XR900 Series
Mass Storage Subsystem
User's Manual

MCPIOSA/UM2

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Motorola, Inc.
Computer Group
2900 South Diablo Way
Tempe, Arizona 85282

Preface

This manual provides general information, hardware preparation, installation instructions and support information for the XR900 Series mass storage subsystem, an SCSI peripheral expansion enclosure designed for use with Modular VME System chassis. The Modular VME System is a family of system enclosures that are configurable with a variety of card cage, storage drive, and power supply options.

This manual is intended for anyone who wants to design OEM systems, supply additional capability to an existing system, or use the equipment in a lab environment for experimental purposes.

A basic knowledge of computers and digital logic is assumed.

Technical knowledge of energy and voltage hazards present in line-connected electronic equipment is assumed.

To use this manual, you may need to be familiar with the publications listed in the *Related Documentation* section in Chapter 1 of this manual.

If any modifications are made to an XR900 Series chassis, the modifier assumes responsibility for radio frequency interference issues. If any payload installed in a Modular System (including the XR900 enclosure) is not totally supported by Motorola, the integrator assumes responsibility for radio frequency interference.

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Safety Summary
Safety Depends On You

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Motorola, Inc. assumes no liability for the customer's failure to comply with these requirements.

The safety precautions listed below represent warnings of certain dangers of which Motorola is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument.

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. The equipment is supplied with a three-conductor ac power cable. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter, with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

Do Not Operate in an Explosive Atmosphere.

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep Away From Live Circuits.

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Do Not Service or Adjust Alone.

Do not attempt internal service or adjustment unless another person capable of rendering first aid and resuscitation is present.

Use Caution When Exposing or Handling the CRT.

Breakage of the Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, avoid rough handling or jarring of the equipment. Handling of the CRT should be done only by qualified maintenance personnel using approved safety mask and gloves.

Do Not Substitute Parts or Modify Equipment.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local Motorola representative for service and repair to ensure that safety features are maintained.

Dangerous Procedure Warnings.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.

WARNING Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

WARNING

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.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe "A" prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

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General Information 1

Introduction

This manual provides general information, hardware preparation and installation instructions, removal/replacement procedures, operating instructions, and support information for the XR900 series SCSI standalone peripheral expansion enclosure. Throughout the rest of this manual, this enclosure may be referred to as the XR900, or simply as the enclosure.

General Description

The XR900 is a member of the Modular VME System, a family of standard chassis building blocks that can readily be adapted and recombined to meet the needs of standard system customers, component-level chassis customers, and buyers of special system configurations for technical, industrial, and telecommunications applications. Although the XR900 can be operated with any SCSI-compatible host, it is used most effectively with other Modular VME System units.

Modular Chassis

The Modular Chassis ‘‘building block’’ approach supports a variety of options in enclosure layout, payload composition, power requirements, and system installation. 20-, 12-, and dual 9-slot card cages are available with such features as:

- Support for a variety of VMEmodules and storage drives
- AC or DC power supplies
- Convenient front access to VMEmodules, fans, mass storage drives, power supplies, and control boards
- Adaptability to floor, rack, or mast installation

XR900 Enclosure

For base chassis that have no built-in drive bays (e.g., the 20- and dual 9-slot versions) or for applications that require additional storage capacity in a mix of 5 1/4-inch and 3 1/2-inch drives, integral and standalone SCSI peripheral expansion enclosures are available. The integral enclosure is described in the *Modular VME System Chassis User's Manual*. The standalone unit (the XR900 enclosure) is presented here.

There are two versions of the XR900 enclosure: the Single Ended XR900 and the Differential XR900. The Single Ended version accommodates 3 1/2-inch and 5 1/4-inch SCSI storage devices, such as hard disk drives, floppy disk drives, streaming tape drives, or CD-ROM devices, as follows:

- Two bays for 3 1/2-inch hard disk drives
- Two bays for 5 1/4-inch or 3 1/2-inch removable-media devices

The Differential version accomodates 3 1/2-inch and 5 1/4-inch differential SCSI hard disk drives as follows:

- Two 3 1/2-inch drive bays for differential hard disk drives
- Two 5 1/4-inch drive bays for differential hard disk drives

Note The differential enclosure only supports differential hard drives.

The XR900 is adaptable to both rack / mast and pedestal installations. It is equipped with its own power supply, available in versions for –48Vdc as well as for 115 / 230Vac inputs. For proper airflow and regulatory compliance, a front bezel is supplied as standard equipment for the enclosure.

The XR900 chassis is linked to its controller or host computer (the associated Modular Chassis system) by an SCSI cable and (if the environmental monitor function is to be used) an RJ45 cable. All

data transfers and control processes, including the switching of the XR900 power supply on and off, occur under the control of the host computer.

Note In applications involving a dual 9-slot system (Modular Chassis model MC1209), the XR900 chassis serves one side or the other, but not both at once.

The mass storage drives and power supplies are described in detail in separate publications. Refer to the *Related Documentation* section of this chapter for their titles and publication numbers.

The following sections present an overview of the XR900 enclosure's major assemblies.

Expansion Chassis

The expansion chassis houses the drive enclosure. A backplane located in the rear distributes DC power and interfaces SCSI signals to the drives. Power is furnished by a 100W AC or DC power supply located beside the drive enclosure.

Note Temperature and humidity limits are determined primarily by tape and disk drives. Broader temperature and humidity limits may be possible, depending on the characteristics of the specific drives installed in the enclosure.

Power Supply

DC power to the XR900 drives and fan assembly comes from a UL / CSA / VDE-approved 100W autoranging power supply module. Power supply modules are available in both –48Vdc- and 115 / 230Vac-compatible versions, each providing +5Vdc and

Table 1-1. XR900 Enclosure Specifications

Characteristics	Specifications
Physical characteristics	
Height	5.25 in. (133 mm)
Width	19.0 in. (483 mm) w/o flange extensions 23.0 in. (584 mm) with flange extensions
Depth	13.5 in. (343 mm) with bezel
Weight (fully loaded)	25 lb. (11.4 kg)
Temperature	
Operating	0˚ to 50˚ C (32˚ to 122˚ F)
Storage and transit	–40˚C to 70˚C (–40˚ to 158˚ F)
Relative humidity	
Operating	20% to 80% noncondensing
Storage and transit	10% to 95% noncondensing
Altitude	
Operating	0 to 10,000 feet (3048 m)
Storage and transit	0 to 30,000 feet (9144 m)

+12Vdc to the enclosure. The power supply module is installed next to the drive enclosure and is cooled by the air drawn through the expansion chassis.

The AC or DC input to the power supply is through a power cord or terminal block connection at the rear of the chassis. The power supply plugs into the SCSI backplane for power distribution to the mass storage drives.

The power supply modules are not adjustable when they are installed in the XR900 enclosure. If you suspect that a power supply may be out of adjustment, replace it with a known good power supply.

SCSI Backplane

The XR900 mass storage drives and power supply plug into an SCSI backplane mounted behind the drive enclosure. The backplane provides:

Table 1-2. XR900 Power Supply Specifications

Characteristics	Specifications
Physical characteristics	
Height	4.0 in. (102 mm)
Width	2.4 in. (61 mm)
Length	9.0 in. (229 mm)
Temperature	
Operating	0˚ to 50˚ C (32˚ to 122˚ F)
Storage and transit	–55˚ to 85˚ C (–67˚ to 185˚F)
Relative humidity	0% to 90% noncondensing
Altitude	
Operating	0 to 10,000 feet (3048 m)
Storage and transit	0 to 30,000 feet (9144 m)
Power ratings	
Input voltage (DC)	–36Vdc to –76Vdc
Input voltage (AC)	90-132Vac, 190-260Vac, 47-63Hz
Output voltages	+5Vdc @ 5A +12Vdc @ 8A (10A peak)
Output power	100W maximum (total from all outputs)

- Support for four SCSI mass storage drives (the two left-hand bays accommodate 3 1/2-inch hard disk drives; the two right-hand bays accommodate 5 1/4-inch or 3 1/2-inch removable-media drives)

Note The differential enclosure only supports four differential hard drives.

- All drive power connections and SCSI signal lines for the above devices

Table 1-3. SCSI Backplane Specifications

Characteristics	Specifications
Physical characteristics	
Height	4.1 inches (104mm)
Width	11.6 inches (295mm)
Thickness	0.062 inches (1.58mm) typical
Temperature	
Operating	0˚C to 55˚C (32˚F to 131˚F)
Storage and transit	–55˚C to +85˚C (–67˚F to 185˚F)
Relative humidity	0% to 90% noncondensing
Power consumption (without drive modules)	0.5W-1W (0.1A-0.2A at +5V)
SCSI sockets	DIN 64CSB, 96-pin. Socket spacing (center to center) 0.1 inch.

Safety and Regulatory Compliance

All systems integrated by Motorola meet the standards claimed for those systems with regard to electromagnetic interference (EMI) and radio frequency interference (RFI). It is possible, however, to install drives in the XR900 enclosure that produce a Modular Chassis system not in compliance with the applicable emission limits. It is the integrator's responsibility to design a payload that does meet the desired standards.

When Motorola integrates a payload into a Modular Chassis system (including the XR900 enclosure), it is often necessary to modify the payload in order for the system to pass RFI standards. The following is a list of conditions that in general must be met for the XR900 to achieve FCC compliance as a component of a Modular Chassis system:

- At a minimum, the chassis should be connected to earth ground through the safety ground wire in the power cord. Where feasible, the chassis ground connection on the back of the card cage ($^1/_4$ x 20 thread) should be used as well. These provide a path for connecting shields to earth ground.
- All external I/O cables should be high-quality shielded types with metal shell connectors.

For minimum RF emissions, it is essential that the foregoing conditions be implemented. Failure to do so could compromise the FCC compliance of all payloads.

This product, as configured and shipped by Motorola, has been designed and tested for compliance with the following RFI standards and product safety regulations:

- Emissions: FCC class A; Vfg 243/1991, Vfg 46/1992, class B
- Safety: UL 1950; CSA C22.2/950; VDE EN 60 950; IEC 950

Related Documentation

The Motorola publications listed below are referenced in this document. If not shipped with this product, they may be purchased by contacting your local Motorola sales office. Non-Motorola documents may be obtained from the sources listed.

Document Title	Publication Number
Disk / Tape Drive Reference Sheets	MDRIVE
Power Supply Reference Sheets	MPWRSUP

Note Although not shown in the above list, each Motorola Group manual publication number is suffixed with characters which represent the revision level of the document, such as " / D2" (the second revision of a manual). A supplement to a manual bears the same number as the manual but has a suffix such as " / D2A1" (the first supplement to the second edition of the manual).

The following publication is available from the source indicated:

ANSI Small Computer System Interface-2 (SCSI-2), Draft Document X3.131-198X, Revision 10c; Global Engineering Documents, P.O. Box 19539, Irvine, CA 92714.

Manual Terminology

An asterisk (∗) following the name of a level-significant signal indicates that the signal is true or valid when the signal is low.

An asterisk (∗) following the name of an edge-significant signal indicates that the actions initiated by that signal occur on a high-to-low transition.

Hardware Preparation and Installation 2

Introduction

This chapter includes hardware preparation and installation directions for the XR900 enclosure. Directions for installing or replacing the various subassemblies are in the Removal/Replacement procedures in Chapter 5.

Mounting Options

A Modular VME System can be rack-mounted, mast-mounted (as in a telecommunications environment) or set up in a floor-standing pedestal configuration. The system may include multiple chassis components, which interconnect vertically with a latching mechanism.

As a member of the Modular VME System, the XR900 is adaptable to both rack/mast and pedestal installations. For proper airflow and regulatory compliance, a front bezel is supplied as standard equipment for the enclosure.

Hardware Preparation

There are a number of items to check or tasks to perform before you apply power to the enclosure. These items include, but are not limited to, the items summarized in Table 2-1.

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

Caution

Unless otherwise instructed, perform all hardware preparation and/or installation with power disconnected. Installing or removing hardware items (drive modules, cables, etc.) while power is applied may damage the equipment.

Table 2-1. Hardware Preparation Items

Item	Location of Instructions
Setting jumper options on drive modules used in this chassis (as required)	User's manual for the respective drive module(s)
Installing drive modules	User's manual for the respective module(s)
Installing external cables (as required)	Installation instructions in this manual, also other user's manual(s) as applicable
Mounting chassis in rack, on mast, or on pedestal	Installation instructions in this chapter

Rack/Mast Mounting

The XR900 chassis, like other Modular Chassis system enclosures, can be installed without modification in a standard 19-inch RETMA (or equivalent) equipment rack. With minor modifications, it can also be installed on a 19-inch mast (as in telecommunications installations), or in a 23-inch rack or mast. The procedure is the same in all cases. To rack- or mast-mount the chassis, proceed as follows:

1. Remove the blank bezel from the desired rack mounting location, if a bezel is installed.
2. Remove the bezel from the XR900 chassis, if a bezel is installed.

3. Determine the width of the rack or mast and, if necessary, attach a pair of mounting flanges to the sides of the chassis in the appropriate locations. Flanges for the right and left sides are identical.
   - For 19-inch rack mounting, use the existing flanges formed in the sheet metal at the forward corners of the chassis.
   - For a 19-inch mast installation, mount a set of flanges at the center (see Figure 2-1), narrow side out.
   - For a 23-inch rack or mast installation, mount the flanges wide side out (at the forward corners for a rack, at the center for a mast).

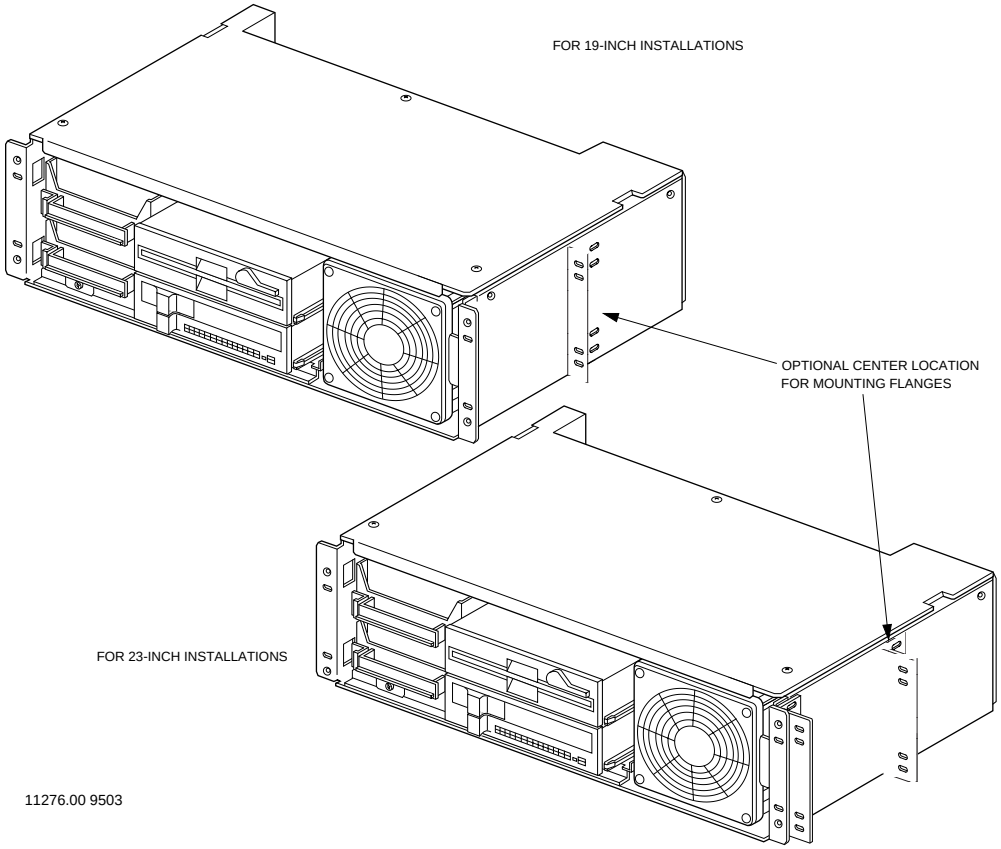

Figure 2-1. Flange Installation on the XR900 Chassis

4. Remove the side and back panels of the rack as necessary to gain access to the interior for chassis installation.

Caution

The next two steps are a two-person operation.

5. Position the chassis in the selected rack bay or mast location and align the slots in the chassis flanges with the corresponding holes in the frame rails of the rack or mast.
6. Install screws at those locations to secure the chassis in position.
7. Reinstall the front bezel on the XR900 chassis.

Pedestal Mounting

The XR900 chassis, like the integrated SCSI peripheral expansion chassis described in the *Modular VME System Chassis User's Manual*, can be mounted directly atop the Modular Chassis in a pedestal configuration. It can also be installed on top of an existing integrated peripheral expansion chassis in a pedestal configuration. Although the XR900 uses no guide pins and (unlike the integrated chassis) receives power through an external cord rather than from the VME card cage, the pedestal installation procedure is similar. To pedestal-mount the XR900 chassis, proceed as follows:

1. Switch all Modular Chassis power to STANDBY and disconnect the power cord(s) from the AC or DC power source:
   – If the power supply is an AC unit, unplug the power cord from the AC outlet.
   – If the power supply is a DC unit, turn off the –48Vdc power source and disconnect the DC leads from the power supply input.

2. Remove the Modular Chassis pedestal cover by removing the two screws at the back edge of the cover and sliding it off the chassis.

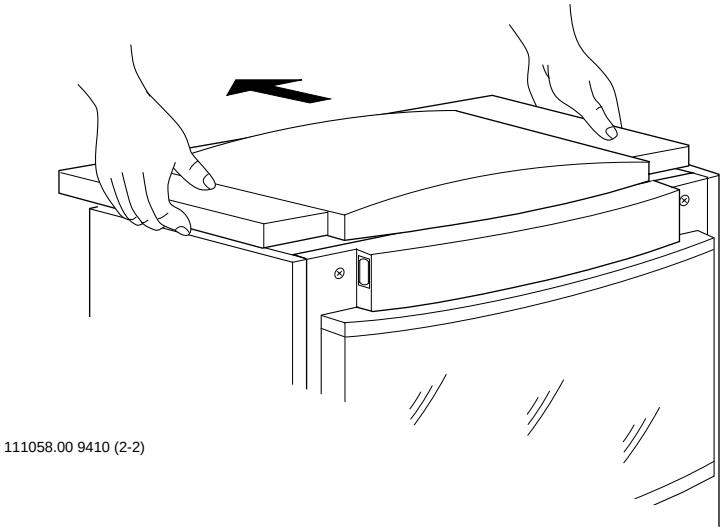

Figure 2-2. Pedestal Cover Removal

3. Remove the bezel from the XR900 chassis, if a bezel is installed.

4. Remove the bezel and side panels from the supporting pedestal unit.
   – If the XR900 is to be mounted on an existing integral SCSI peripheral expansion chassis, remove the bezel and side panels from that enclosure. The bezel and panels on the Modular Chassis underneath can be left in place.

– If the XR900 is to be mounted directly on a Modular Chassis enclosure, remove the bezel and side panels from that enclosure.

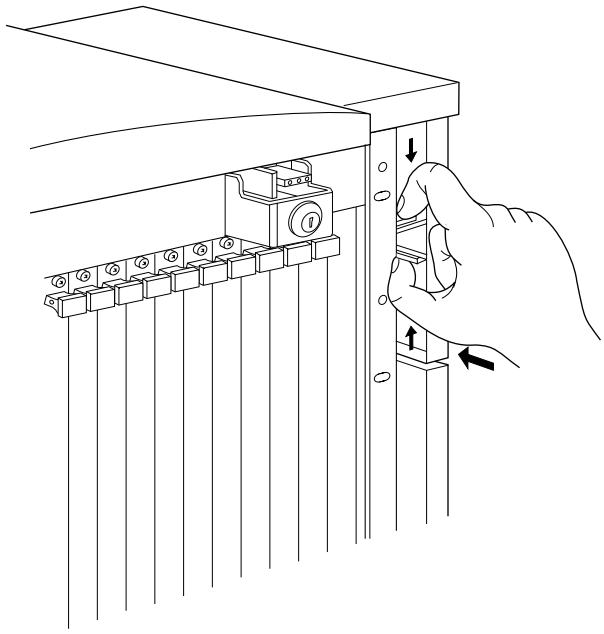

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Figure 2-3. Side Panel Removal

5. Remove the stacking brackets from the top section of the supporting pedestal unit.
6. Place the XR900 chassis on top of the pedestal unit. Fasten the XR900 to the pedestal unit with the stacking brackets removed in the preceding step.
7. Install a second set of stacking brackets (supplied with the chassis) on the upper section of the XR900.
8. Reinstall the bezel and side panels removed from the supporting pedestal unit in step 4.

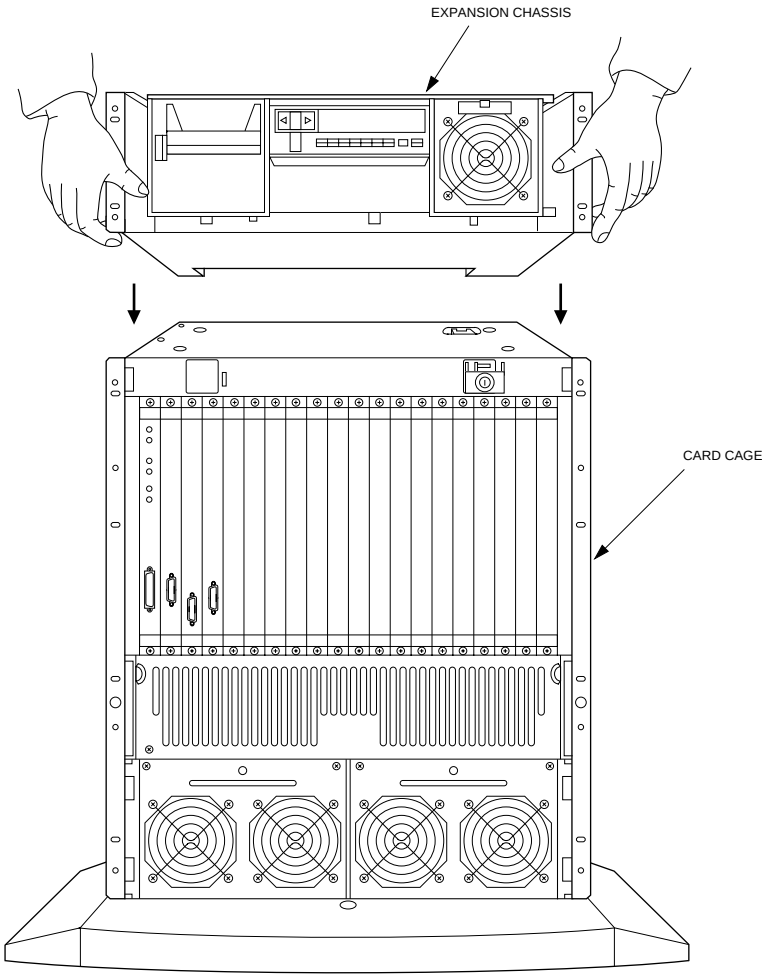

Figure 2-4. Installing XR900 Chassis

9. Install the bezel and side panels supplied with the XR900 chassis on the XR900.

10. Install the pedestal cover removed in step 2 on the XR900.

2

Cabling

After you have completed the rack or pedestal installation of the XR900 chassis and associated equipment, proceed as follows to cable the hardware together.

Note All rack cabling should be contained within the rack bay. Cabling to external peripheral equipment should be routed through the rear panel of the rack.

Data/Control Cables

1. Attach one end of an SCSI cable to the lower of the two 68-pin connectors labeled SCSI on the back of the XR900 chassis (Figure 2-5).

Note For the differential enclosure, make sure the cabling is connected to a differential controller.

2. Locate the upper SCSI connector on the back of the existing integral SCSI peripheral expansion chassis (if one is present) or the appropriate SCSI connector on the back of the Modular Chassis. Remove the terminator block and plug the other end of the SCSI cable into that connector.
3. Move the terminator block to the unused upper SCSI connector on the XR900 chassis.

Note On the differential enclosure, you must use a differential terminator.

4. To connect the environmental monitor circuitry, attach an RJ45 cable to the lower of the two RJ45 connectors (identified

with a ‘‘no telephone’’ graphic) on the back of the XR900 chassis.

5. Plug the other end of the cable into the upper RJ45 connector on the back of the existing integral SCSI peripheral expansion chassis (if one is present) or into the appropriate RJ45 control board connector on the back of the Modular Chassis.
6. Cable all other associated equipment (terminals, printers, etc.) to the system as described in the installation guides for those peripherals.

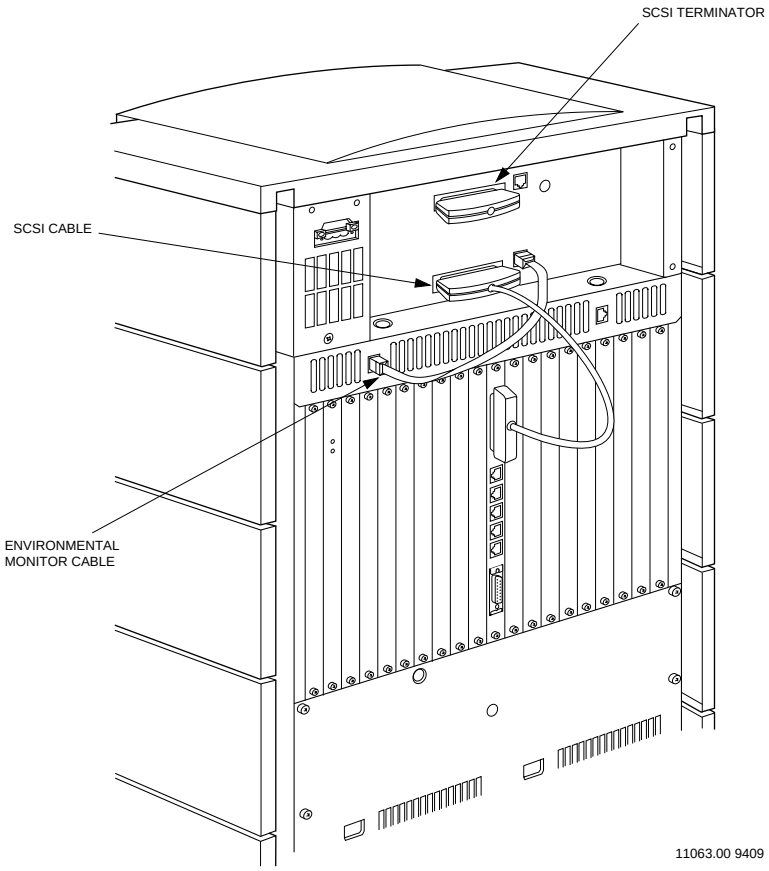

Figure 2-5. SCSI and Environmental Monitor Connections

Power Cables (AC Chassis)

1. Plug the socket end of the XR900 power cord into the AC power inlet located on the upper back panel.
2. Plug the socket end of the Modular Chassis power cord into the AC power inlet located on the lower back panel.
3. Plug the socket end of the console terminal's power cord into the AC power inlet on the back of the terminal.
4. Attach power cords to all other associated equipment.
5. Plug the power cords into appropriate electrical outlets (if any of the equipment is rack-mounted, the rack may be equipped with power distribution modules).

Power Cables (DC Chassis)

1. Power down the –48Vdc supply.

Caution

Use a –48Vdc supply source that is electrically isolated from the main DC source. The –48Vdc source is to be reliably connected to earth.

2. Guide the free end of a DC power cable, with about 1/2 inch of insulation stripped from the wires, to the terminal block supplied with the XR900 DC chassis. Clamp the DC leads (positive, negative, and ground) to the terminal block as illustrated in Figure 2-6.

Caution

The connection to DC power consists of three #10 AWG wire leads. To avoid grounds or shorts, exercise care when securing the wires to the terminal block.

Note For additional protection if the conditions of the site call for it, you may wish to also use the chassis ground point on the rear wall of the unit (the GND connection with a 1/4 x 20 thread located to the right of the upper set of SCSI and RJ45 connectors). This ground point is to be connected to the equipment rack or other reliable path to earth ground.

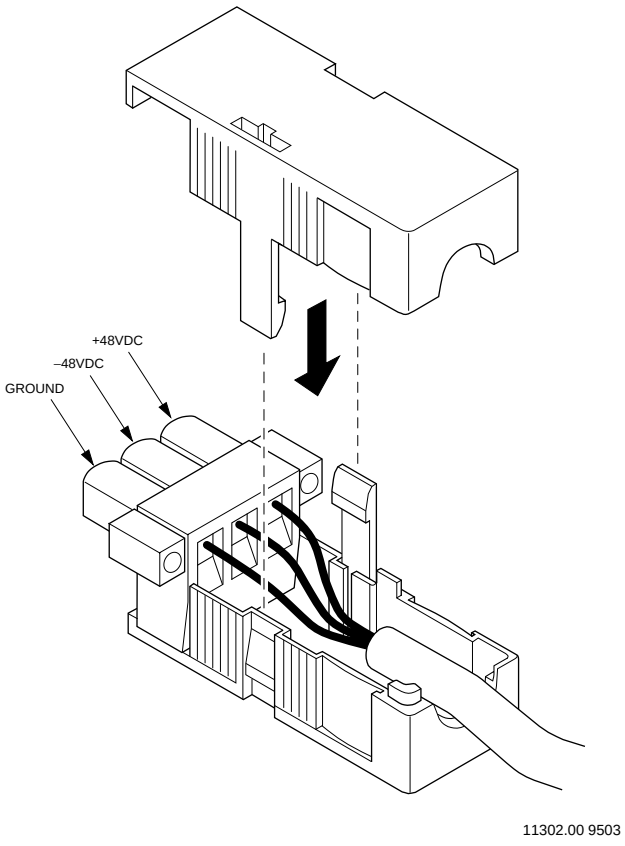

Figure 2-6. DC Terminal Block

3. Assemble the clam-shell connector housing around the terminal block as shown in Figure 2-6. Secure a length of Tyrap around the housing to reinforce the assembly.
4. Plug the assembled connector into the DC power inlet located on the upper back panel of the XR900.
5. If there is other equipment requiring DC power, cable those devices to the DC source as described in the associated installation guides.
6. For AC equipment such as the system console, plug the socket end of the unit's power cord into the AC power inlet on the back of the unit.
7. Plug the power cord of the console terminal (and any other AC equipment) into an electrical outlet.
8. Turn the DC power back on.

Power Supply Limit Considerations

The XR900 chassis, like the Modular Chassis, can be equipped with a power supply module accepting either –48Vdc or 115/230Vac inputs. The +5Vdc output is rated at 5A. The +12Vdc output is rated at 8A.

Caution

The system integrator must ensure that the installed peripheral devices do not exceed the power supply rating.

The current rating for the individual outputs must not be exceeded, and the total power supply output power must not exceed 100 watts.

2

Chassis Cooling Considerations

It is essential that all modules used in the system be properly cooled. The following information is supplied to help determine whether the cooling is adequate.

Modular Chassis equipment, including the XR900 chassis, is designed for an input air temperature below 50° C (122° F). The XR900's DC-powered fan provides forced-air cooling for the power supply module and mass storage drives. Cooling air is drawn in the front of the module and vented out through the lower back panel of the chassis.

Note that for tape storage media, a maximum safe temperature of 50° C (122° F) is specified. Since the operating temperatures within the chassis will always be greater than the air inlet temperature, avoid using tapes if the inlet temperature exceeds 40° C (104° F).

To provide adequate cooling:

- The air space behind the chassis must not be blocked, and the fan inlet screen must be clean.
- The air inlet temperature must not exceed 50° C / 122° F (or 40° C / 104° F if storage tapes are used). When the XR900 is installed in a rack with other chassis, be sure that each chassis in the rack is provided with its own supply of cooling air. Do not use air heated by one chassis to "cool" another chassis.
- In rack installations, the side and back panels of the rack must be in place. All unoccupied rack mount locations must be covered with blank bezels.

The system is designed for use in a relatively clean (office or lab) environment. To assure reliable operation in an industrial environment, you may need to provide protection against airborne particles and other contaminants, especially for the disk or tape drives and their associated media.

Operating Instructions 3

Controls and Indicators

This chapter describes the controls, indicators, and operating procedures for the XR900 chassis. Only those controls that are part of the base chassis configuration are described here; many of the mass storage modules used in the chassis are equipped with controls and / or indicators of their own. For a description of the controls and indicators on a specific module, refer to the user's manual for that module.

Overtemperature Indicator

The Overtemperature LED (located next to the SCSI connectors on the back panel of the XR900 chassis) turns on when the temperature sensor in the enclosure is not adequately cooled. At that point, Motorola-supported SCSI devices in the XR900 (and most other SCSI devices) are approaching their upper temperature limits but are not in danger of immediate damage. The sensor temperature is typically about 20˚ F above ambient temperature.

Test Switch

Near the SCSI connectors on the lower back panel of the XR900 chassis is a test switch, used for calibration purposes at the factory. The switch needs to be in the TEST position for the XR900 power supply to operate; flipping the switch disables the unit.

Environmental Monitor

An environmental monitoring function to track enclosure temperatures and operating voltages is incorporated into the Modular Chassis system design. The extent of coverage can be specified when the equipment is ordered.

In the Modular Chassis, power supply outputs and temperatures are always monitored. A backplane temperature sensor is available as an option; with the sensor installed, card cage temperatures are monitored as well.

The XR900 chassis has no power supply monitoring, but is equipped with a backplane temperature sensor. As long as the RJ45 cable is installed, XR900 temperatures are monitored along with Modular Chassis power supply voltages / temperatures and (optionally) card cage temperatures.

Temperature Monitoring Function

The Overtemperature LED on the front panel of the Modular Chassis indicates the presence of excessive operating temperatures within one or more of the following subassemblies:

- The Modular Chassis power supply
- The Modular Chassis card cage (if an optional backplane thermal sensor is installed)
- The integral and / or standalone SCSI peripheral expansion enclosures (if installed)

In addition, the XR900 enclosure has an Overtemperature LED of its own on the back panel.

Power Supplies

Two temperature thresholds exist in Modular Chassis system power supplies. In the event of a heat buildup beyond the lower threshold within a monitored power supply, thermal protection circuitry illuminates the Overtemperature LED on the front panel of the Modular Chassis.

Note If the XR900 is the location of the overtemperature condition, its Overtemperature LED also illuminates.

If temperatures climb further, beyond the higher threshold of maximum safe ratings, an ACFAIL signal is placed on the VMEbus and the affected power supply is shut down automatically.

At the lower threshold, Motorola-supported SCSI devices in the XR900 enclosure and most other SCSI devices are approaching their upper temperature limits but are not in danger of immediate damage. Several conditions can trigger the alarm:

- A failed fan in a warm environment
- Blocked airflow in or out of the enclosure
- An ambient temperature near the specified limits of the enclosure (50˚ C / 122˚ F)

The Overtemperature LED turns off when the cooling problem is corrected if the correction is made before the power supply sensor warms another 5˚ F to system shutdown. Powering down to correct a problem may not be necessary, because many failures are caused by nothing more than inadvertent blockages of the airflow. Prompt removal of a blockage allows recovery without a shutdown of system power. In general, power should not be removed from the system until a normal system shutdown is completed.

Other Subassemblies

In other parts of the system, temperature sensors provide only the lower threshold warning. As with power supplies, a heat buildup beyond the first threshold within a monitored subassembly illuminates the warning LED on the front of the Modular Chassis. If temperatures climb further, however, no power shutdown occurs.

Assemblies Monitored

In all cases, the temperature monitoring function covers:

- The Modular Chassis power supply
- The integral and / or standalone SCSI peripheral expansion enclosures (provided that the cables are installed)

If an optional backplane thermal sensor is installed, the temperature monitoring function also covers the Modular Chassis card cage.

Voltage Monitoring Function

Similarly, overvoltage protection circuitry monitors the power supply inputs and outputs. If the –48Vdc or 115 / 230Vac inputs of a monitored power supply go out of range, or if the +5Vdc output strays out of tolerance and remains so, the defective power supply is shut down automatically.

This function is confined to the Modular Chassis itself; voltage monitoring does not extend to the SCSI peripheral expansion enclosures.

Recovery

The surest way to reset the power distribution system after a shutdown triggered by the environmental monitor is to cycle the primary power (remove and reconnect the –48Vdc or 115/230Vac input power).

In systems with a redundant power supply, setting the key switch on the Modular Chassis to STANDBY and back to RUN after a thermal or undervoltage failure does restart the power supply, but requires that the operating system first be shut down.

Operating Procedures

System operation with a Modular Chassis and XR900 is entirely dependent on your choice of modules and software. Only the basic power on/power off procedure and remote interface are discussed here. For additional operational information, refer to the user's manual(s) for the modules used in the chassis.

Recommended Power-On Procedure

The XR900 has no power switch. The power supply cycles on and off under the control of the host computer (i.e., through application of the SCSI TERMPWR signal). The only fuse is in the power supply and if that fuse blows, it is advisable to replace the power supply.

1. Verify that all chassis, modules, and associated data/control cabling are properly configured and installed. If the system is rack-mounted, also check that all required external cabling (to non-rack-mounted equipment) is correctly installed.
2. On the Modular Chassis, verify that the power switch is set to STANDBY (off).

Note If the power switch is in the RUN position when the line cord is connected to a power source, the outputs of the Modular Chassis power supply cycle on immediately.

3. Verify that the Modular Chassis and the XR900 have been connected to a –48Vdc or 115/230Vac input power source (as appropriate to the installation and system configuration).

Caution The voltage on the rating label adjacent to the power receptacle must agree with the type of line cord and the applied voltage.

4. Insert the key and turn the Modular Chassis power switch to RUN (on).
5. If the system incorporates a dual 9-slot chassis, repeat steps 3 and 4 for System B.

   The fans run while power is on. The indicator LED on the front panel of each Modular Chassis power supply illuminates as long as the power supply remains connected to a –48Vdc or 115/230Vac input power source and is free of defects.

Caution To ensure adequate cooling, all fans in the system must be running. If any of the fans do not run, shut the system down and correct the problem before continuing.

6. When the system is operating correctly, remove the key to prevent tampering with the power switch.

Note Locking the system is not required, but is recommended to prevent accidental resetting or powering off.

XR900 Power Control

When the AC or DC power cord is attached at the upper left rear corner of the chassis and connected to an appropriate power source, DC power within the enclosure is controlled during normal operation through SCSI terminator power. When the host (the Modular Chassis) is powered up, the XR900 detects the presence of the TERMPWR signal and powers itself up in response. When terminator power is removed by the host, the XR900 powers down.

A loss-of-cooling shutdown triggered by the environmental monitor can be reset by cycling any power-controlling input off and back on. If the cooling sensor has cooled sufficiently, the shutdown condition then resets.

If the power supply fuse blows, the power supply should be considered as failed and should be replaced. Damage to the drives in the enclosure can occur if the fuse opened as a consequence of component failure in the power supply. Overloading or shorting the outputs of the power supply does not cause the fuse to blow.

Remote interface

The remote interface is designed to interconnect with an environmental monitor I/O port on the host computer. Each pin connection, signal mnemonic, and signal characteristic for the connector is listed in the following table.

Table 3-1. Environmental Monitor Connector Signals

Pin Number	Signal Mnemonic	Signal Name and Description
1, 8	SVCCFAIL*	Active-low output from SCSI backplane indicating a DC power problem. SVCCFAIL* activates if the +5Vdc power supply output falls below 0.5 volts. In installations with multiple peripheral expansion enclosures, any enclosure on the environmental monitor bus can pull SVCCFAIL* down to its active low state. Check the power-on LEDs on the drives to identify the faulty unit.
2, 7	DISKOT*	Active-low output that illuminates the Overtemperature LED to indicate a cooling problem. Activates at a slightly lower sensor temperature than cooling failure shutdown, so that system operation can continue if the problem is corrected promptly.
3, 6	GND	Signal return path.
4, 5	DCEN*	Open-collector active-low input from host. When low, remotely enables the XR900 power supply (i.e., the power supply turns on if the SCSI TERMPWR signal is present). When high, disables the XR900 power supply. When open, passes control of the power supply to the SCSI TERMPWR signal.

Recommended Power-Off Procedure

As described in the previous section, the XR900 has no power switch. The power supply cycles on and off under the control of the host computer. Powering down the Modular Chassis also powers down the XR900 chassis.

Note Ensure that proper software shutdown procedures have been followed before you continue.

1. Insert the key and turn the Modular Chassis power switch to STANDBY (off). The power supply cycles down, but the power status LED on the power supply remains on, indicating that primary power is still present.
2. If the system incorporates a dual 9-slot chassis, repeat step 1 for System B.
3. If the chassis is to be powered down for a long time or will be left unattended, remove the key to prevent tampering with the power switch.

Emergency Power Removal

In the event of an emergency, pull the AC or DC power cable from the rear of the enclosure. There are no user-accessible circuit breakers on the chassis.

Removal/Replacement Procedures 4

Introduction

This chapter describes recommended procedures for the removal and replacement of major assemblies and / or components of the XR900 chassis. For identification and location of the assemblies and parts mentioned in these procedures, refer to the drawings and parts lists in Chapter 6.

The removal / replacement procedures are organized and presented in the following order:

- Front bezel
- Side panels and pedestal cover
- Power supply
- Cooling fan
- 3 1/2- or 5 1/4-inch drive modules

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting the equipment.

Caution

Do not remove power from an operating system without taking the necessary steps to prevent damage to the software, the peripherals, or their contents.

Front Bezel

The XR900 front bezel (as well as the bezels for the Modular Chassis card cage, fan trays, and power supplies) can be used in both pedestal and rack / mast chassis configurations. The bezel is a requirement for complete RFI shielding in either configuration. The 9U bezels used on the larger enclosures of a Modular Chassis system are mounted on ball studs at the bottom and latched at the top; the 3U bezel used on the XR900 enclosure is simply latched. Screwdriver-operated locks at the upper corners prevent the latches from being arbitrarily disengaged.

The suggested procedure for removal and replacement of the XR900 front bezel is as follows:

Removal

1. Unlock the bezel latches (Figure 5-1) by rotating the locks a quarter-turn inward from the ‘‘locked’’ icon to the ‘‘unlocked’’ icon with a Phillips screwdriver (clockwise on the left side, counterclockwise on the right).
2. Unlatch the bezel from the enclosure by pressing the latch buttons at either side of the bezel and pulling straight out.

Replacement

1. Press the sides of the bezel against the enclosure until the latches at the sides snap into place.
2. Lock the bezel latches by rotating the locks a quarter-turn outward from the ‘‘unlocked’’ icon to the ‘‘locked’’ icon with a Phillips screwdriver.

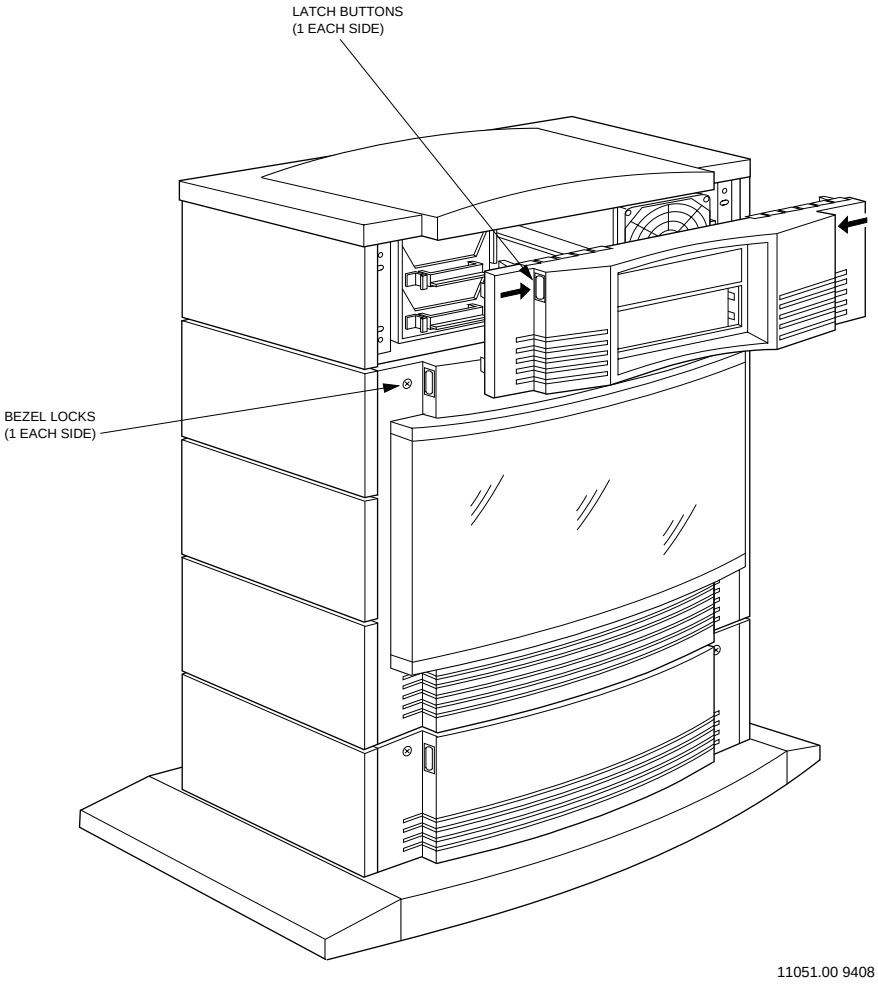

Figure 4-1. Bezel Removal

Side Panel/Pedestal Cover

The Modular Chassis pedestal configuration incorporates side panels for the various system enclosures (including the XR900 chassis) and a pedestal cover. The inner surfaces of the panels and cover are molded with slots that engage slide hooks mounted on the corresponding enclosure. In addition, the side panels are fitted with latching mechanisms.

The suggested procedure for removal and replacement of XR900 side panel assemblies is as follows:

Side Panel Removal

1. Remove the front bezel.
2. Unlock the side panel assembly (Figure 5-2) by squeezing the inner latch levers at the forward edge with one hand and simultaneously slide the assembly backward approximately an inch until it clears the slide hooks on the chassis.

Caution

Hand clearance in the latch area is limited. Work carefully to avoid injury to fingers.

3. Lift the assembly off the chassis.
4. Repeat steps 2 and 3 at the opposite side of the chassis.

Side Panel Replacement

1. Engage the slots of the panel assembly with the slide hooks on the enclosure and slide the panel assembly forward until the latch snaps into place.
2. Repeat step 1 at the opposite side of the chassis.
3. Reinstall the front bezel.

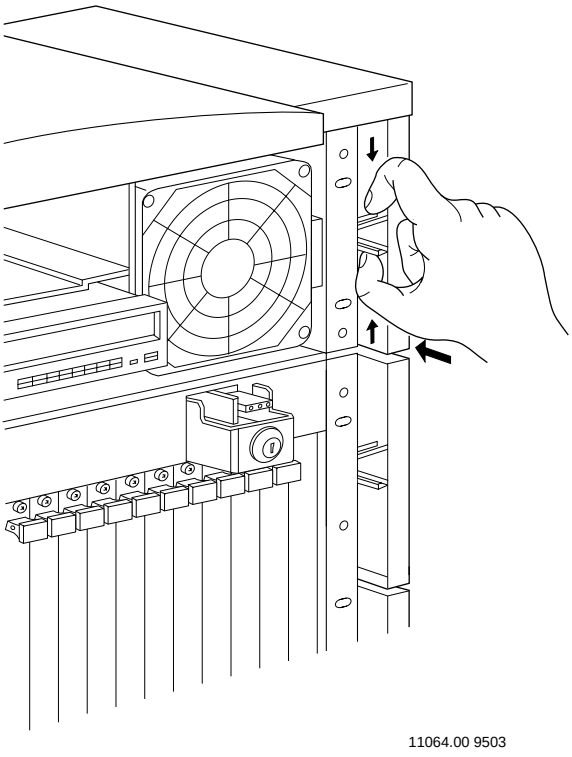

Figure 4-2. Side Panel Removal

Pedestal Cover Removal/Replacement

The pedestal cover is mounted with the same type of hardware as the side panels, but no latch is used. Instead, two screws on the back edge near the corners hold the cover in place. The removal procedure consists of simply removing the screws, then sliding the cover backward and disengaging it from the slide hooks. Replacement is the reverse.

Power Supply

The power supply module (Figure 5-3) is installed at the right side of the drive bays in the XR900 chassis. The power supply receives –48Vdc or 115 / 230Vac input power directly through its back panel. The power supply outputs are cabled to the cooling fan and to a backplane connector, which applies operating voltages from the power supply to the mass storage modules.

Caution

Removal of a power supply module involves exposure to high voltages. Avoid touching the connectors. Allow one minute for the capacitors in the power supply to discharge.

The suggested procedure for removal and replacement of the XR900 power supply module is as follows:

Removal

1. Switch the power supply of the host system to STANDBY.
2. Disconnect the input power source from the XR900 chassis:
   – If the power supply is an AC unit, unplug the power cord from the AC outlet (the other end of the cord disconnects automatically when you remove the module from the chassis).
   – If the power supply is a DC unit, turn off the –48Vdc power source and unplug the DC connector from the power supply input.
3. Remove the XR900 bezel, if installed.
4. At the upper right corner of the power supply module, loosen the captive screw that holds the module in the chassis.
5. Slide the module out.

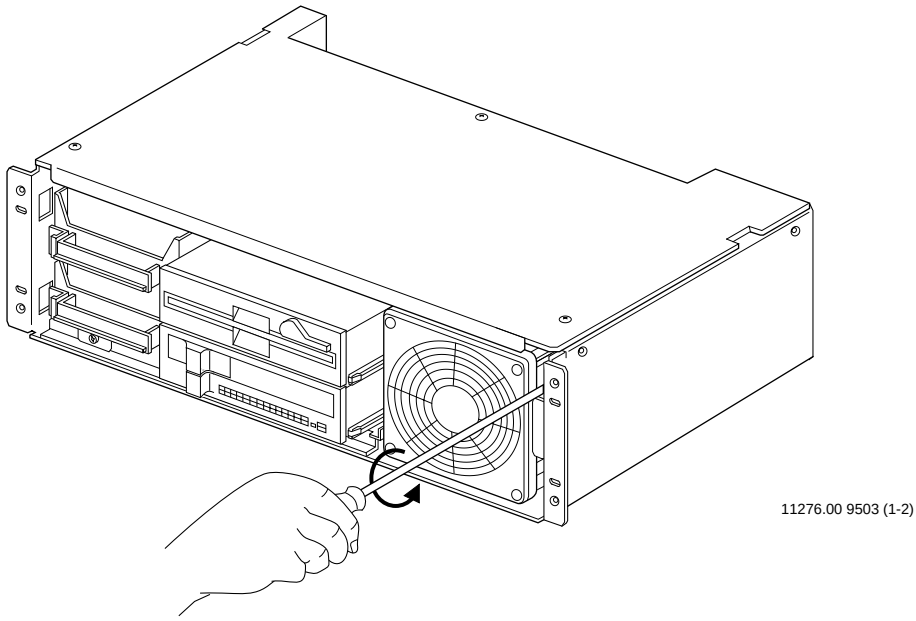

Figure 4-3. Power Supply Removal

Replacement

1. Slide the power supply module carefully into the chassis. Use firm steady pressure to seat the connector properly.
2. Tighten the captive screw that holds the module in the chassis.
3. Reinstall the XR900 bezel, if the installation includes one.
4. Reconnect the module to the AC or DC power source:
   - If the power supply is an AC unit, plug the power cord back into the module and the AC outlet.
   - If the power supply is a DC unit, plug the DC connector into the power supply input and turn the –48Vdc power source back on.

Cooling Fan

The DC-powered fan mounted on the power supply module provides forced-air cooling for the power supply and the mass storage drives.

The suggested procedure for removal and replacement of the cooling fan is as follows:

Removal

1. Remove the power supply module as described in the previous section.
2. Using a flat-tipped screwdriver, remove the three screws that secure the fan and finger guard to the power supply assembly.
3. While still keeping the power supply assembly and fan together, move the fan aside far enough to reach in and unplug the fan connector from its mating connector on the side of the power supply assembly.
4. Remove the fan.

Replacement

1. Plug the fan wire connector into its mating connector on the side of the power supply assembly.
2. Attach the new fan and finger guard to the power supply assembly with the hardware removed in step 2 above.
3. Reinstall the power supply module as described in the previous section.

3½- or 5¼-Inch Drive Modules

The SCSI peripheral expansion enclosure contains up to four half-height storage devices. Two bays accommodate 3 1/2-inch devices only. The other two bays accommodate either 3 1/2-inch or 5 1/4-inch devices.

The suggested procedure for removal and replacement of 3 1/2- or 5 1/4-inch drive modules is as follows:

Removal

1. Switch the power supply of the host system to STANDBY.
2. Disconnect the input power source from the XR900 chassis:
   - If the power supply is an AC unit, unplug the power cord from the AC outlet.
   - If the power supply is a DC unit, turn off the –48Vdc power source and unplug the DC connector from the power supply input.
3. Remove the XR900 bezel, if installed.
4. While pressing the latch at the side of the drive carrier (Figure 5-4), move the module back and forth slightly to loosen the backplane connection. Then carefully remove the module from the chassis by pulling straight out.

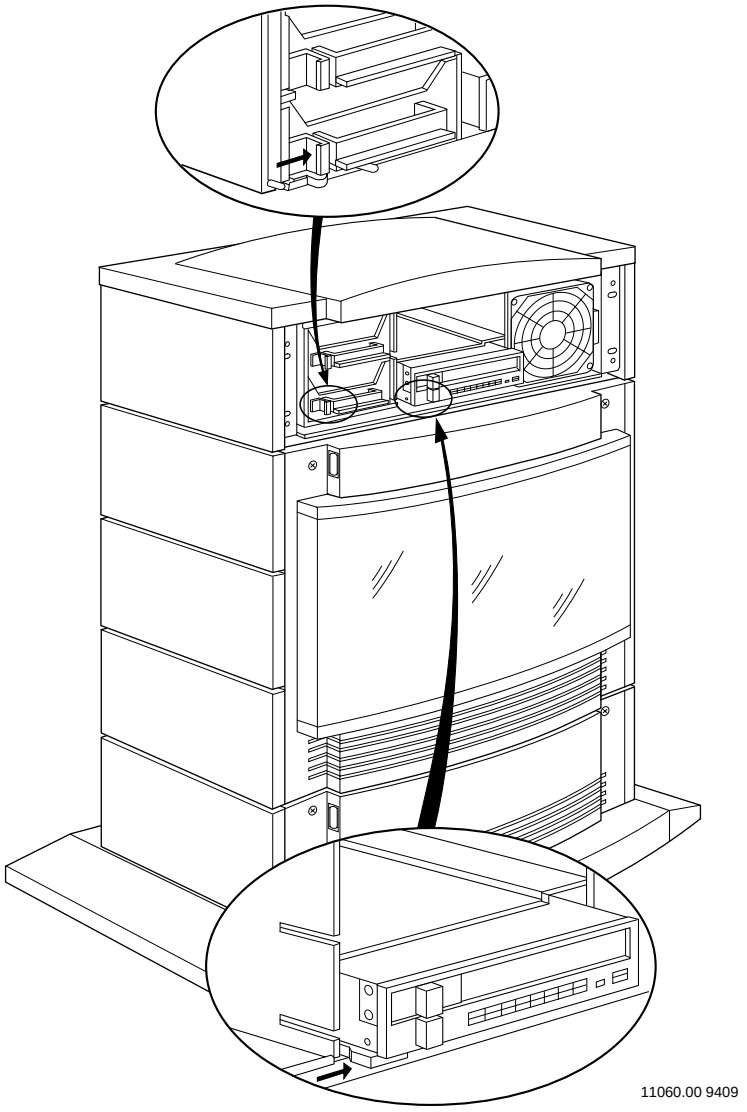

Figure 4-4. Drive Module Release Latches

Replacement

1. Ensure that power to the host system is set to STANDBY and the XR900 power cord is disconnected from the AC or DC power source.
2. Note the device address setting on the drive you are replacing, and set the address switch on the new drive to the same device number.
3. Slide the replacement drive module gently into the drive bay until it contacts the backplane connector.
4. Use firm steady pressure to seat the drive connector in the backplane.
5. Reinstall the XR900 bezel, if the installation includes one.
6. Reconnect theXR900 chassis to the AC or DC power source:
   - If the power supply is an AC unit, plug the power cord back into the module and the AC outlet.
   - If the power supply is a DC unit, plug the DC connector into the power supply input and turn the –48Vdc power source back on.

Support Information 5

Introduction

This chapter supplies parts lists and diagrams of the XR900 chassis. For parts lists and drawings of the mass storage drives and power supply used in this chassis, refer to their respective reference sheets or contact the vendor (manufacturer) of these units.

Parts List and Ordering Information

The following sections of this chapter provide a parts list and location diagram for the XR900 chassis and its subassemblies. Should you need to order replacement parts, order them from the Customer Support Operations (CSO) Service Center. The order should include the part number (when applicable) and description of the part that appears in this chapter. The serial number of the chassis should also be included with the ordering information.

Parts lists reflect the latest issue of hardware at the time of printing.

Table 5-1. XR900 Chassis Parts List

Find Number	Motorola Part Number	Description/Quantity	
--	01-W2518D01A	Blank bezel assembly	2
--	01-W2649D01A	Front bezel	1
1	01-W2651D01A	Fan assembly, 119mm	1
2	01-W2654D01A	Expansion chassis	1
3	01-W2722D01A	100W power supply (AC)	1
3	01-W2722D02A	100W power supply (DC)	1
--	01-W3948B01A	SCSI backplane	1
--	03SW990F606	Sem, Phillips pan head, 6-32 x 3/8" w/cone washer	3
--	03SW990F805	Sem, Phillips pan head, 8-32 x 5/16" w/cone washer	1
--	03SW996E104	Sem, slotted hex head, self-tapping, 10-16 x 1/2"	3
--	07-W4353C01A	Bracket, RFI shield	2
--	30-W2740D01A	Cable assembly, power/fan	1
--	30-W2787D01A	Cable assembly, adapter	1
--	33-W4658C01A	Label, rating, AC component, peripheral expansion	1
--	33-W4659C01A	Label, rating, AC system, peripheral expansion	1
--	33-W4660C01A	Label, rating, DC component, peripheral expansion	1
--	33-W4661C01A	Label, rating, DC system, peripheral expansion	1
--	35-W4408C01A	Air filter	1
4	35NW9303A12	Screen, fan, finger guard	1
--	42NW9401B28	Tyrap, nylon, L3-7/8, B3/4	4
--	67-W2592D02A	Kit assembly, DC connector (DC chassis)	1
--	67NW9415A42	Kit, screw lock, female	2

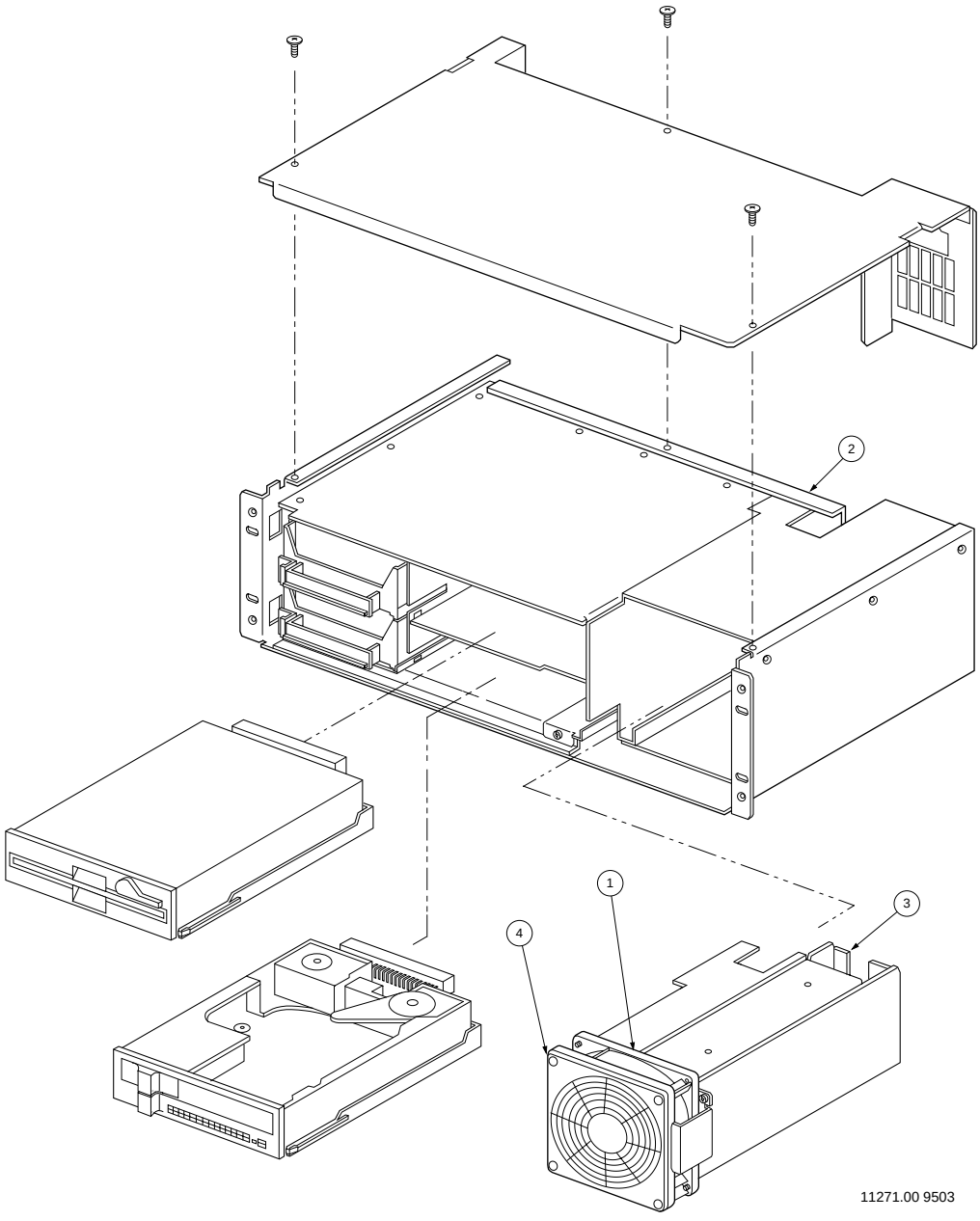

Figure 5-1. XR900 Series Chassis

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