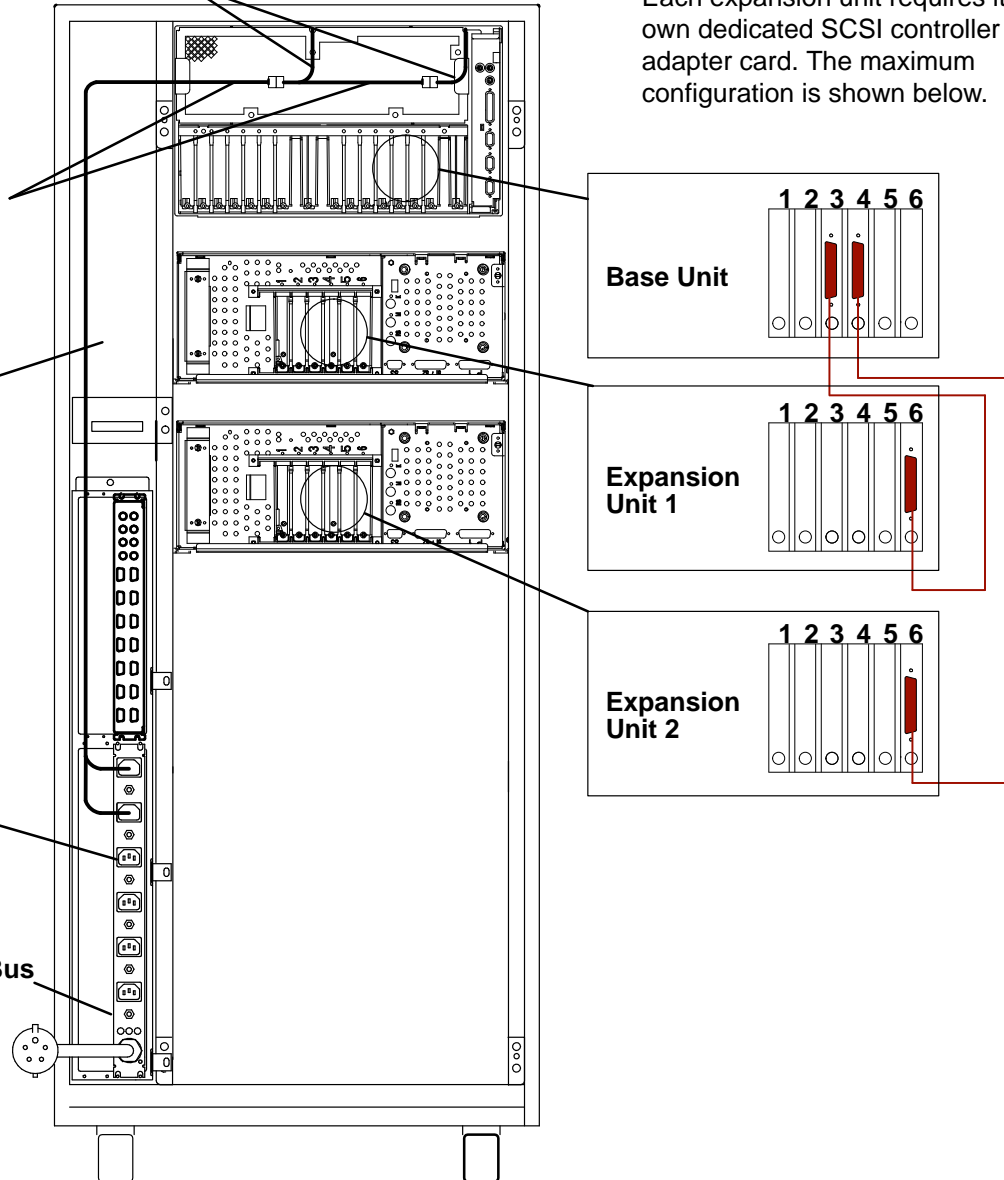
Power Supply Power Cords

Power Distribution Bus Outlet Power Cords

Rear of CPU Enclosure

Outlets (6)

Power Distribution Bus



Step 10: Checking Customer Outlets

Note: For a translation of the following notices, see *System Unit Safety Information*, Order Number SA23-2652.

CAUTION:

Do not touch the receptacle or the receptacle faceplate with anything other than your test probes before you have met the requirement in step 8.

- 1.. Have the customer locate and turn off the branch circuit CB (circuit breaker). (Attach tag S229-0237, which reads "Do Not Operate.")

Note: All measurements are made with the receptacle faceplate in its normal installed position.

- 2.. Some receptacles are enclosed in metal housings. On receptacles of this type, perform the following steps:

- a. Check for less than 1 volt from the receptacle case to any grounded metal structure in the building, such as a raised floor metal structure, water pipe, building steel, or similar structure.
- b. Check for less than 1 volt from receptacle ground pin to a grounded point in the building.

Note: If the receptacle case or faceplate is painted, be sure the probe tip penetrates the paint and makes good electrical contact with the metal.

- c. Check the resistance from ground pin of the receptacle to the receptacle case. Check resistance from ground pin to building ground. The reading should be less than 1.0 ohm, which indicates the presence of a continuous grounding conductor.
- 3.. If any of the three checks made in step 2 are not correct, ask the customer to remove the power from the branch circuit and make the wiring corrections; then check the receptacle again.

Note: Do not use the digital multimeter to measure grounding resistance.

- 4.. Check for infinite resistance between the ground pin of the receptacle and each of the phase pins. This is a check for a wiring short to ground or a wiring reversal.
- 5.. Check for infinite resistance between phase pins. This is a check for a wiring short.

CAUTION:

If the reading is other than infinity, do not proceed. Have the customer make necessary wiring corrections before continuing. Do not turn on the branch circuit CB until all the above steps are satisfactorily completed.

- 6.. Have the customer turn on the branch circuit CB. Measure for appropriate voltages between phases. If no voltage is present on the receptacle case or grounded pin, the receptacle is safe to touch.
- 7.. With an appropriate meter, verify that the voltage at the outlet is correct.
- 8.. Verify that the grounding impedance is correct by using the ECOS 1020, 1023, B7106, C7106, or an appropriately approved ground impedance tester.

Note: Do not use the 120-volt convenience outlets inside a machine to power the tester.

Step 11: Connect Power Cords

For the base unit and each expansion unit, connect the power cord to the rear of unit.

Note: For a translation of the following notices, see *System Unit Safety Information*.

CAUTION:

This product is equipped with a three-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.

Attention: Do not plug the power cords into the power outlets yet.

**Power Supply Power Cords
for Base Unit**

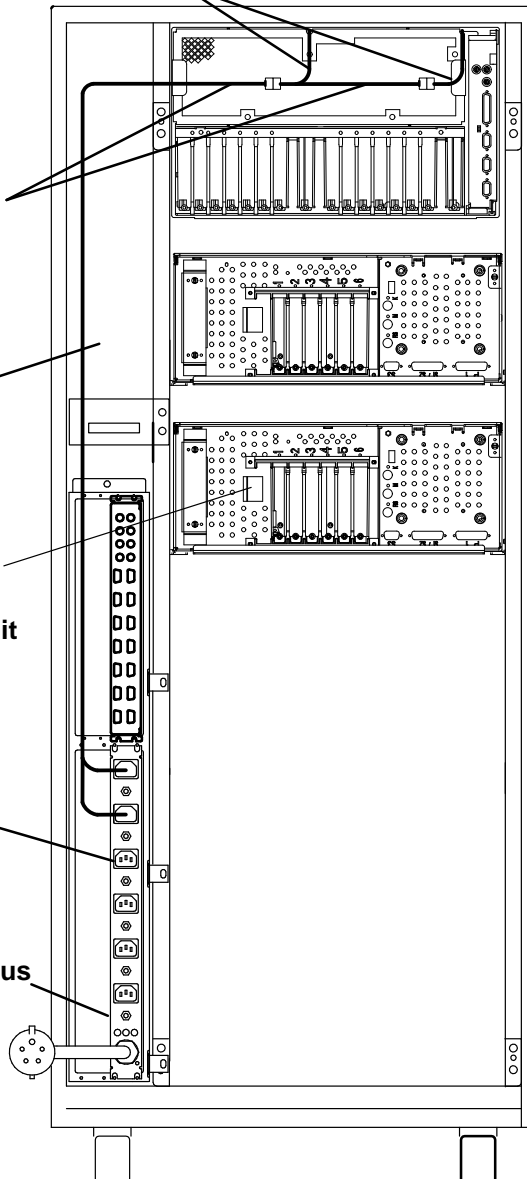
**Power
Distribution
Bus Outlet
Power Cords**

**Rear of CPU
Enclosure**



**Connector for
AC Power to
Expansion Unit**

Outlets (6)

**Power
Distribution
Bus**



Step 12: Set the Key Mode Switches and Plug in the Power Cords

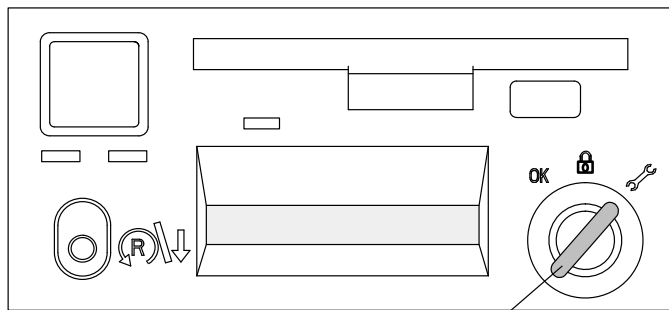
Set the Base Unit Key Mode switch to Service (), and each expansion unit Key Mode switch to Secure (). Plug each expansion unit, the base unit, the (optional) terminal and any external device power cables into the outlets on the power distribution unit or other properly grounded electrical outlets. Then go to Step 13.

Attention: In this step the expansion unit key mode switch is set to the secure position. Leave this switch set to the secure position during normal operations.

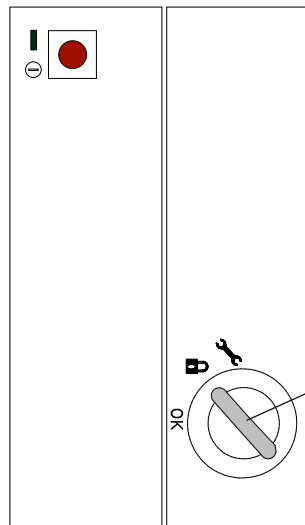
Note: For a translation of the following notices, see *System Unit Safety Information*.

CAUTION:

This product is equipped with a three-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.



**Base Unit Key Mode Switch
Set to the Service Position**



**Expansion Unit Key Mode Switch
Set to the Secure Position**

Step 13: Your Expansion Unit Hardware Is Now Set Up

Go to Step 14.

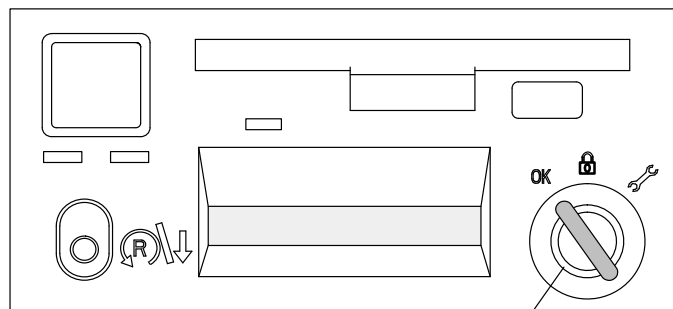
Step 14: For Operating System Information:

If the AIX operating system has not been installed, go to *Before You Begin* in *AIX Quick Installation and Startup Guide*.

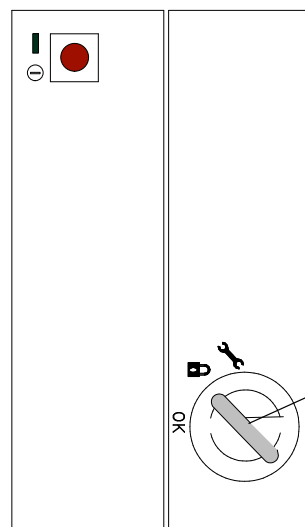
For information regarding SystemGuard, go to *Chapter 3. Using SystemGuard* in *7015 Model R30, R40, and R50 CPU Enclosure Operator Guide*.

For more information about the system unit, go to *Chapter 2. Using the System Unit* in *7015 Model R30, R40, and R50 CPU Enclosure Operator Guide*

If the AIX operating system has been installed, open the front door of the Expansion Unit, ensure that the key mode switch is set to the Secure position (🔒) and press the power button. Then open the front door of the Base Unit, set the key mode switch to the Normal Position (OK) and press the power button (the power light below the power button is green when the system is on).



**Base Unit Key Mode Switch
Set to the Normal Position**



**Expansion Unit Key Mode Switch
Set to the Secure
Position**

Chapter 3. Removal and Replacement Procedures

This chapter describes the removal and replacement procedures for all replaceable units unique to the system, and for other hardware components, such as the system unit covers. Any parts not listed here can be found in the removal and replacement procedures for the 7012 G Series systems.

Electrical Safety

Observe the following safety instructions any time you are connecting or disconnecting devices attached to the workstation.

Notes:

1. After you replace any FRU, you should test it. Refer to the *Diagnostic Information For Micro Channel Bus Systems* for any detailed information.
2. For a translation of the following notices, see *System Unit Safety Information*.

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communications lines.

CAUTION:

This product is equipped with a three-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.

DANGER

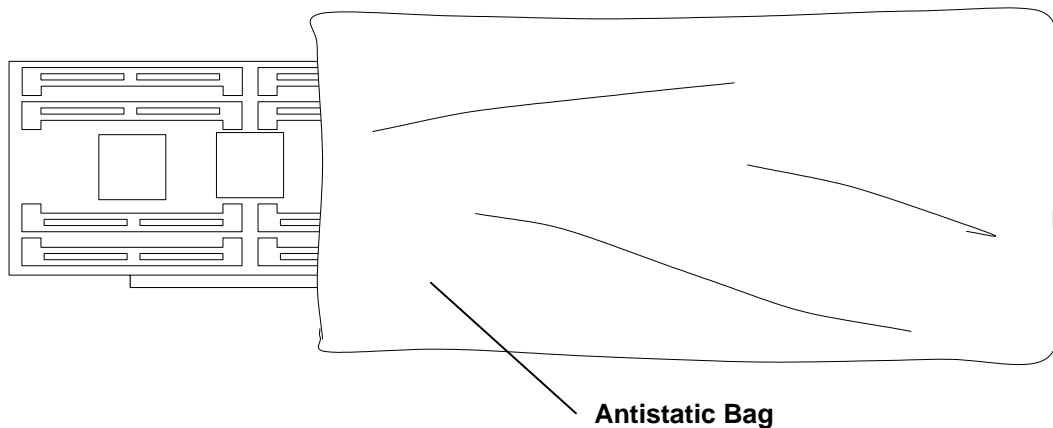
To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

Handling Static-Sensitive Devices

Attention: Adapters, planars, diskette drives, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags, as shown in this illustration, to prevent this damage.


Take the following precautions:

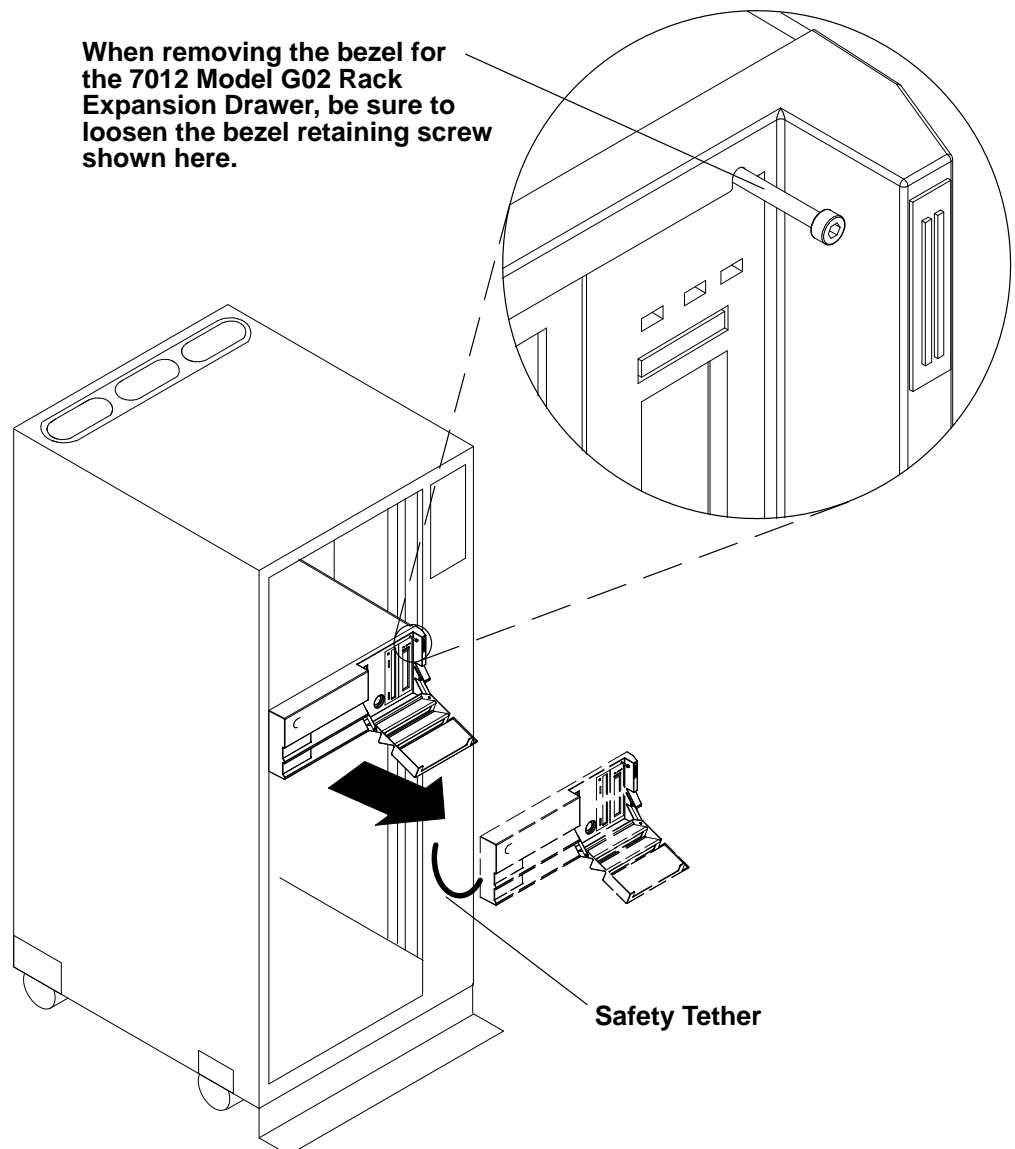
- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- If you have an antistatic wrist strap available, use it while handling the device.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before you pick it up again, touch the antistatic bag and the metal frame of the system at the same time.
- Handle the devices carefully in order to prevent permanent damage.



Bezel

Removal

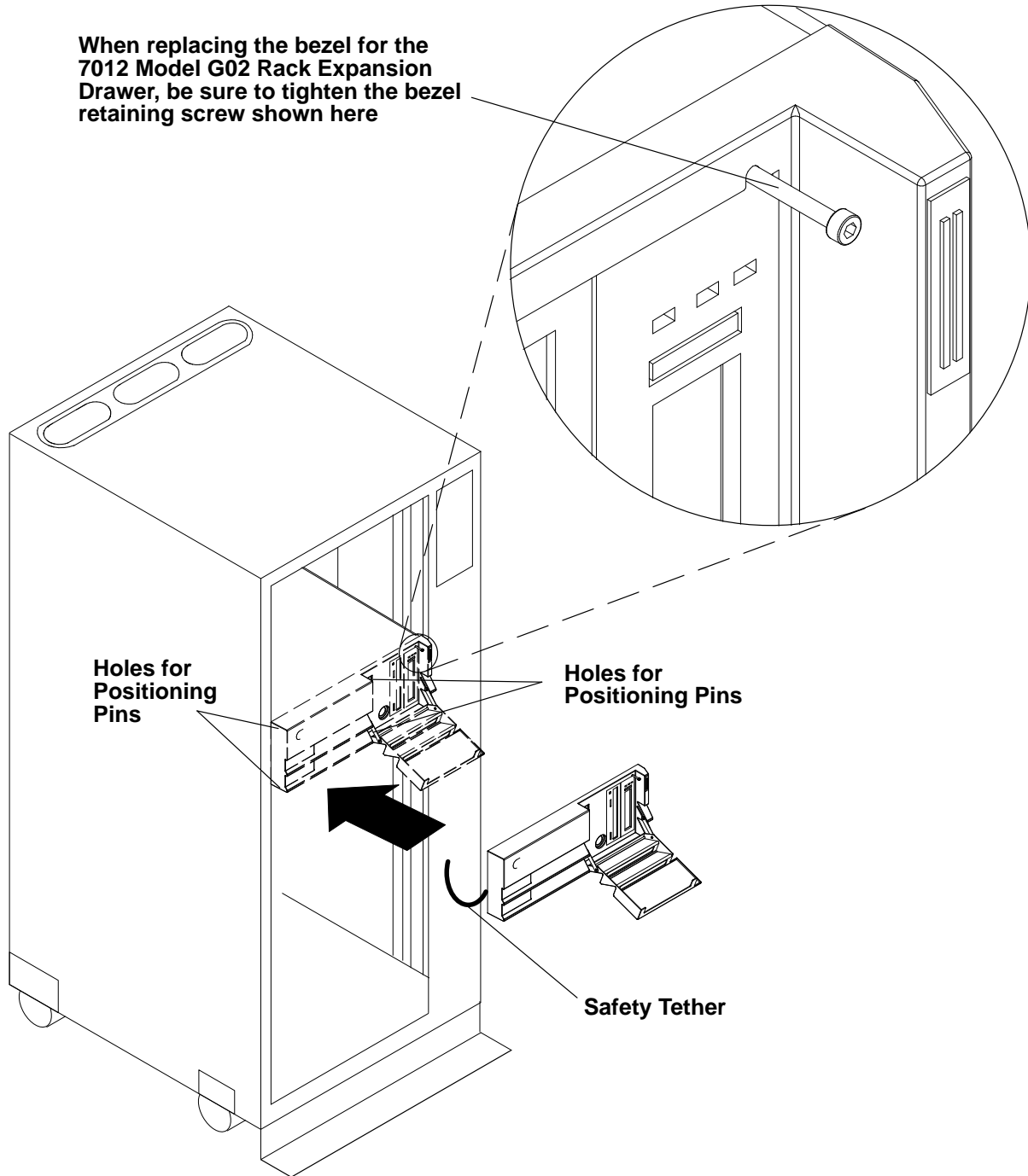
1. Set the power switches of the attached devices to Off.
2. Set the power switch of the system unit to Off.
3. Disconnect the power cable from the wall outlet.
4. Set the key mode switch to the service position ().
5. Remove the key from the mode switch, if present.
6. Loosen the bezel retaining screw.
7. Firmly grip the bezel and pull forward to remove it from the unit.
8. If necessary, remove the screw holding the bezel safety tether to the unit.



Replacement

Replace in the reverse order. Insert the positioning pins located on the inside of the bezel in the corresponding holes on the unit frame, and push the bezel toward the frame to snap the bezel into place.

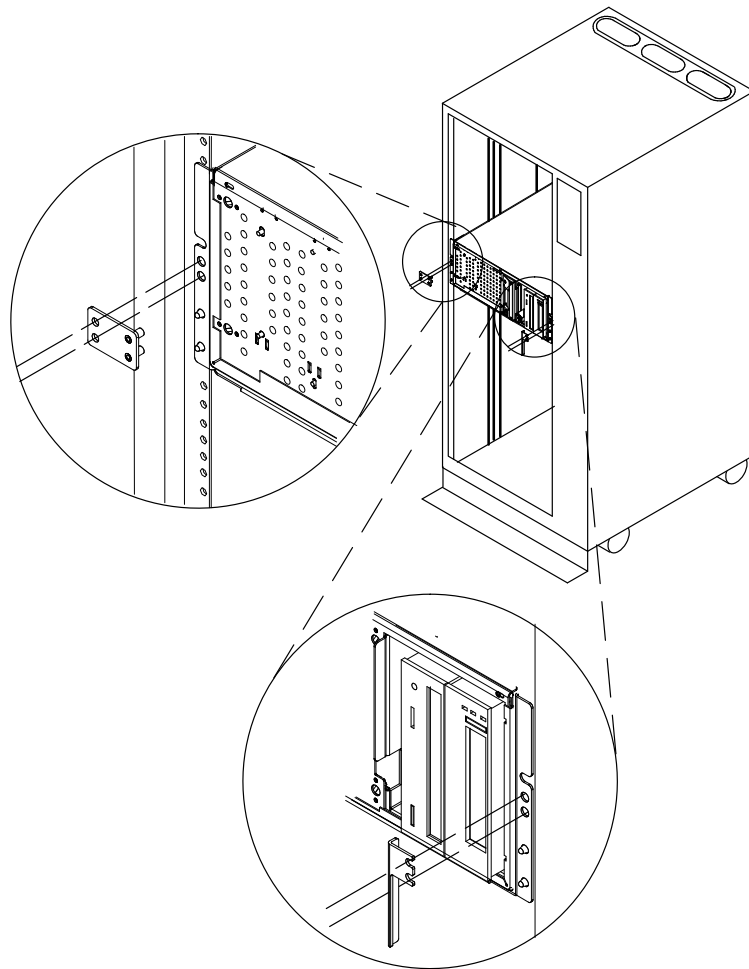
When replacing the bezel for the 7012 Model G02 Rack Expansion Drawer, be sure to tighten the bezel retaining screw shown here



Top Cover

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures* in *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Disconnect the power cord from the expansion unit.
3. Remove the bezel following the procedure on page 3-3.
4. Disconnect any cable connected to the rear of the expansion unit. Record the locations of the cables and connectors.
5. Remove the screws and brackets securing the front of the expansion unit to the tray.



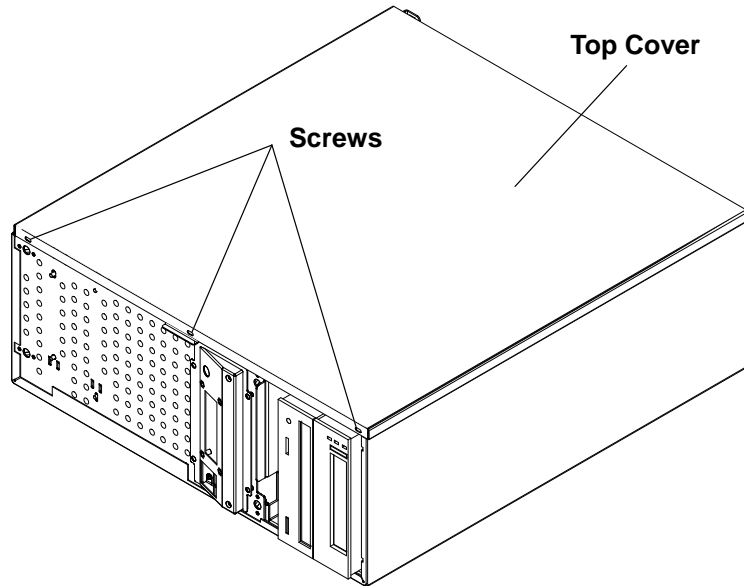
Note: For a translation of the following notices, see *System Unit Safety Information*.

CAUTION:

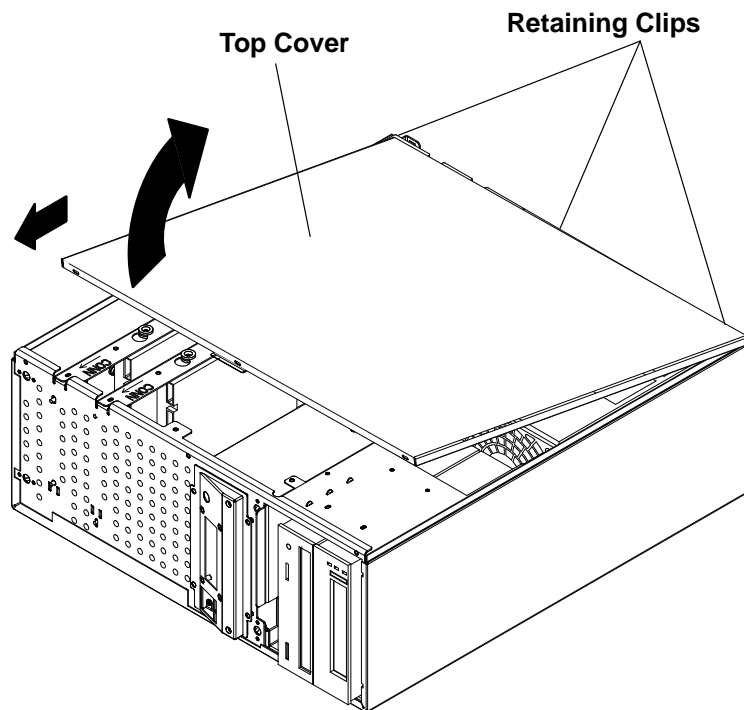
This unit weighs between 18 kg (39.7 pounds) and 32 kg (70.5 pounds). Two persons are required to safely move it. Using less than two persons to move it can result in injury.

6. Pull the expansion unit out of the rack and place it on a table.

7. Remove the three retaining screws located on the front of the top cover.

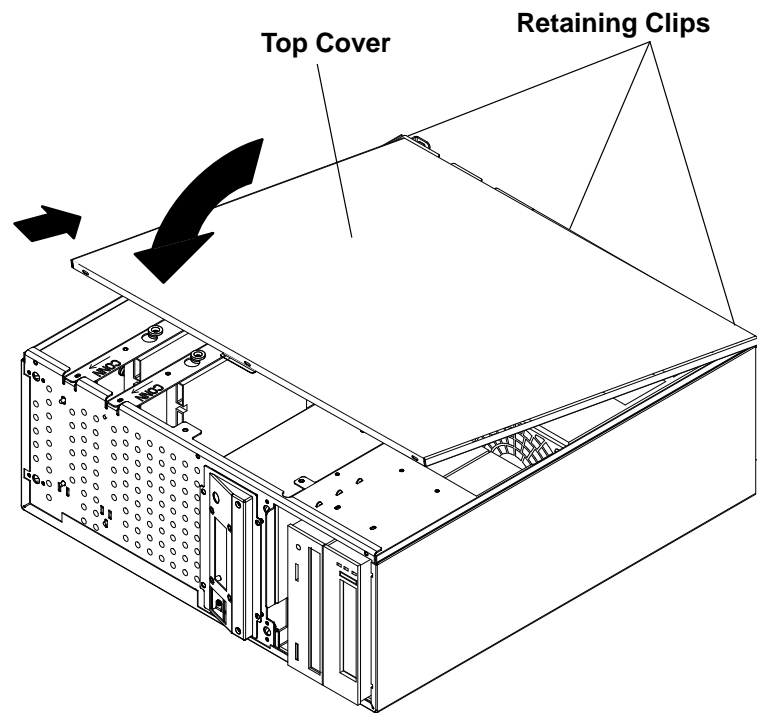


8. With a firm grip on the cover, rotate it slightly to the left while pulling the cover upward.



Replacement

Replace in the reverse order. Be sure to center the retaining clips on the rear of the top cover with the corresponding holes on the unit.

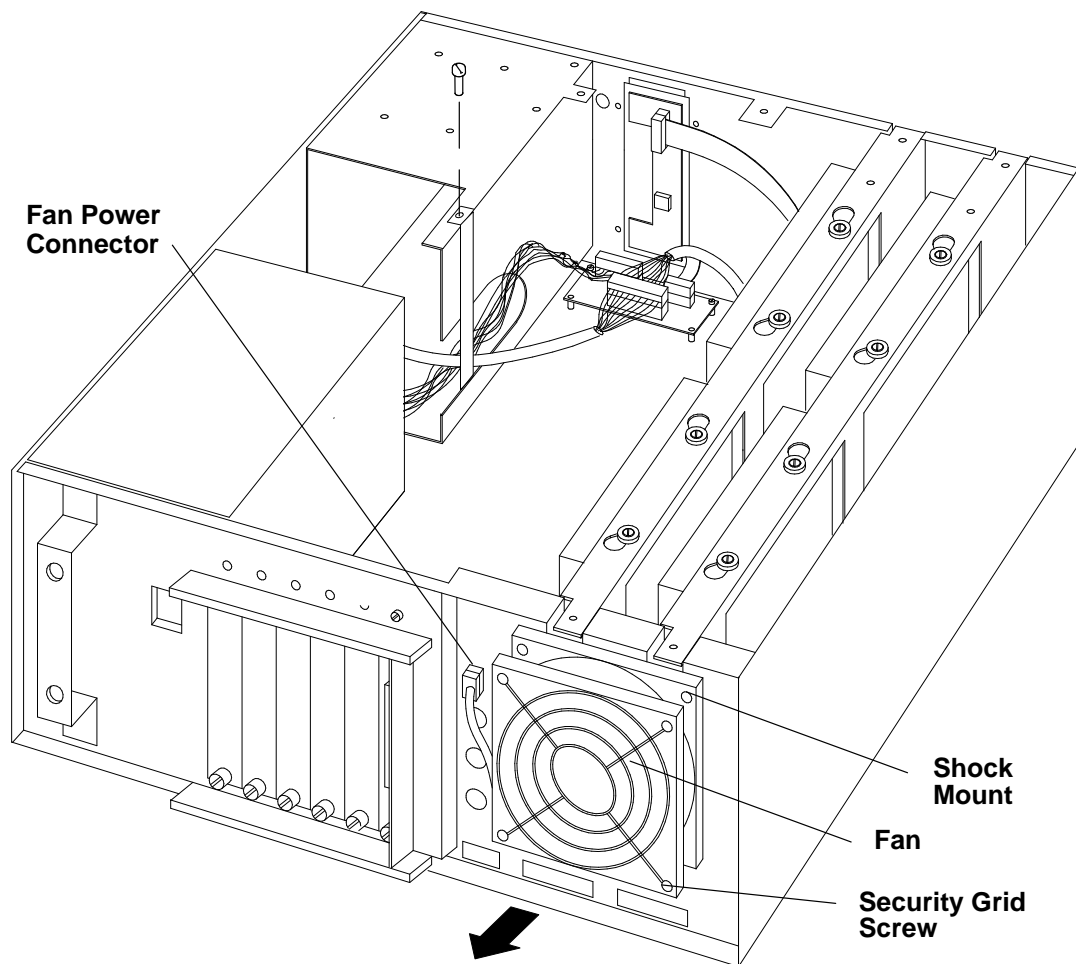


Rear Fan

Note: Before removing the rear fan, make a note of the air flow direction of the fan.

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures in the 7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in “Bezel” on page 3-3 and “Top Cover” on page 3-5.
3. Unplug the fan power connector located above the fan.
4. Firmly grip the fan accessing it from the rear of the unit. Then pull it out of the unit.
5. Pull the four shock mounts out of their mounting holes in the frame.
6. Remove the screws which hold the security grid to the fan.



Replacement

Replace in the reverse order.

Power Supply

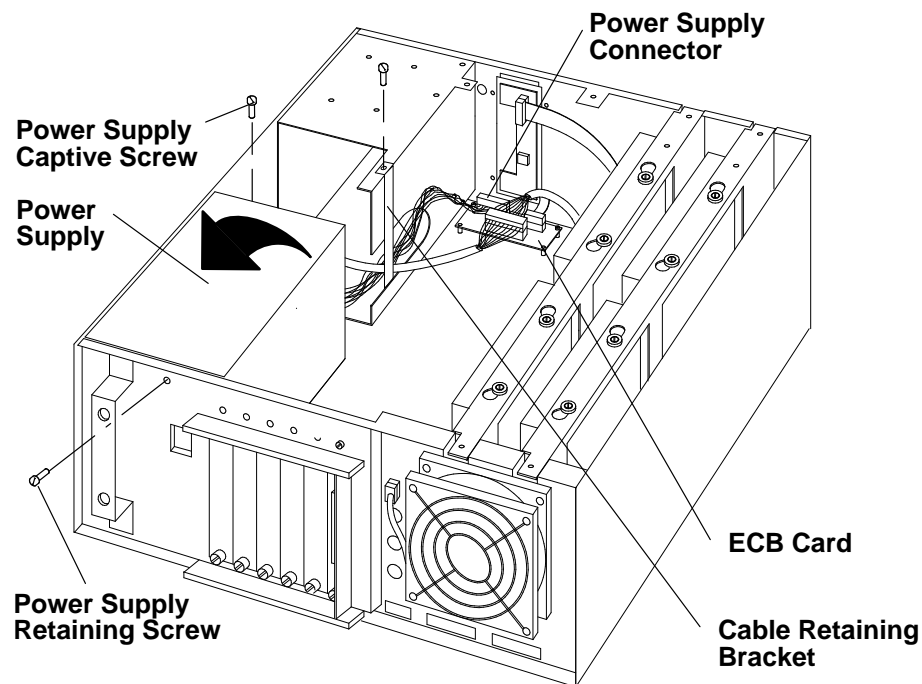
Note: For a translation of the following notices, see *System Unit Safety Information*.

DANGER

Do not attempt to open the covers of the power supply. The power supply is not serviceable and is to be replaced as a unit.

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures* in the *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in "Bezel" on page 3-3 and "Top Cover" on page 3-5.
3. Unplug the power supply power connectors from the ECB card, disk drive/media devices, and RS-485 card.
4. Remove the cable retaining bracket holding the power supply cables.
5. Remove the retaining screw used to attach the power supply to the unit. (This screw is located in the rear.)
6. Loosen the captive screw located at the front right side of the power supply. Then slightly rotate the power supply upward until you are able to remove it from the unit.



Replacement

Replace in the reverse order, with the power supply cables facing the front of the system unit.

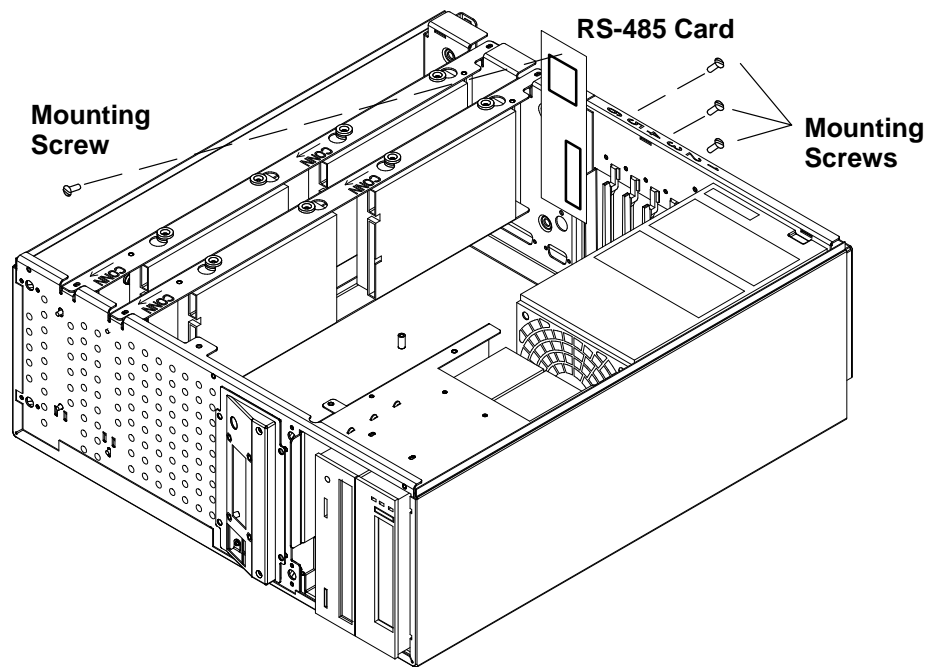
Note: Ensure that any unused power supply cable connector is retained by the bracket as originally installed.

RS-485 Card

Note: Before attempting to handle the RS-485 card, read “Handling Static Sensitive Devices”, on page 3-2.

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures in the 7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in “Bezel” on page 3-3 and “Top Cover” on page 3-5.
3. Remove the three screws on the RS-485 card back connector mounting screws on the rear of the system.
4. Unplug any external and internal RS-485 card connector.
5. Remove the mounting screw on the inside of the system and slide the card out of the unit by gripping its edges. It is strongly recommended that you do not touch the board components. Handle the card gripping it by its edges.



Replacement

Replace in the reverse order.

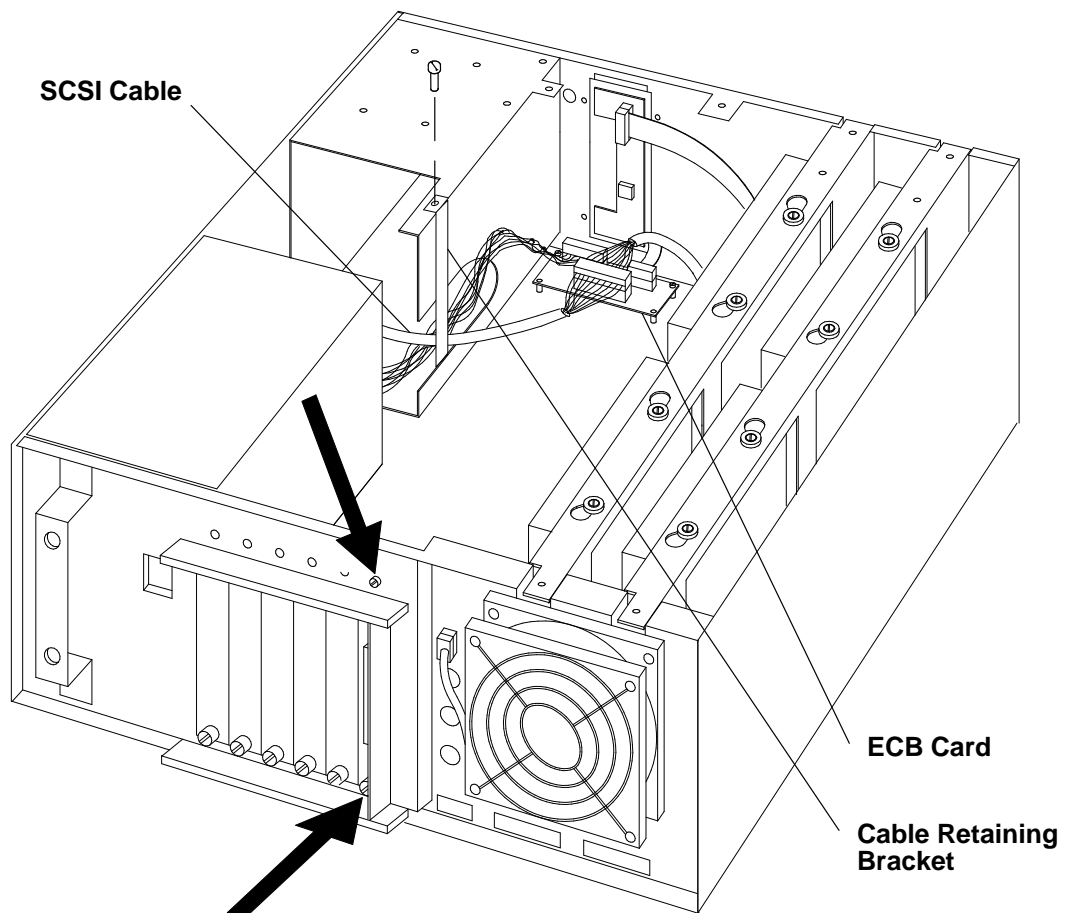
Expansion Unit SCSI Cable

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures* in the *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in “Bezel” on page 3-3 and “Top Cover” on page 3-5.

Note: Before removing the SCSI cable from the unit, note the cable path.

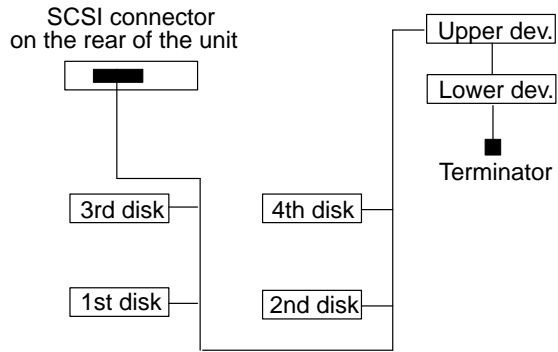
3. Unscrew the two screws highlighted in the following figure, at the rear of the system unit, to unlock the SCSI connector from the unit.
4. Disconnect the SCSI cable connectors from any disk drives, media devices, and the ECB card.
5. Remove the cable retaining bracket holding the SCSI cable to the system unit.
6. Slide the SCSI cable out of the unit.



Installation

Replace in the reverse order. Position the SCSI cable in the unit, making it follow the correct routing. Then connect any SCSI cable connector to the designated hard disks and/or media devices in the unit, and to the ECB card. See the following *SCSI Cable Routing* diagram.

SCSI Cable Routing



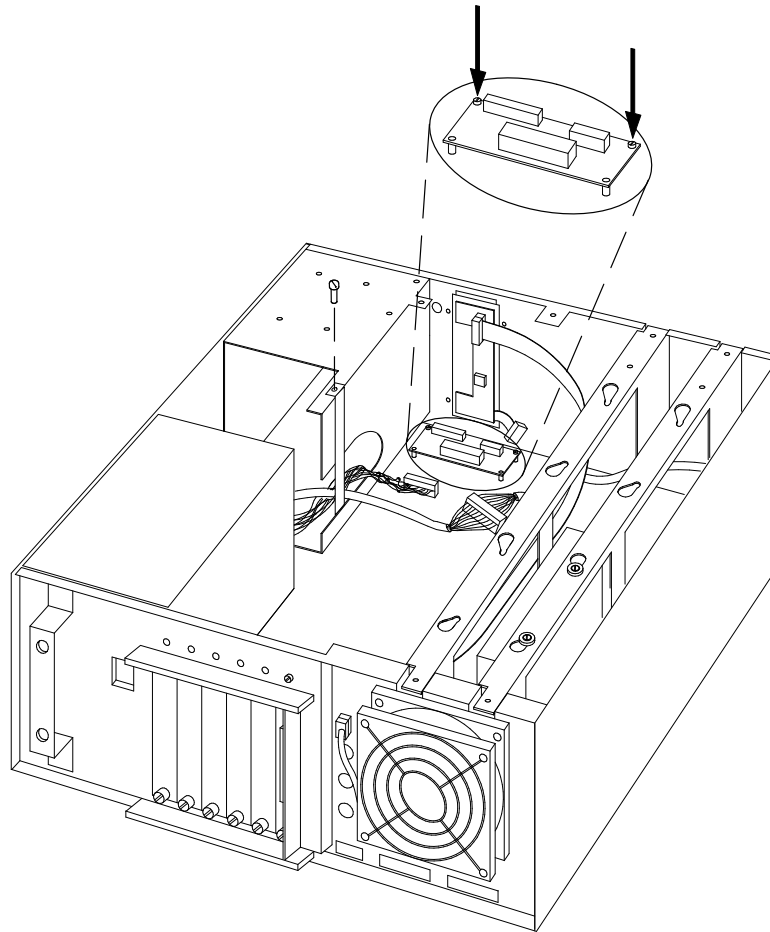
ECB Card

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures* in the *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in “Bezel” on page 3-3 and “Top Cover” on page 3-5.

Note: Before attempting to handle the ECB card, read “Handling Static Sensitive Devices”, on page 3-2.

3. Unplug any ECB card connector.
4. Remove the two ECB card retaining screws, and then hold the ECB card by its edges and pull it out of the disk expansion unit.



Installation

Replace in the reverse order. If installing a new ECB card, remove the backing from the double-sided adhesive tape from the feet of the card.

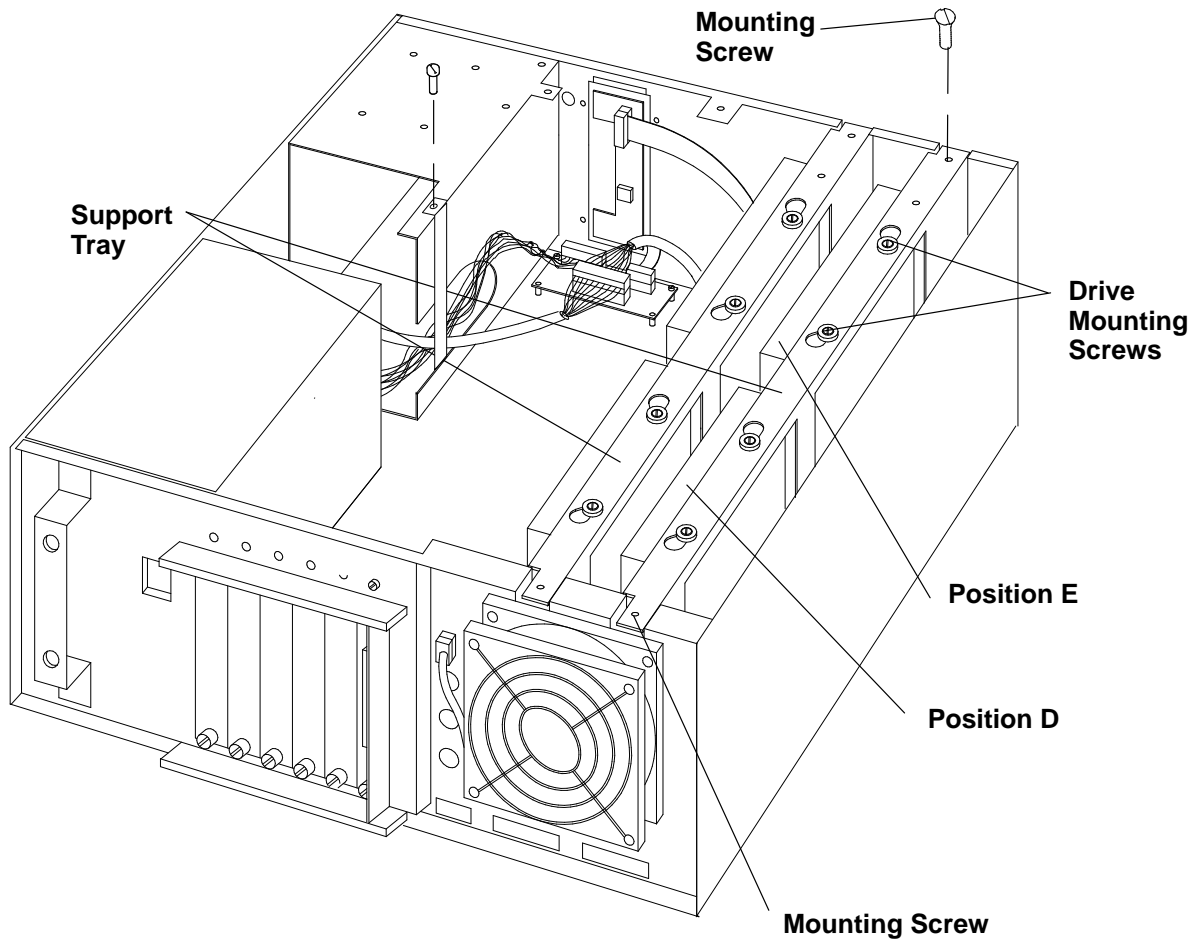
Disk Drive

References to the small computer systems interface (SCSI) input/output controller is abbreviated as SCSI controller in this publication.

Note: Refer to "Handling Static-Sensitive Devices" on page 3-2.

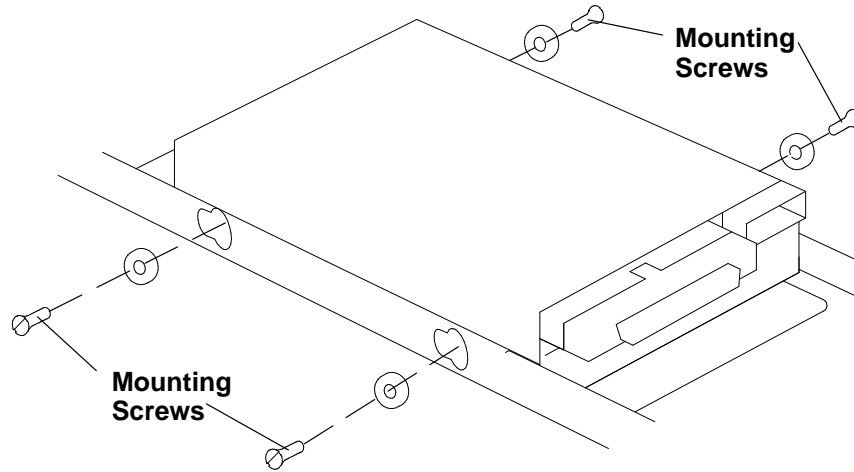
Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures in the 7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in "Bezel" on page 3-3 and "Top Cover" on page 3-5.
3. Place the system unit in horizontal position.
4. Remove the two mounting screws that mount the disk drive support tray to the system unit frame and remove the support tray.

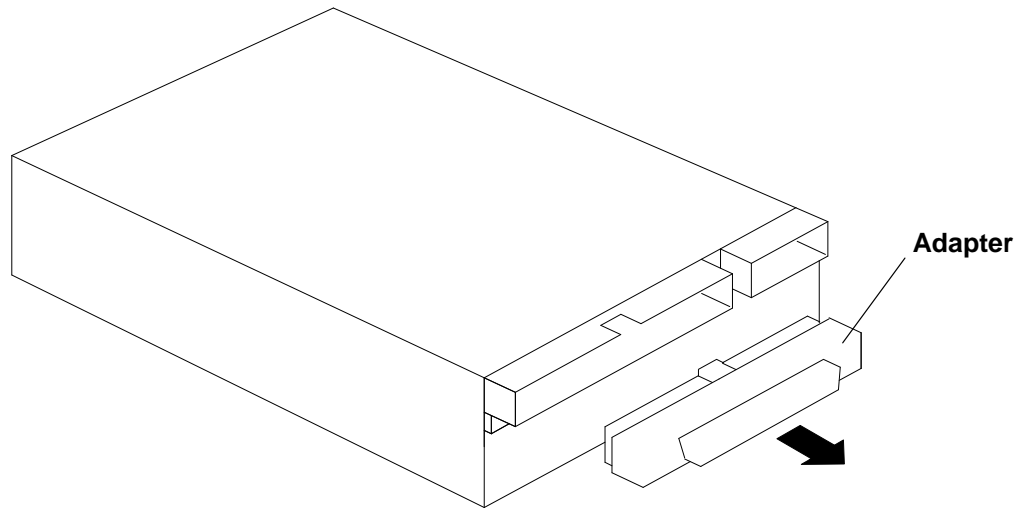


5. Disconnect the power supply connectors and the SCSI cable from the drives. Be sure to note how the SCSI cable is routed to the drives.
6. Disconnect the internal SCSI cable from the SCSI controller, if necessary.
7. Gently slide the support tray out of the system unit.

8. To remove the drives from the support tray, remove the four mounting screws holding the drives to the support tray.



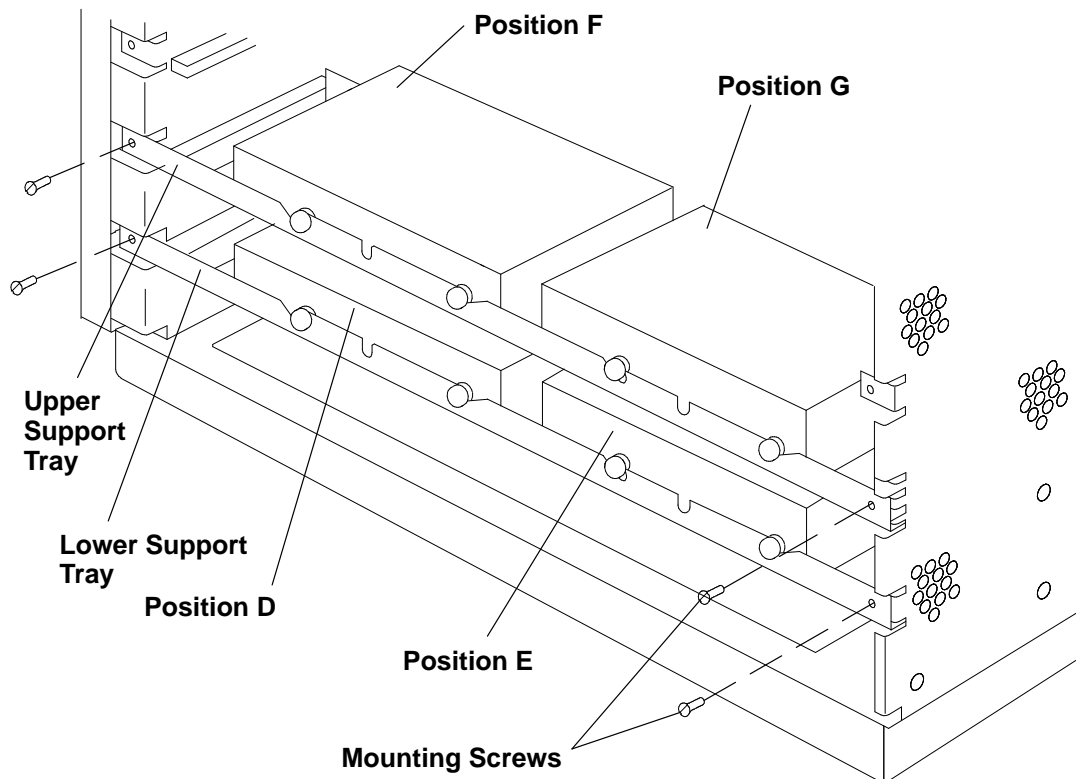
9. Lift the disk drive out of the support tray.
10. Record the settings of any jumpers and/or switches that are present on it.
11. If equipped with an adapter, remove the adapter from the disk drives SCSI cable connector.



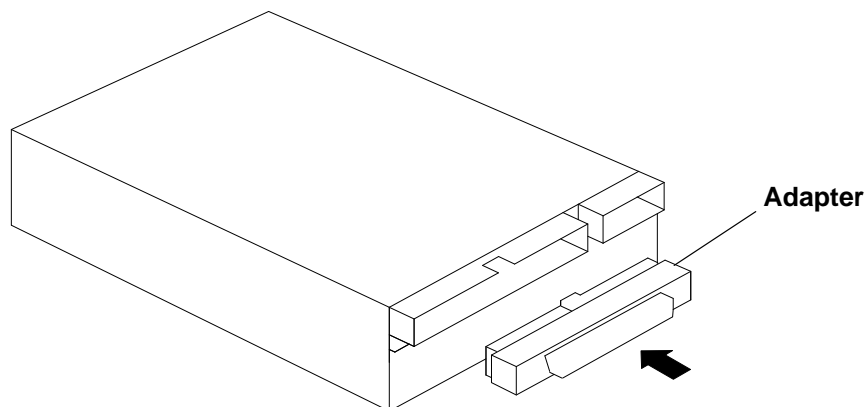
Replacement

Notes: It is important to remember the following facts when installing or replacing optional disk drives in positions F and G:

- The third and fourth disk drives, positions F and G, must be installed on the upper support tray.
- The third disk drive, position F, must be installed on the left.
- The fourth disk drive, position G, must be installed on the right.

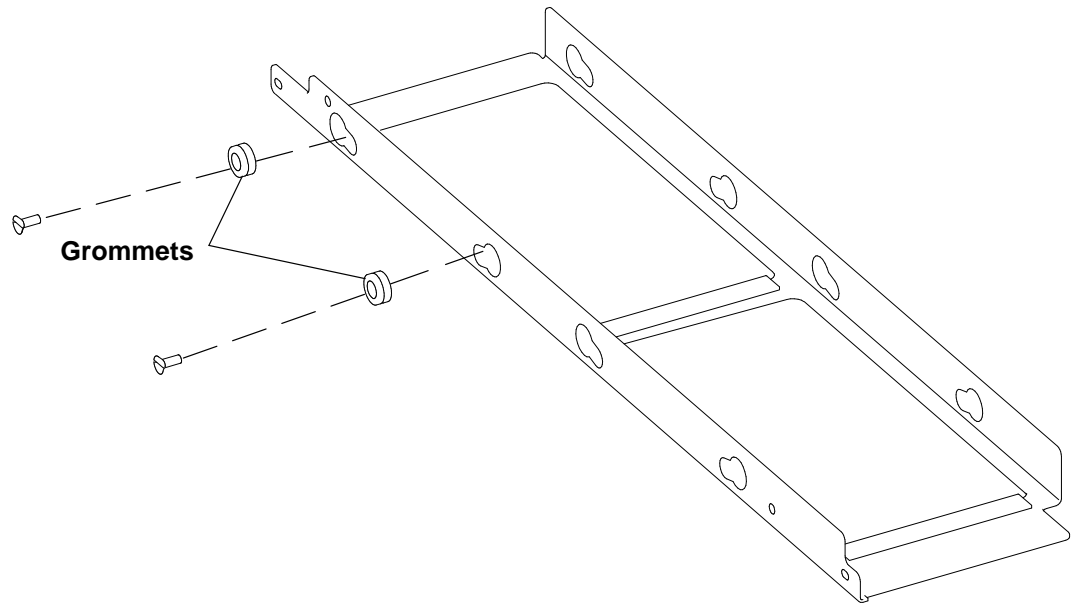


1. If required, replace the adapter on the SCSI cable connector on the disk drive that you are installing or replacing.

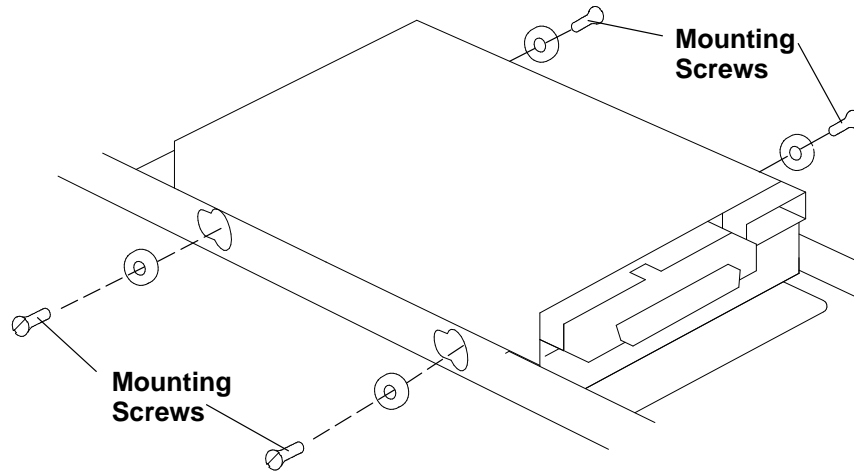


2. Set the address settings of the new disk drive the same as the settings of the old drive. For more information, refer to the *Diagnostic Information For Micro Channel Bus Systems*.

3. Install the required grommets in the grooves located on the support tray.

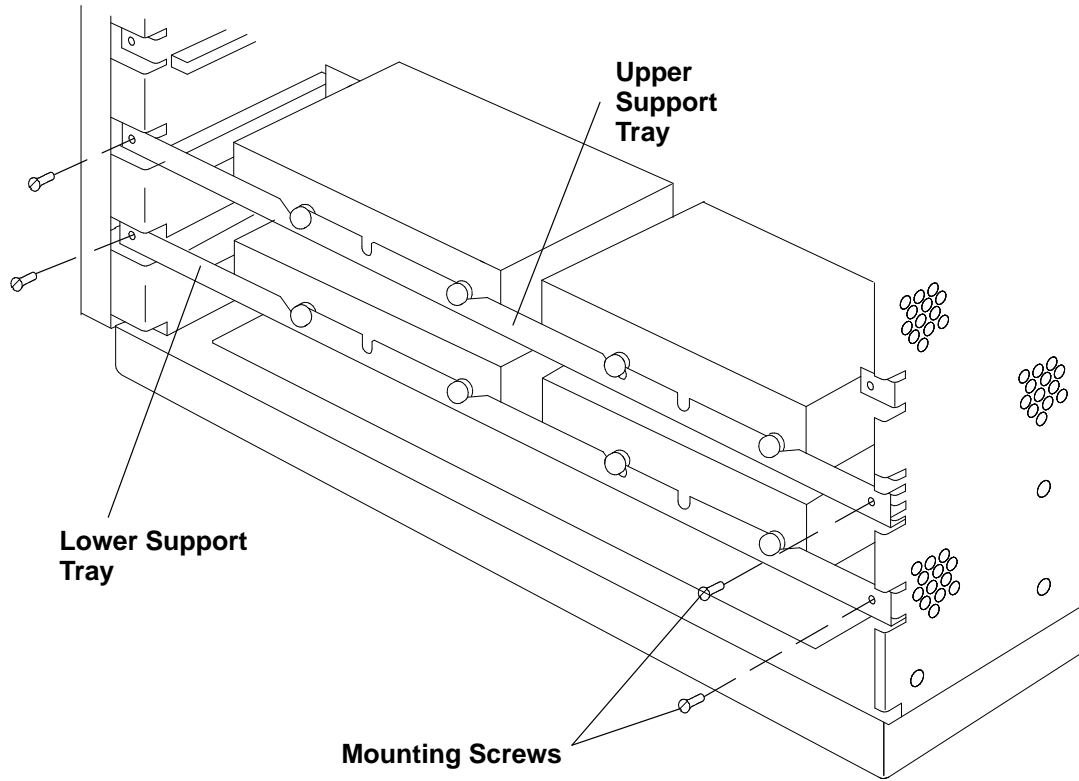


4. Lay the disk drive, that you are installing, on the support tray in the dedicated position. The power connectors of the disk must be kept on the right, that means the disk must be installed with the power connectors toward the front of the unit.
5. Replace the four mounting screws holding the drives to the support tray.



6. Align the support tray with its guides and slide it inside the system unit.
7. Connect the internal SCSI cable to the SCSI controller, if necessary.
8. Connect the power supply connectors and the signal cable to the drives. See page 3-12 for a cable routing diagram.

9. Replace the mounting screws that anchor the disk drive support tray to the system unit frame.



10. Replace the top cover and the bezel, following the procedures described in "Top Cover" on page 3-5 and "Bezel" on page 3-3.
11. Perform the power-on procedure in *Chapter 4. Removal and Replacement Procedures* in the *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.

Media Devices

Notes:

1. For a translation of this notice, see *System Unit Safety Information*.
2. This caution only applies to the CD-ROM drive.

CAUTION:

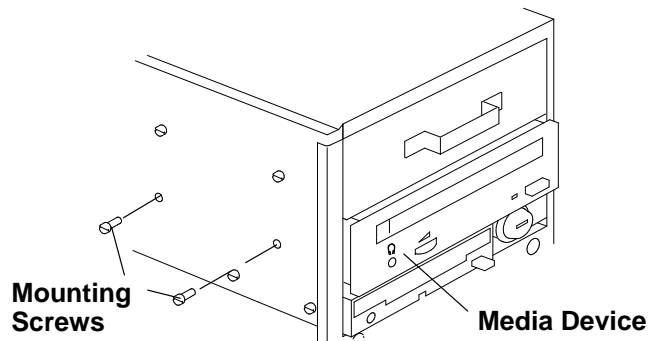
A class 3 laser may be contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive as it is not serviceable and is to be replaced as a unit.

Note: Before removing the device from the unit, make sure that it does not contain any removable media.

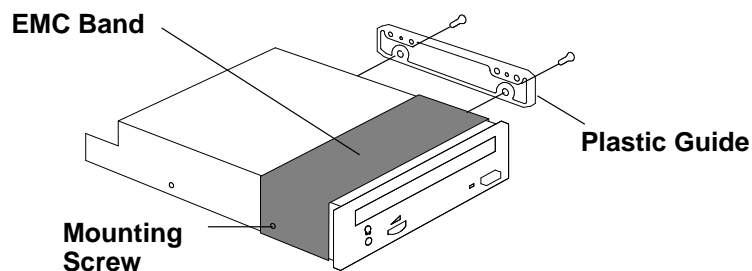
This procedure also applies to the 3.5-inch disk drives in the slots dedicated to the media devices in the expansion units.

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures in the 7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in "Bezel" on page 3-3 and "Top Cover" on page 3-5.
3. Disconnect the power cable and the SCSI cable from the media device.
4. Remove the mounting screws, located on the left side of the system, from the device, then gently pull it out of the slot.



5. Record the settings of any jumpers and/or switches.
6. Remove the mounting screws for the plastic guide from the device.

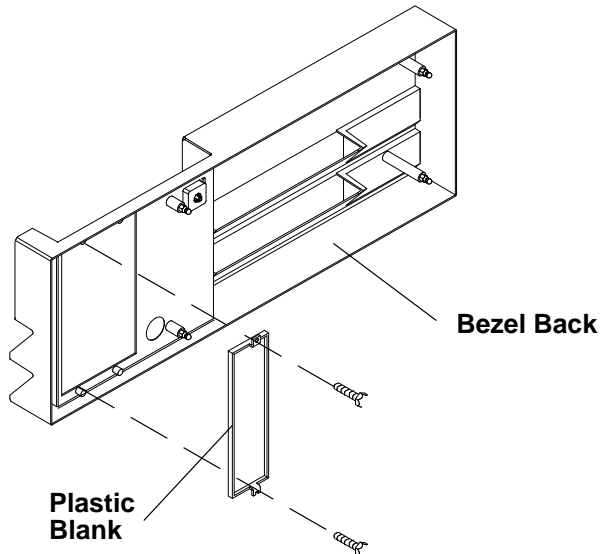


7. Remove the mounting screws for the EMC band, if installed, from the device. (The EMC band will be installed on the new device using these mounting screws.)

8. Remove the SCSI cable interposer from the SCSI connector of the device.

Replacement

1. If you do not replace the device just removed with any other device, install the plastic blank in the area corresponding to the free slot. Access the bezel from its back side and hold the plastic blank front side facing forward as you secure the plastic blank to the bezel by tightening the mounting screws.

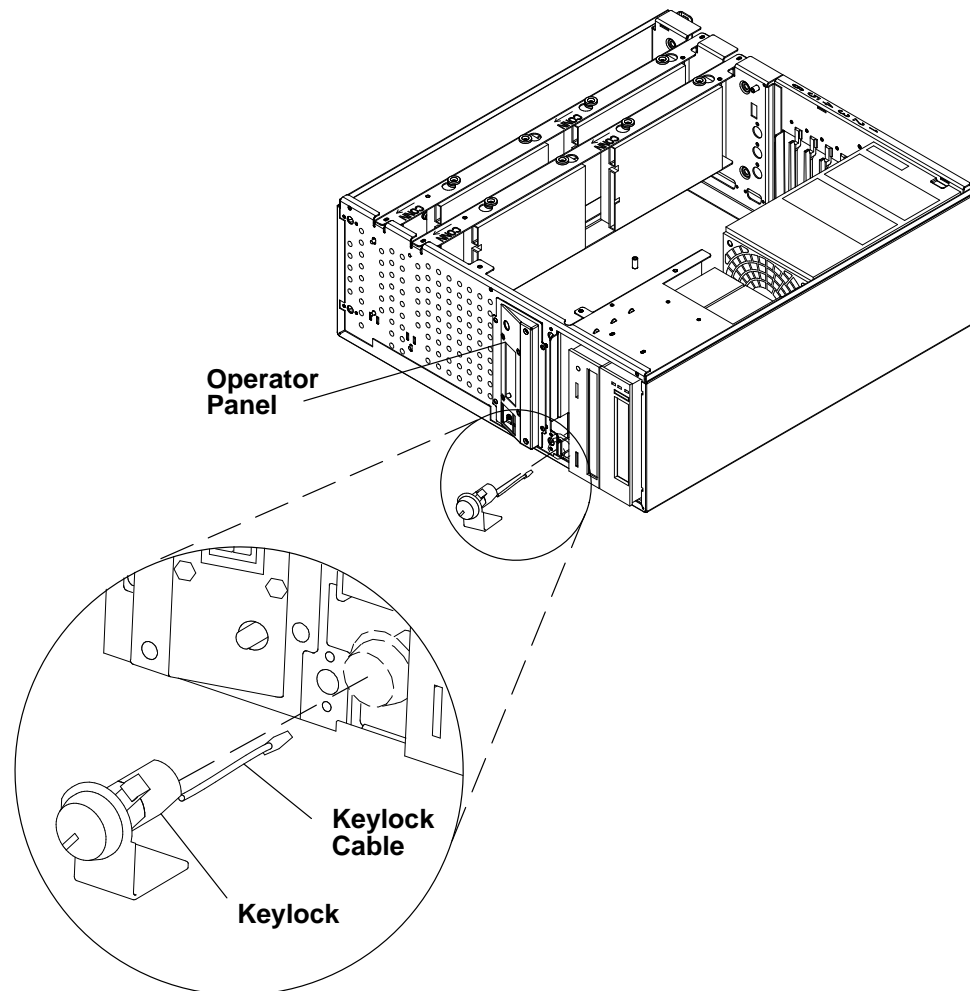


2. Replace the SCSI cable interposer in the SCSI connector of the device.
3. Install the EMC band on the device.
4. Install the plastic guide.
5. Adjust the setting of any jumper and/or switches to match the device you are replacing.
6. Gently push the device into the appropriate slot and secure it in place with the mounting screws.
7. Connect the power cable and the SCSI cable to the media device.
8. Replace the top cover and the bezel, following the procedures described in "Top Cover" on page 3-5 and "Bezel" on page 3-3.
9. Perform the power-on procedure in *Chapter 4. Removal and Replacement Procedures* in the *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.

Key Lock

Removal

1. Perform the power-off procedure in *Chapter 4. Removal and Replacement Procedures* in the *7015 Model R30, R40, and R50 CPU Enclosure Installation and Service Guide*.
2. Remove the bezel and the top cover, following the procedures described in “Bezel” on page 3-3 and “Top Cover” on page 3-5.
3. Remove the retaining screw used to secure the key lock to the unit. The screw is positioned to the left of the key lock, near the ECB card. If necessary, remove the ECB card for easier access to the retaining screw.
4. Unplug the keylock cable from the operator panel.
5. Remove the key lock, by pulling it out from the front side of the unit.

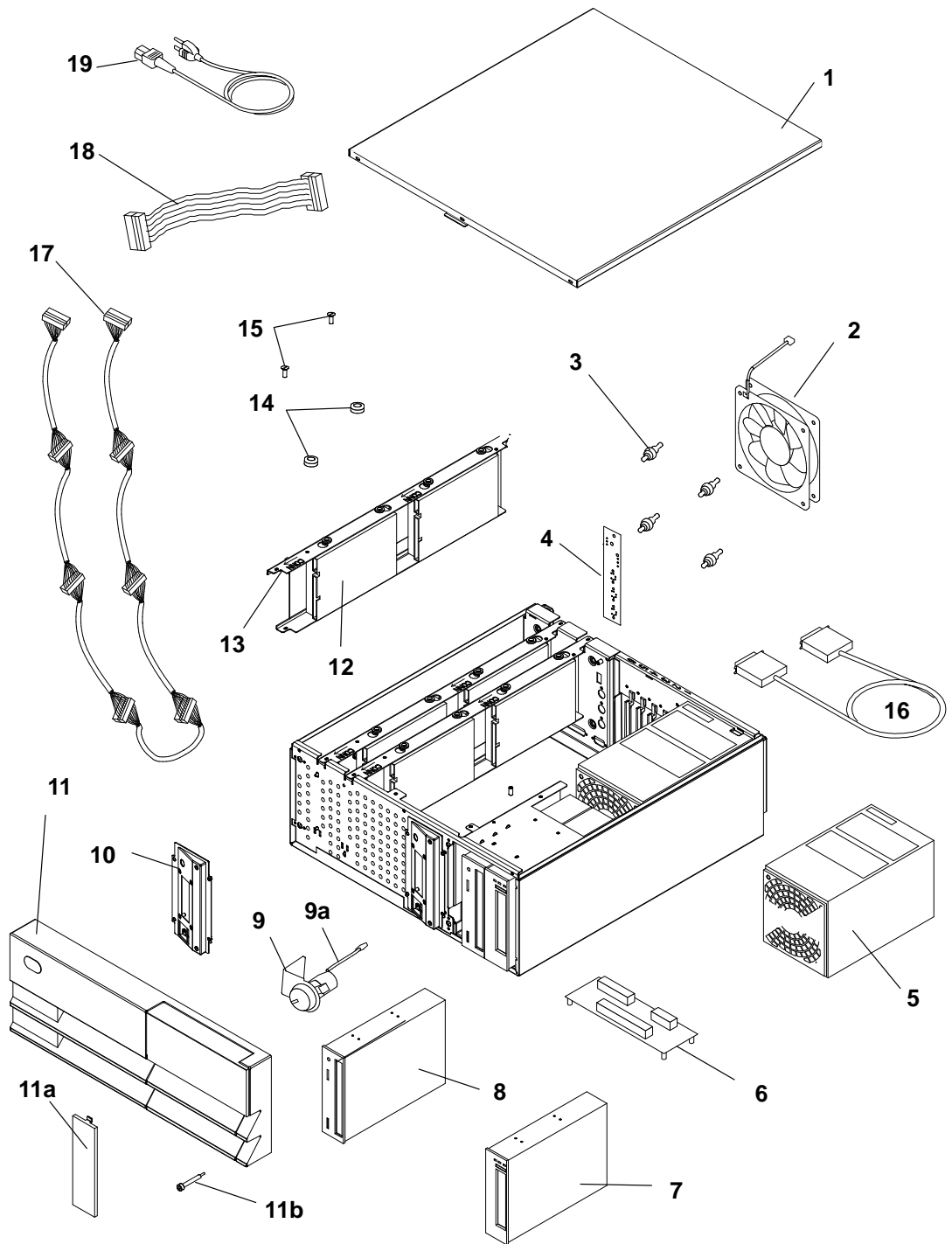


Replacement

Replace in the reverse order.

Chapter 4. Parts Information

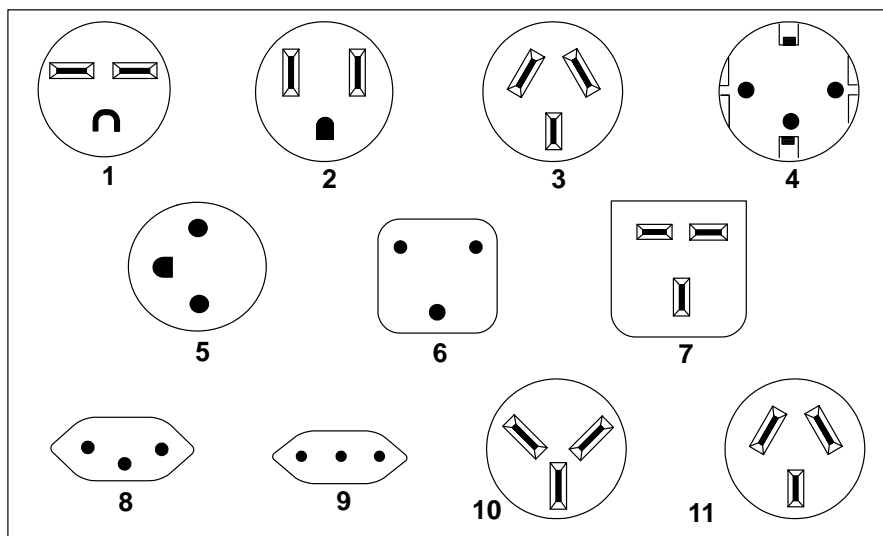
7012 Model G02 Expansion Rack Parts Listing



Index Number	Part Number	Units per Asm	Description
1	52G0241	1	Top cover
2	11H3884	1	Fan, rear
3	81F7977	4	Shock mounts
4	88G4461	1	RS-485 Interface
5	52G4020	1	Power supply
6	11H7538	1	ECB card assembly
7	See Note	1	CD-ROM drive
8	See Note	1	Tape drive
9	52G0252	1	Locking mode keylock
	52G0254	1	Non-locking mode keylock
9a	11H7687	1	Mode switch and cable
10	11H3904	1	Operator panel
11	11H8279	1	Bezel
11a	41F0636	0-2	Bezel blank
11b	40H2723	1	Bezel retaining screw
12	See Note	1-6	Drive assembly, disk
13	11H7658	1-2	Bracket (disk drive support tray)
14	00G3272	4-16	Bushing
15	316807	4-16	Screw
16	52G9501	1	External SCSI cable (expansion unit)
17	11H3930	1	Internal SCSI cable (expansion unit)
18	11H3629	1	Internal RS485 cable (expansion unit)
19	42F6841	1	Power cord (rack PDU to G02 expansion unit)
<p>Note: See the "Failing Function Codes" and "FRU Cross References" chapters in the <i>Diagnostic Information For Micro Channel Bus Systems</i> for part numbers.</p>			

Power Cables

Note: The rack PDU to G02 expansion unit power cable is shown on page 4-2. If you should need a different power cable, use this figure and the following table to assist you when ordering.



Index	Part Number	Country
1	1838574	Bahamas, Barbados, Bolivia, Brazil, Canada, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Netherlands Antilles, Panama, Peru, Philippines, Taiwan, Thailand, Trinidad, Tobago, U.S.A. (except Chicago), Venezuela
2	6952300	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Saudi Arabia, Suriname, Trinidad, Taiwan, U.S.A. (except Chicago), Venezuela
2	62X1045	Chicago, U.S.A.
3	6952311	Argentina, Australia, New Zealand
4	13F9979	Abu Dhabi, Austria, Belgium, Bulgaria, Botswana, Egypt, Finland, France, Germany, Greece, Iceland, Indonesia, Korea (South), Lebanon, Luxembourg, Macau, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sudan, Sweden, Turkey, Yugoslavia
5	13F9997	Denmark
6	14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
7	14F0033	Bahrain, Bermuda, Brunei, Channel Islands, Cyprus, Ghana, Hong Kong, India, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Arab Emirates (Dubai), United Kingdom, Zambia
8	14F0051	Liechtenstein, Switzerland
9	14F0069	Chile, Ethiopia, Italy
10	14F0087	Israel
11	6952291	Paraguay, Colombia, Uruguay

Glossary: Special Terms Used in SystemGuard

BP (back plane). A panel located in the system unit and used to interconnect boards and devices.

BIST (built in self-test). Tests performed during the standby phase of the IPL process. The BIST phase comes ahead of the POST phase.

BUMP (bring-up microprocessor). A microprocessor which monitors the system, especially during the various IPL phases before AIX is loaded.

C1D card. See CPU card.

CPU card. A card containing the central processor unit (CPU). **CPU n** is used to designate the n th CPU card. For example, CPU2 designates the second CPU card.

CPU (central processor unit). A primary processor for general calculations.

DIMM (dual in-line memory module).

Electronic Mode Switch (also known as **E_KEY**). A flag which enables the Key Mode Switch to be changed without actually moving the physical key.

EEPROM (electronically erasable programmable read-only memory). A type of non-volatile memory used to store firmware maintenance programs (like SSF) or boot programs.

FEPRM (flash electronically erasable programmable read-only memory). A type of non-volatile memory used to store firmware maintenance programs (like SystemGuard) or IPL programs.

E_KEY. See **Electronic Mode Switch**.

ELM. See I/O planar

FFC (failing function code).

FRU (field replaceable unit).

I2C (inter integrated circuit). Special circuits used to connect devices to a high-speed bus called the I2C bus.

IOD. See I/O card.

I/O: Input /Output.

I/O card. A card which handles system I/O and directly connects to the system planar.

IPL (initial program load). The first phase of the system program loading.

JTAG (join test action group).

LCD (liquid crystal display). A low power display screen. There is a small LCD screen on the operator panel.

MCA (Micro Channel adapter). An adapter for the micro channel bus.

MCA Planar. A card with connectors for Micro Channel adapter cards.

MPE. A type of memory card.

MR2. A memory card with 8 8MB SIMMs.

MR4. A memory card with 8 32MB SIMMs.

MVR (multivoltage regulator). A power supply unit which regulates several voltage levels for various system parts (disks, CPUs, memory chips).

NFx. A type of memory card.

NVRAM (non volatile random access memory).

MP. The MCA planar located in the base unit.

MPB. See System planar.

MPe. The MCA planar located in the expansion unit.

PMA. See MP.

PME. See MPe.

POS (programmable option select). POS registers are used to specify MCA board options.

POST (power-on self-test). Tests performed during the initial phase of the program load process. The BIST phase comes ahead of the POST phase.

RDS (removable disk status). The status information for a removable disk drive (a disk drive which can be removed without turning the power off to the entire system).

ROS (read-only storage). Storage which does not support writing.

SCSI (small computer system interface). A standard bus interface used to connect peripherals such as disk drives or tape drives.

SIB (system interface board). The SIB is a system board which controls the power supply and the RS-485 interconnect bus.

SIMM (single in-line memory module).

SMP. Symmetric multiprocessor.

SRN (service request number).

SSBus (subsystem bus). A special bus used to interconnect the BUMP and some local resources such as the EEPROM, the flash EEPROM, and the non-volatile RAM.

SSF (system service facility). See SystemGuard.

SYSID (system identification). Identifies part of the EEPROM containing important data such as the system serial number, remote access rights, dial-out phone numbers, and other information.

SystemGuard. The firmware maintenance programs which run on the bring-up microprocessor (BUMP). It enables an operator to manage power supplies, check system hardware status, update various configuration parameters, investigate problems, and perform tests.

VPD (vital product data). Certain vital product data (VPD), such as the product serial number and status information, is stored on each board.

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