Sun StorEdge™ A7000 Service Manual

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Preface

The *Sun StorEdge A7000 Service Manual* describes removal, replacement, and other procedures for the Sun StorEdge™ A7000, the Intelligent Storage Server™. It also includes card configuration settings, such as jumpers and switches.

This service manual is intended for Sun Microsystems, Inc. personnel and other trained service engineers (SEs) responsible for maintaining Sun StorEdge A7000 hardware. Read and become completely familiar with the procedure you need to perform before servicing a Sun StorEdge A7000 server.

How This Book Is Organized

Chapter 1 introduces the Sun StorEdge A7000 and maintenance considerations.

Chapter 2 describes maintenance types and server characteristics.

Chapter 3 contains card configuration information including card layout, LEDs, switches, and jumpers.

Chapter 4 describes standalone diagnostic software used to test individual cards.

Chapter 5 describes RDC FORM installation.

Chapter 6 describes removal and replacement procedures for the field-replaceable units (FRUs). This chapter also describes or notes software procedures to perform after removing or replacing system components.

Chapter 7 describes how to use the System Console, power on and power off procedures, and ROM monitor firmware features for the service engineer.

Chapter 8 lists part numbers for major assemblies.

Appendix A provides basic information about the power conditioning unit (PCU).

Appendix B describes installing the high-density storage array (HDSA) expansion cabinet.

Appendix C shows the Portable Maintenance Box.

Graphical User Interface Terms

TABLE P-1   Graphical User Interface Terms

Verb	Action	Example
Choose	To open a menu or initiate a command.	Choose New from the File menu.
Click	To press and release a mouse button without moving the pointer.	Click the left mouse button on the OK button.
Double-click	To click a mouse button twice quickly without moving the pointer.	Double-click on the File Manager icon to re-open the program.
Drag	To move the pointer or an object by sliding the mouse with one button pressed.	Drag the Applications Menu Bar to the left corner of the screen.
Point	To move the mouse pointer to a specific location on the screen with no mouse buttons pressed.	Point to the Trash icon and click to select it.
Press	To push a mouse button down and continue to hold it.	Press the left mouse button on NVRAM.
Release	To let up on a mouse button to initiate an action.	Release the left mouse button when the Print button is highlighted.
Select	To highlight an entire window or data in a window.	Select the Applications Menu bar. Select the dsp1 window.

Typographic Conventions

TABLE P-2   Typographic Conventions

Typeface or Symbol	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output.	Edit your .login file. Use ls -a to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output.	% **su** Password:
AaBbCc123	Book titles, new words or terms, words to be emphasized. Command-line variable; replace with a real name or value.	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be root to do this. To delete a file, type rm *filename.*
Keyname-Keyname	A hyphen between the names of keys or mouse buttons indicates simultaneous use of two keys or a key and a mouse button.	Ctrl-W
Underlined letter in menu title or item	An underlined letter in a menu title is a menu shortcut (mnemonic). This means that simultaneously pressing the Alt key and the key for that letter makes that menu appear.	File
Menu item→Menu item	An arrow between the names of menu items indicates a cascading menu.	Utilities→service
.	In examples, a vertical ellipsis indicates that information was omitted.	Testing Backplane Cards . . . Term set to: vt100 <CR>= default>

Shell Prompts

TABLE P-3   Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#

Related Documentation

TABLE P-4   Related Documentation

Application	Title	Part Number
Installation	*Sun StorEdge A7000 Installation Guide* *Sun StorEdge A7000 Physical Planning Manual*	805-4632 805-4878
Service	*Best Power Technology UNITY/I Installation Manual (shipped with PCU)*	not available; shipped with each Sun StorEdge A7000

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Introduction

This chapter discusses Sun StorEdge A7000 maintenance considerations. Topics include the following:

- Maintenance—page 1-2
- Electrostatic Discharge Protection—page 1-4
- Electromagnetic Interference—page 1-5

1.1 Maintenance

This section describes general maintenance practices.

1.1.1 Planning Maintenance

Before performing maintenance tests, arrange time with the system or site administrator for placing the A7000 server and mainframe offline. In cases of emergency testing, the system administrator should place the Sun StorEdge A7000 server and host computer offline before you perform the procedures in this manual.

1.1.2 Safety Procedures and Practices

Caution – Do not move or attempt to move the Sun StorEdge A7000 cabinet with the high-density storage array (HDSA) drawer extended or open in any way. The cabinet could become unbalanced and topple if you try to move it incorrectly. Make sure the cabinet is properly level at all times. Section 6.7 "Leveling the Cabinet Before and After Disk Installation" on page 6-15 describes how to level the cabinet. Do not remove or retract the main cabinet leveler feet if the HDSA drawer contains disk drive modules.

To ensure your personal safety and that of your co-workers, follow these safety precautions at all times:

- Before turning any power on or off, check that no one is working on or around the equipment. Look for any tags indicating work-in-progress on the equipment. Verify that the AC feature of your digital voltmeter (DVM) is functional.

- Ensure that the equipment is properly powered off before turning off the power (circuit breakers or switch). Always use a reliable voltmeter to verify that power is actually off after using power-off switches. Most power supplies have bleeder resistors to drain the capacitor charge when power is removed. As a precaution, use a meter to check all capacitors before you attempt maintenance. A defective bleeder resistor could create an unexpected hazard. If the equipment has a battery backup feature installed, the output from the battery backup must also be de-energized or disconnected (refer to the battery backup equipment maintenance manual).

- Turn off the energy-isolating device or power disconnect that controls the equipment on which you will be working. (This may be at the customer power distribution panel, the system main power disconnects, or the frame level disconnects. If power needs to be turned off at the customer panel, have the customer turn off the appropriate switch or circuit breaker.) Do not rely on logic controls to power off equipment.

- Perform only necessary tasks on equipment. Double check your work for any errors.

- Replace all protective covers or other safeguards that were removed.

- Check that no one is working on or around equipment, and ensure that all tools and foreign objects are removed from the immediate work area.

- Do not work alone when working on systems supplied with AC or DC power greater than 50 volts. Use the buddy system. The buddy can be a customer, employee, or other vendor employee.

- Observe customer safety regulations at all times.

- To prevent injury to your back, use your leg muscles to lift equipment. Always get someone to help you with loads that are difficult for you to lift safely.

- Verify that all appropriate AC and DC power is off before you:
  - Remove or assemble major components.
  - Work on or near power supplies.
  - Perform mechanical inspections.
  - Install electrical or mechanical devices.

- When you must work on equipment with the power on, take these precautions:
  - Arrange for another person familiar with the power-off controls to be in the immediate vicinity.
  - Remove all rings, wrist watches, chains, necklaces, and bracelets.
  - Use only insulated tools.
  - Keep one hand in your pocket.
  - Avoid contacting ground potential, such as metal floor strips or machine frames.

- Avoid wearing loose garments and keep long hair out of the way (such as pinned up or under a cap). High-speed, electromechanical devices (such as fans and drive belts) can seize articles of clothing and hair.

- During maintenance, practice good housekeeping to reduce safety hazards in your work area. When you are finished, put tools, parts, and work materials in a safe, secure place. Also, clean up debris and return the work area to its original condition.

- Put all safety devices such as guards, shields, and ground wires back in place when you finish.

- Use grounding straps to protect components from electrostatic discharge.
- Check and replace worn or broken tools on a continuing basis.
- Wear eye protection when:
    - Soldering or cutting wire.
    - Using solvents, sprays, or cleaners to clean parts.
    - Using power tools.

1.2 Electrostatic Discharge Protection

Moving paper, plastic, rubber, or a leather shoe against itself on a carpet or vinyl flooring generates large amounts of static electricity that discharge through you to whatever you touch. This electricity is called electrostatic discharge (ESD).

If you are holding or wearing any of these materials and then touch any equipment sensitive to static electricity, that equipment can be damaged. You must bring static-sensitive equipment to the same ground potential as the machine you are installing, deinstalling, or working on—which means grounding all static electricity that is present by following these general rules:

- Do not touch, or allow a static-sensitive component to touch any item that is not properly grounded.
- Never set a component on a surface that is not grounded.
- Use antistatic ground mats to temporarily hold components that are being removed or reattached.
- Always wear a properly grounded wrist strap when handling static-sensitive components. Once you are wearing a grounded wrist strap, you may touch any static-sensitive device or component without causing damage.
- Always ship static-sensitive devices and components in approved containers. Use the packaging and shipping container from a replacement component to carry and/or return the component. Packaging material and shipping containers used alone do not completely shield static-sensitive devices from damage. Repeated tests have shown that, although containers prevent static charge buildup on their contents, they do not shield their contents from damage caused by external static discharge.

Observe these guidelines when packaging and shipping printed circuit boards (PCBs):

■ Always use a grounded wrist strap when handling PCBs.

■ When packaging individual PCBs for local or short distance shipments, put the PCBs into conductive grid bags first, and into protective bags.

■ When packaging individual PCBs for customer or long distance shipments, put the PCBs into conductive grid bags first, then into protective bags, and into a padded shipping container.

1.3 Electromagnetic Interference

Electromagnetic interference (EMI) is radiated electrical energy that causes interference in digital or analog equipment. EMI is also known as Radio Frequency Interference (RFI).

EMI is present in varying strengths around AC-driven electric motors, electrostatic copiers, and X-ray machines. Hand-held electric power tools, air dehumidifiers, refrigerators, and air-conditioning units are other sources of EMI.

Make sure the test system is properly grounded and has all its shields in place. Pay special attention to the finger stock on all doors, interframe connections, and panels. Make sure they are all correctly in place and are connected to the system ground.

Static, or noise generated by this equipment, travels along AC power cords to the junction box that is the source of its power. Do not connect any EMI-sensitive subsystems to power sources that are shared with EMI generating devices. Use isolated or single-line power sources when performing diagnostic testing before deinstallation.

General Information

This chapter describes the Sun StorEdge A7000 maintenance types and server characteristics.

- System Maintenance Types—page 2-2
- Identifying Sun StorEdge A7000 Models—page 2-4
- High-Density Storage Array Drawer (HDSA)—page 2-7
- Disk Drive and Chassis Faceplate/Frontpanel—page 2-10
- Chassis Contents Information—page 2-11

Caution – Do not move or attempt to move the Sun StorEdge A7000 cabinet with the high-density storage array (HDSA) drawer extended or open in any way. The cabinet could become unbalanced and topple if you try to move it incorrectly. Make sure the cabinet is properly level at all times. Section 6.7 "Leveling the Cabinet Before and After Disk Installation" on page 6-15 describes how to level the cabinet. Do not remove or retract the main cabinet leveler feet if the HDSA drawer contains disk drive modules.

2.1 System Maintenance Types

You can perform two types of maintenance the Sun StorEdge A7000 system:

■ Concurrent maintenance

■ Maintenance that requires partial or total Sun StorEdge A7000 power removal

See TABLE 2-1.

TABLE 2-1 Sun StorEdge A7000 FRUs Needing Concurrent and Other Maintenance

---

Power Off the Entire Sun StorEdge A7000 To Service or Replace This Field-Replaceable Unit (FRU)...

HDSA power supply module chassis

Linear actuator device (LAD)

LAD/SCSI expander power supply

AC power distribution unit with AC box and terminal block

SCSI expander (splitter) cards and chassis

Quad-Channel block mux channel (BMC) card

Quad-Channel SCSI controller

Dual-Channel ESCON to VME card

Chassis card cage with backplane

Power Off the Subsystem of the FRU to Service or Replace This FRU...

Subsystem power supply (requires AC box power off also)

Processor card: adapter and processor boards

Cache memory card

Quad-Channel SCSI Target Mode controller

No Power Off Necessary to Service or Replace This FRU....

High-density storage array (HDSA) power supply module

Disk drives

Disk drive array chassis

System Console notebook computer

Cabinet blower fan

CPU transceiver and loopback cable

HDSA drawer fan

2.2 Identifying Sun StorEdge A7000 Models

The Sun StorEdge A7000 server is available as two basic models:

- **Dual-drawer versions**, in a single cabinet
- **Multiple-drawer versions**, with a drawer extension cabinet; this expansion cabinet supports up to four disk drawers, but contains no subsystem hardware like controller cards. This guide describes this cabinet where necessary, but most service procedures in this guide apply to all models. This manual describes specific differences among models when necessary.

Note – There may be older single-drawer models in the field. Typically, the second disk drawer does not contain any disk drives.

2.2.1   Front Inside View of the Sun StorEdge A7000

I/O bay
cabinet

HDSA drawer
open/close switches

HDSA power supply
on/off switch

HDSA power supply
on/off switch

DSP1 power supply
on/off switch

DSP2 power supply
on/off switch

System boot disk (2)
located below
the HDSA power supplies

Blower assembly

Cabinet power
on/off switch

Main circuit breaker
(CB1)

Power reset
circuit breaker (CB2)

Sun StorEdge A7000 power:
main cabinet power
and AC distribution boxes (2)

FIGURE 2-1   Cabinet Inside Front View

2.2.2 Rear Inside View of the Sun StorEdge A7000

HDSA

14-slot chassis DSP2

14-slot chassis DSP1

SCSI expanders
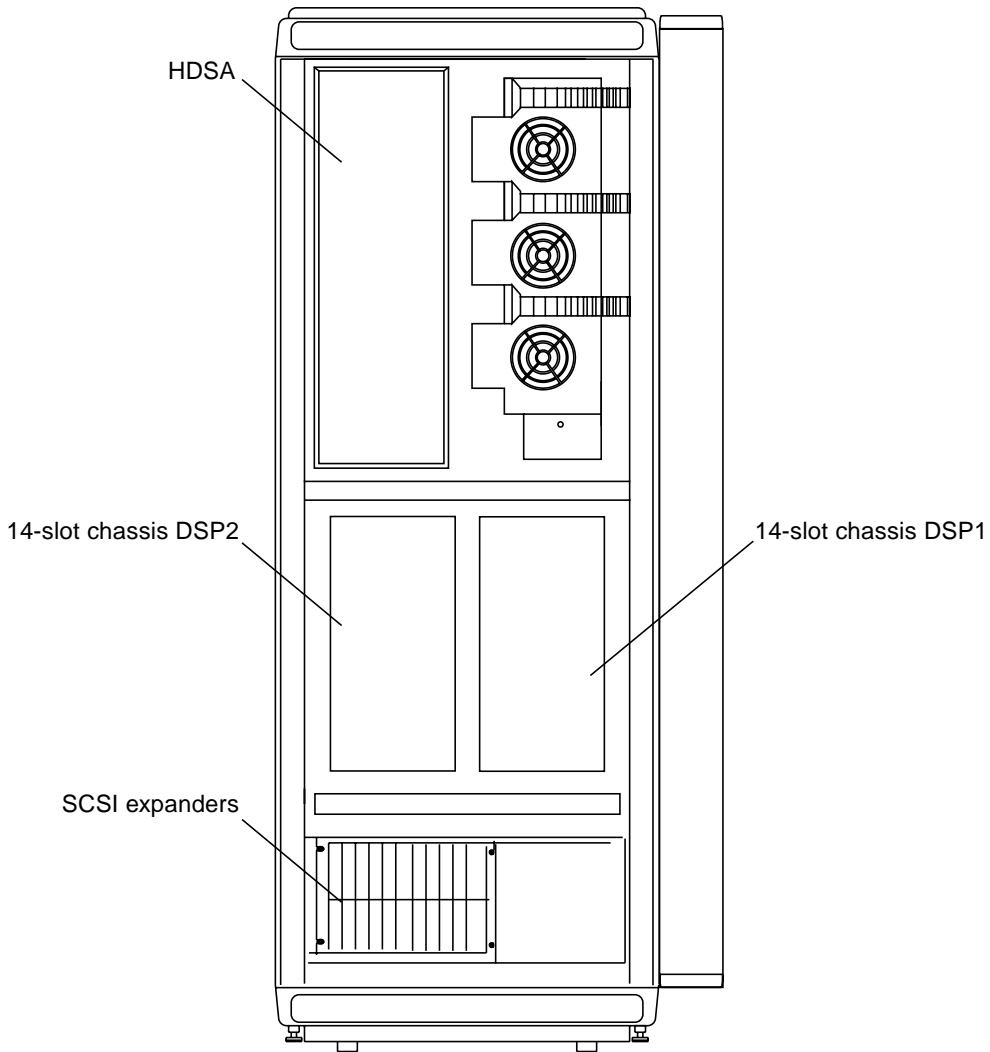
FIGURE 2-2 Cabinet Inside Rear View

2.3   High-Density Storage Array Drawer (HDSA)

The Sun StorEdge A7000 contains two high-density storage array (HDSA) drawers, with each HDSA holding up to nine storage bundles. Each storage bundle contains six disk drives.

The front of the HDSA drawer has nine groups of seven light-emitting diodes (LEDs); these LEDs relate to each six-disk drive bundle, with one LED for each disk drive. When lighted, these LEDs indicate disk activity. The seventh LED, when lighted, indicates an over-temperature condition for that bundle. See FIGURE 2-3.

The Sun StorEdge A7000 with expansion cabinet contains two HDSA drawers in the system cabinet and up to four HDSA drawers in the expansion cabinet. FIGURE 2-4 shows this model.

o Disk 5

o Disk 4

o Overtemp   o Disk 3

o Disk 2

o Disk 1

o Disk 0

Disk drive LEDs, drawer 1 (9 places)

o Disk 0

o Disk 1

o Disk 2

o Overtemp

o Disk 3

o Disk 4

o Disk 5

Disk drive LEDs, drawer 2 (9 places)

disk 0	disk 5
disk 1	disk 4
disk 2	disk 3
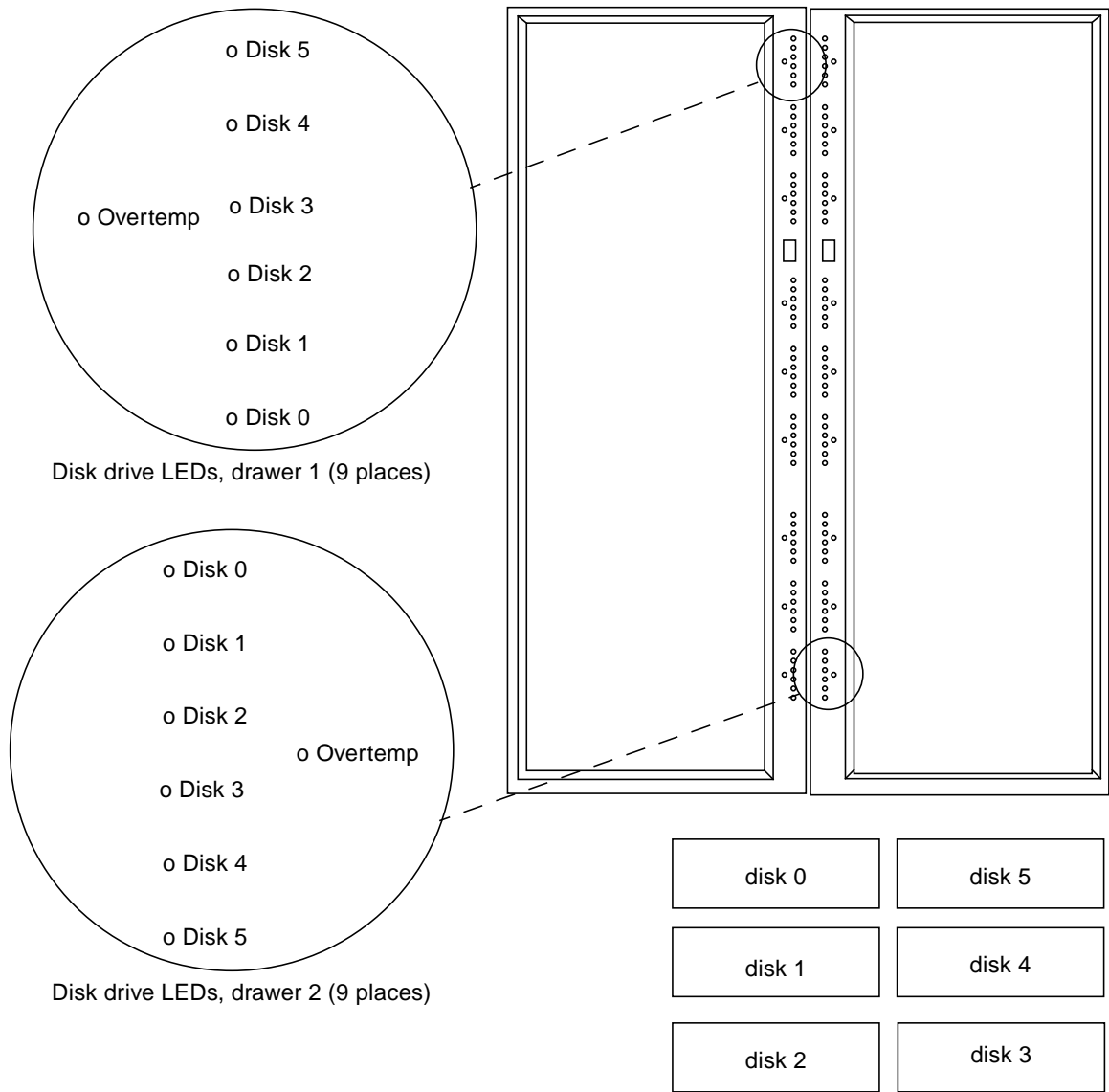
How each bundle is installed in the drawer

FIGURE 2-3   HDSA LEDs and Drive Layout
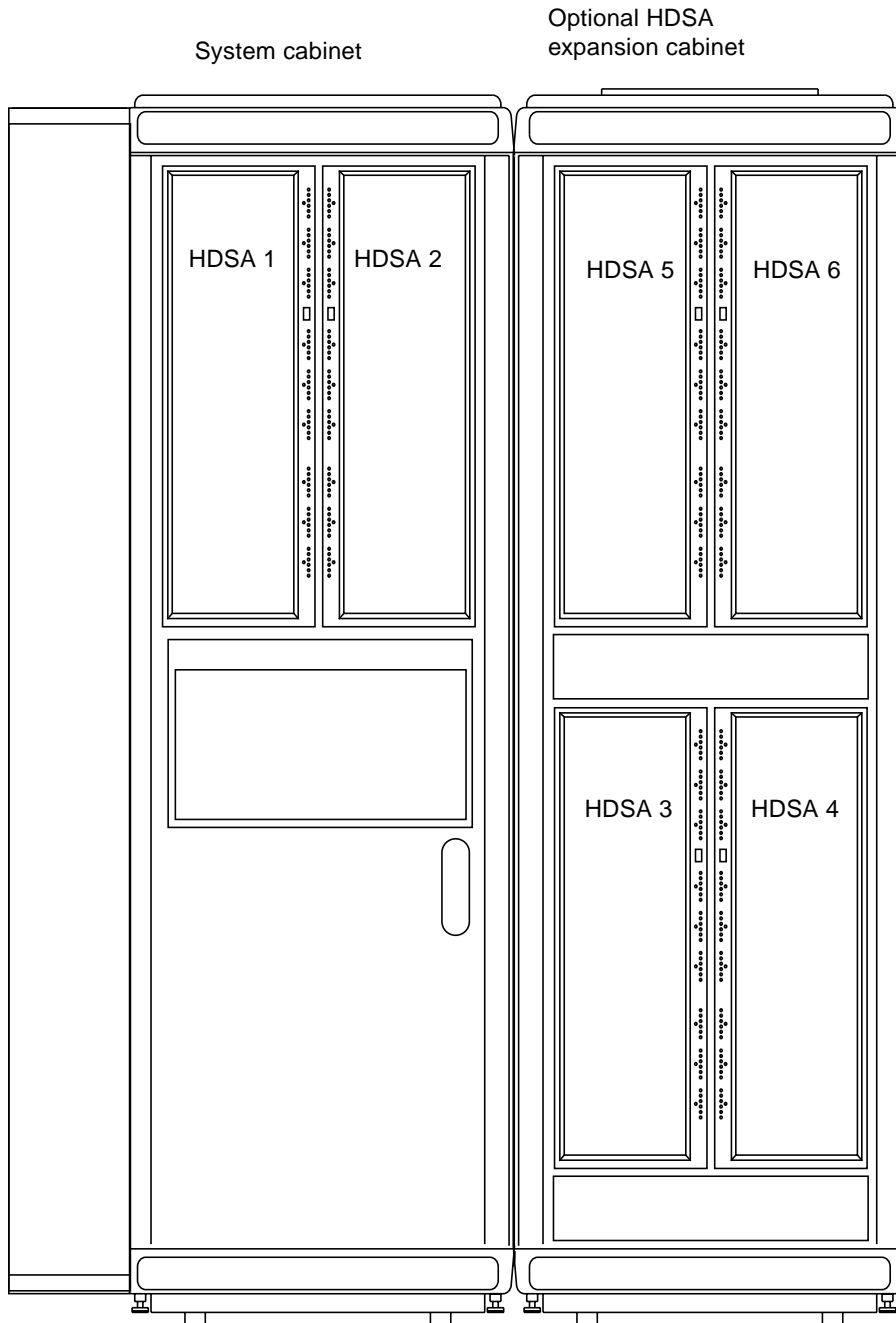
FIGURE 2-4 Sun StorEdge A7000 With Expansion Cabinet

2.4 Disk Drive and Chassis Faceplate/ Frontpanel

Each disk drive enclosure is sealed, completely enclosing the heads and storage media to keep out contamination. The unit is small and easy to install.

Two types of disk drive faceplate or frontpanel are available; FIGURE 2-5 shows the faceplate type, which is on each disk drive in the bundle. The two LEDs on the faceplate indicate the following:

- POWER—when yellow and steady, the drive is powered on
- SAFE TO REMOVE—when green, the drive can be removed from its storage bundle slot
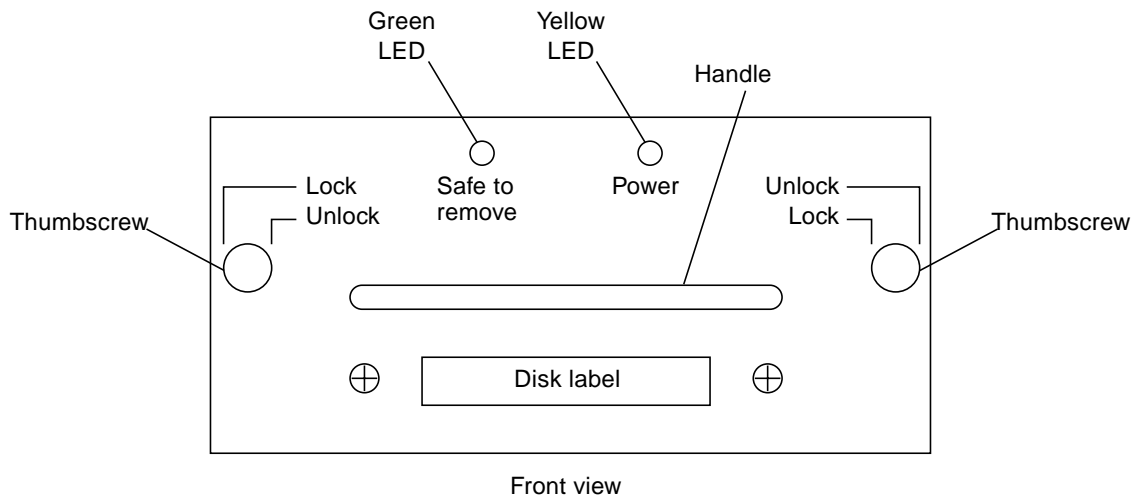
FIGURE 2-5 Disk Drive Faceplate Type

FIGURE 2-6 shows the frontpanel type, a single frontpanel for all six drives in each bundle. The LEDs on the frontpanel indicate the following:

- +5V—left side of frontpanel; when green and steady, the +5V power is on
- -12V—right side of frontpanel; when green and steady, the -12Vpower is on
- ACTIVE—when green, the drives are being accessed

The filled-in box corresponds to the disk drive location in the bundle.

Spring-loaded online/offline switch (6x)

Drive access LED (6x)
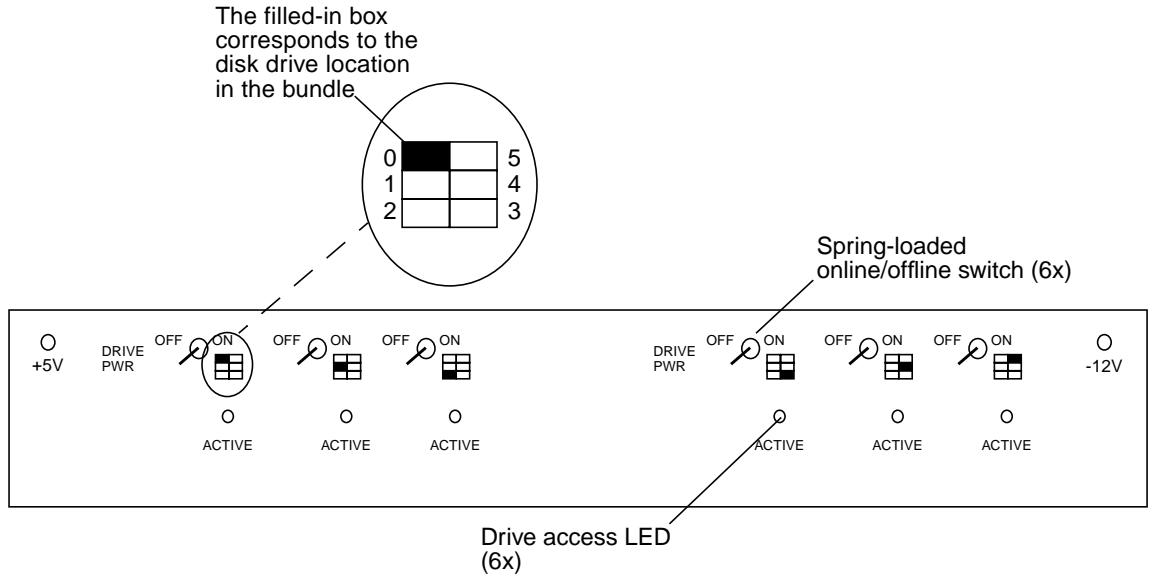
FIGURE 2-6   Disk Drive Chassis Frontpanel Type

2.5   Chassis Contents Information

Actual chassis contents depend on the model and options ordered. However, each subsystem chassis contains one dual-slot Processor card.

Each Sun StorEdge A7000 model cabinet contains two identically-configured 14-slot chassis. The Sun StorEdge A7000 Processor card is two boards and always occupies slots 1 and 2.

Typically, chassis contents are configured as follows:

- Slots 1/2 — Processor card
- Slots 3/4/5/6 — cache memory cards
- Slots 7 and above — I/O controller cards such as SCSI, BMC, and ESCON

CHAPTER **3**

Card Configuration Information

⚠ **Caution –** Do not move or attempt to move the StorEdge A7000 cabinet with the high-density storage array (HDSA) drawer extended or open in any way. The cabinet could become unbalanced and topple if you try to move it incorrectly. Make sure the cabinet is properly level at all times. Section 6.7 "Leveling the Cabinet Before and After Disk Installation" on page 6-15 describes how to level the cabinet. Do not remove or retract the main cabinet leveler feet if the HDSA drawer contains disk drive modules.

This chapter describes card layout, jumper settings, address, and switch settings.

- Card Base Addresses—page 3-2
- Processor Card Set—page 3-4
- Cache Memory Card—page 3-10
- Quad-Channel Block Multiplexor Channel Card and Driver/Receiver Card—page 3-21
- Dual-Channel ESCON to VME Card and Interface Panel—page 3-30
- Integrated Quad-Channel SCSI Controller with RAID—page 3-38
- Integrated Quad-Channel SCSI Target Mode Controller—page 3-42
- Ultra-Wide Quad-Channel SCSI Target Mode Controller—page 3-46
- SCSI Expander Card—page 3-51
- Transition Module Interface (TMI) Card—page 3-53
- Fiber Transition Module (FTM) Card—page 3-61
- Arbitration Termination Board—page 3-64

3.1 Card Base Addresses

TABLE 3-1 shows the valid base addresses for most controller cards available for the StorEdge A7000. Customer configurations vary, but most interface cables inside the cabinet are labeled with address and connector information. The address information depends on the shipped machine.

TABLE 3-1 Valid Controller Card Base Addresses

Card Type	Valid Base Address (Hexadecimal)
Cache memory card	**0000***
	1000
	2000
	3000
Quad-Channel SCSI Target Emulation (STE) Controller	**4000***
	4800
	5000
	5800
	6000
Fibre-Channel-Arbitrated Loop Controller	**4000***
	5000
	6000
	7000
	8000
	9000
	A000
	B000
	C000
	D000
	E000
	F000

TABLE 3-1   Valid Controller Card Base Addresses *(Continued)*

Card Type	Valid Base Address (Hexadecimal)
Quad-Channel SCSI Controller	**6800***
	7000
	7800
	8000
	8800
	9000
	9800
	A000
	A800
	B000
	B800
	C000
	C800
	D000
	D800
	E000
	E800
Quad-Channel BMC	**E000***
	E400
	E800
	EC00
Dual-Channel ESCON to VME interface	**E000***
	E200
	E400
	E600
	E800
	EA00
	EC00
	EE00

* Typically the first card of its type in the chassis. Starting base addresses will depend on your configuration and configuration rules.

3.2　Processor Card Set

The processor card set consists of an adapter board (part number 501-5078-xx) and processor board (501-5070-xx). The adapter board must reside in chassis slot 1 and the processor board must reside in slot 2.

3.2.1　Connectors

Rear of both boards—FIGURE 3-1 and FIGURE 3-2 show the connectors at the rear of each board:

- P1—VMEbus; mates with backplane connector J1
- P2—VME/local bus; mates with backplane connector J2
- P3—local bus; mates with backplane connector J3

Front of the adapter board—FIGURE 3-3 shows the connectors on the board's front panel:

- J2—Ethernet; provides the Ethernet connection between processor card set and the System Console

⚠ **Caution –** The Ethernet port J2 is reserved for the System Console notebook computer only. Any use of this port by other devices is strictly prohibited.

- P5—external interrupt connector; connects to processor board J1
- SCSI 0—single ended; 50-pin connector to SCSI channel 0; provides the connection to the system boot disk
- SCSI 1—differential; 50-pin connector to SCSI channel 1
- Ser 0—System Console; serial connector
- Ser 1—terminal 1
- Ser 2—terminal 2
- Ser 3—power conditioning unit (PCU); serial connector
- CCI—not used

Front of the processor board—FIGURE 3-3 shows the connectors on the board's front panel:

- J1—slot 1/slot 2 connect
- J2—external interrupts

LED0 to
LED7,
ERR

Front edge of card

P1

Reset/abort
toggle switch

SER0
SER1
SER2
SER3

P5 external
interrupts

J2
LAN

P2

Switch SW3
See Detail A
Factory-set: do not change

SCSI 0

SCSI 1

P3

LD12 LD11 LD10

LD22 LD15 LD20 LD19 LD18 LD17 LD16 LD21 LD14

On

Off

1   2   3   4

Detail A
Switch SW3
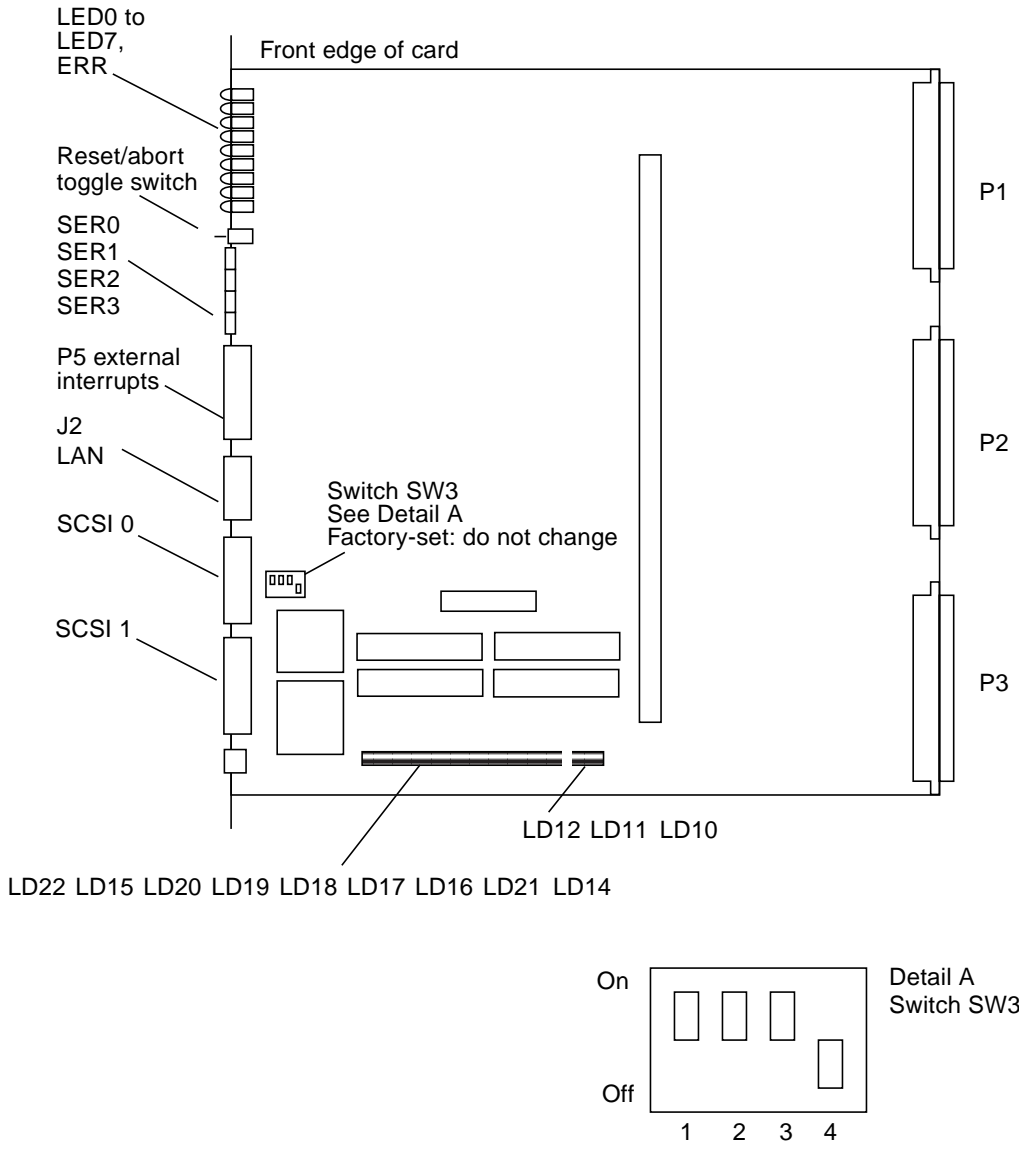
FIGURE 3-1   Adapter Board Layout

Software-controlled status LEDs:

410P
LBP
ECCE
LBTO
ND0
ND1
ND2
ND3
410B
PLL

Front edge of card

J1
Slot 1/slot 2
connection

J2
external
interrupts

P1

P2

P3

Jumper block X1
See Detail A

Detail A
Jumper block X1
The standard configuration
is all jumpers removed
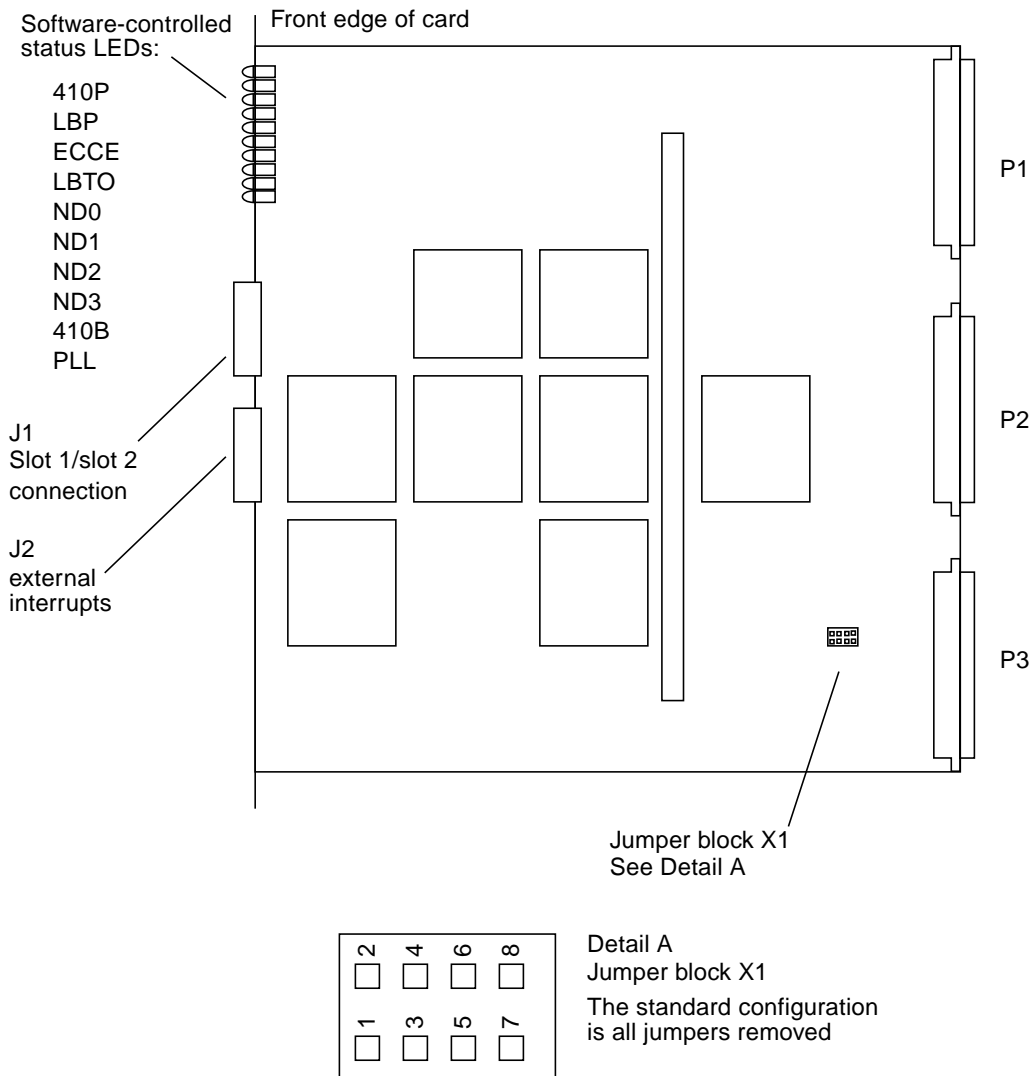
FIGURE 3-2   Processor Board Layout
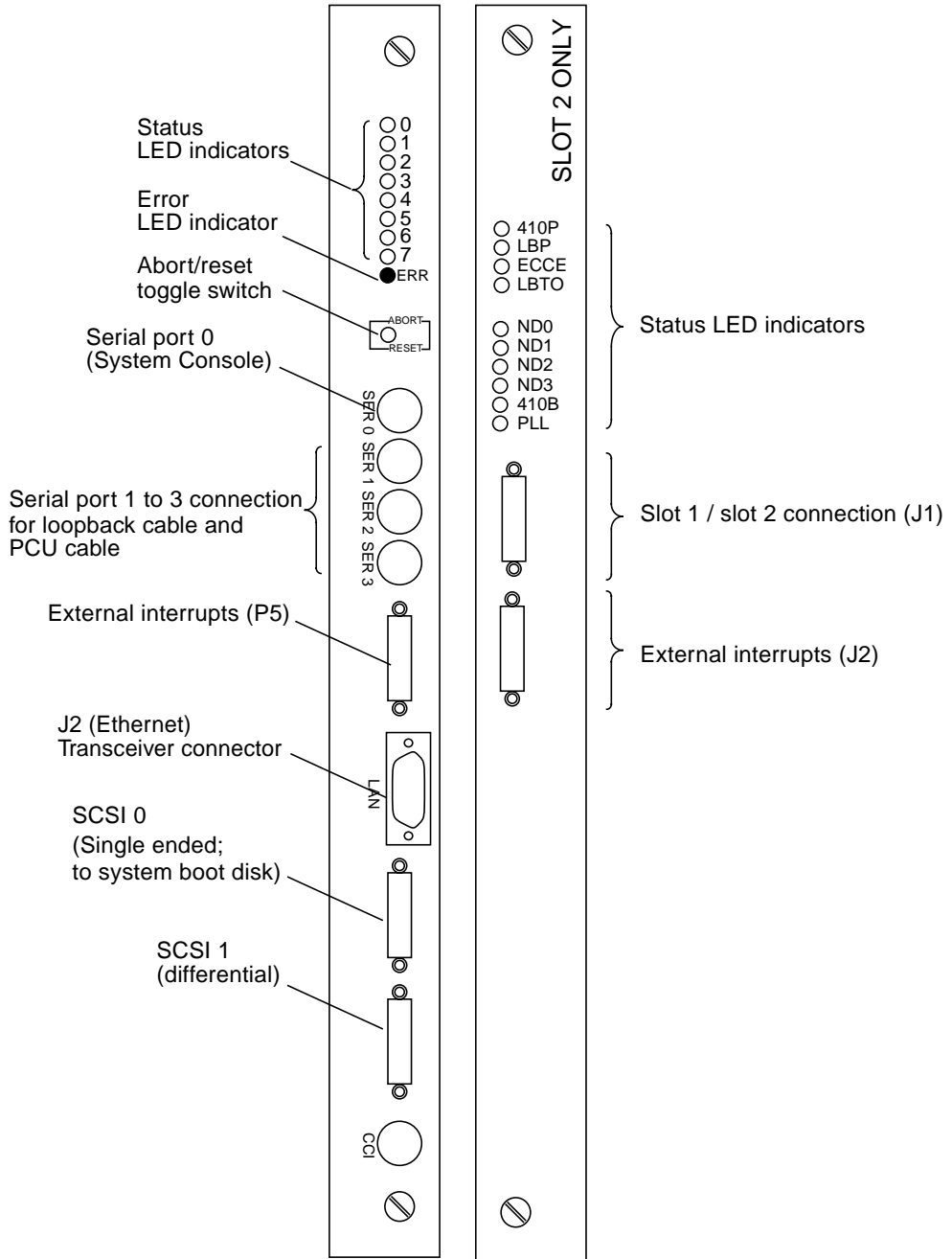
FIGURE 3-3 Processor Card Set Front Panels

3.2.2 LED Indicators

Adapter board—The first set of LEDs (LED0 through LED7), located on the front edge of the adapter board (see FIGURE 3-1), are software-controlled LEDs. TABLE 3-2 defines the second set, located on the bottom edge of the card.

TABLE 3-2   Adapter Board LED Indicators, Bottom Edge of Card

LED	When Lighted, Indicates...
LD10, HLDA700A;	SCSI IOP0 active
LD11, HLDA700B	SCSI IOP1 active
LD12, HLDA596	LAN IOP active
LD14, VLOCBA	VME master on local bus
LD15, IOLOCBA	I/O device on local bus
LD16, CPU0BA	Not used
LD17, CPU1BA	Not used
LD18, CPU2BA	Not used
LD19, CPU3BA	Not used
LD20, LOCVAEN	processor access to VMEbus
LD21, SYSFAIL	System fail
LD22, ERRINT	Interrupt error

Processor board—The LEDs located on the front edge of the processor board are software-controlled status LEDs. See FIGURE 3-2 and TABLE 3-3.

TABLE 3-3   Processor Board LED Indicators, Front Edge of Card

LED	When Lighted, Indicates...
410P	410 system bus parity error
LBP	Local bus parity error
ECCE	Multibit ECC error in processor board memory
LBTO	Local bus time-out counter expired (88110 master) condition
ND0	CPU 0 processor Bus is in use
ND1	CPU 1 processor Bus is in use
ND2	CPU 2 processor Bus is in use
ND3	CPU 3 processor Bus is in use
410B	410 system bus is in use
PLL	PLL Clocks Locked condition

3.2.3   Switches

The front of the adapter board has two switches:

- Abort/Reset toggle switch—a three-position toggle switch located on the card front panel. When the switch is in the Reset position (down), it resets the processor card set and also provides system reset through the backplane. When the switch is in the Abort position (up), it generates an interrupt. In the center position, the switch is not operating and has no affect on card
- Switch SW3—a four-pole DIP switch, SW3 is reserved for future functionality and should be left as set by the factory. See Detail A in FIGURE 3-1 for factory setting

3.2.4   Jumpers

The adapter board has no field-selectable jumpers. The processor board has one four-position jumper block used for diagnostic test. See FIGURE 3-2. All jumpers are removed for normal operation.

3.3 Cache Memory Card

The cache memory card is a 9U VME printed circuit board (PCB). The card consists of a motherboard (the EDRAM card) and daughtercard (the MEMORY CHANNEL adapter; MCA) mounted on a single card, occupying a single chassis slot. The part numbers for various models of this card are:

- 565-1458-xx
- 565-1459-xx
- 565-1460-xx
- 565-1461-xx
- 565-1462-xx
- 565-1463-xx

3.3.1 Connectors

The MCA, connected to the EDRAM card through Mezzanine interface ports, also has front panel connectors to connect to the MEMORY CHANNEL (MC) bus; the EDRAM card connects to the chassis VMEbus through connectors P1, P2, and P3.

Rear of the card—FIGURE 3-4 shows the connectors at the rear of the card:

- P1—VMEbus; mates with backplane connector J1
- P2—VME Extended; mates with backplane connector J2
- P3—local bus; mates with backplane connector J3

Front of the card—FIGURE 3-5 shows the connectors at the front of the card; these connectors connect to the cache memory card in the other subsystem chassis, transmitting data over the MC bus:

- J1—address/data

- J2—address/data

- J3—address/data/control

- J4—arbitration

Base address switch S1;
Some cards have S1 on
opposite side of card

Front edge of card

LEDs

GND

J1

+5V

J2

P1

P2

P3

LREFENA
(alternate location,
some models)

General location of jumpers
LREFENA, LLBPRES,
OSC, LCLKIN;
refer to TABLE 3-5 for card
reference designators

Switch S1
(some
models)

MODE91
jumper
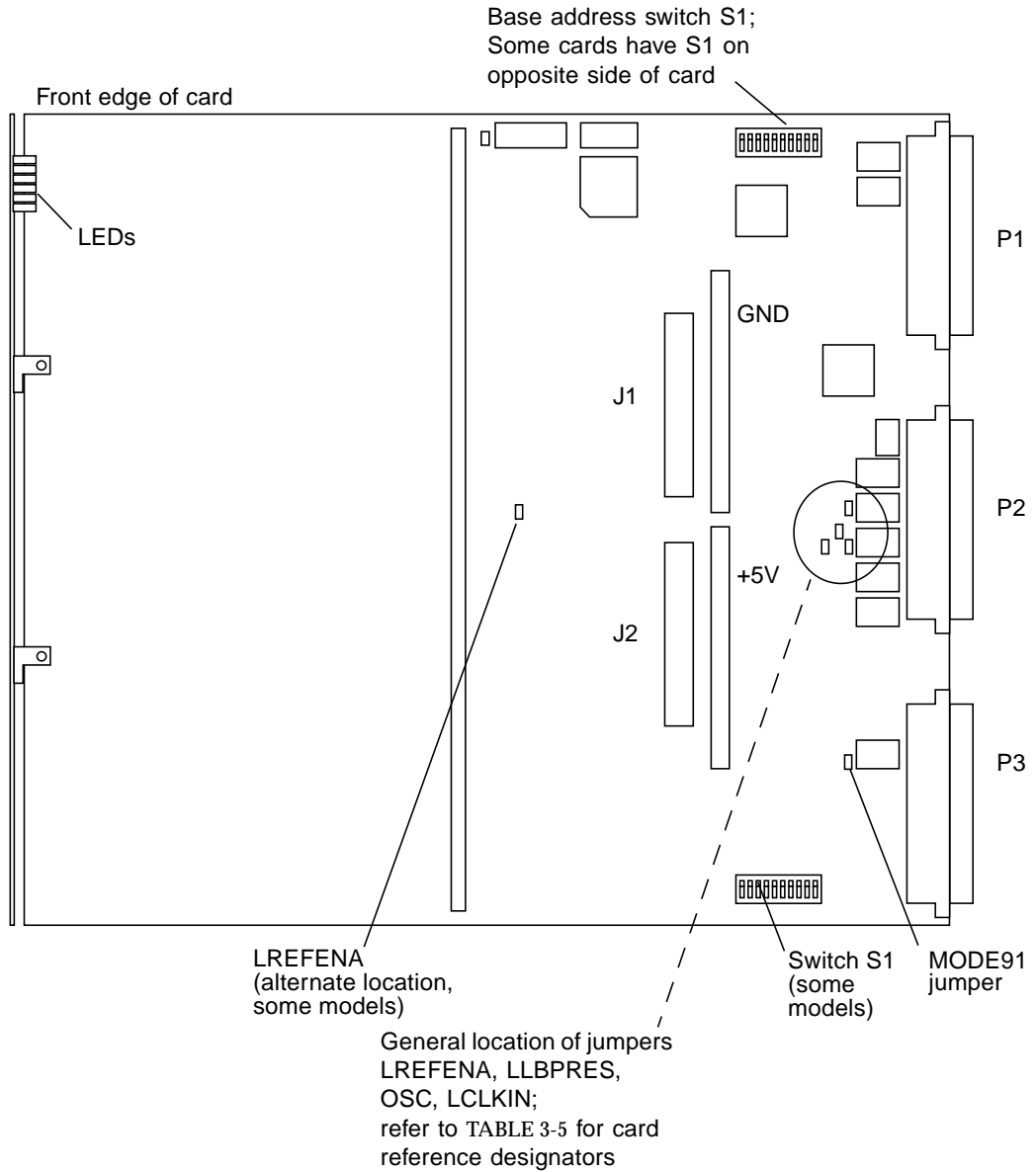
FIGURE 3-4   Cache Memory Card Motherboard (EDRAM)

Onboard MCBUS arbiter

S1
(Node ID)

J5

4 3 2 1

LEDS

GND

P1

J1

+5V

J2

P2

J3

J4

Front edge of card
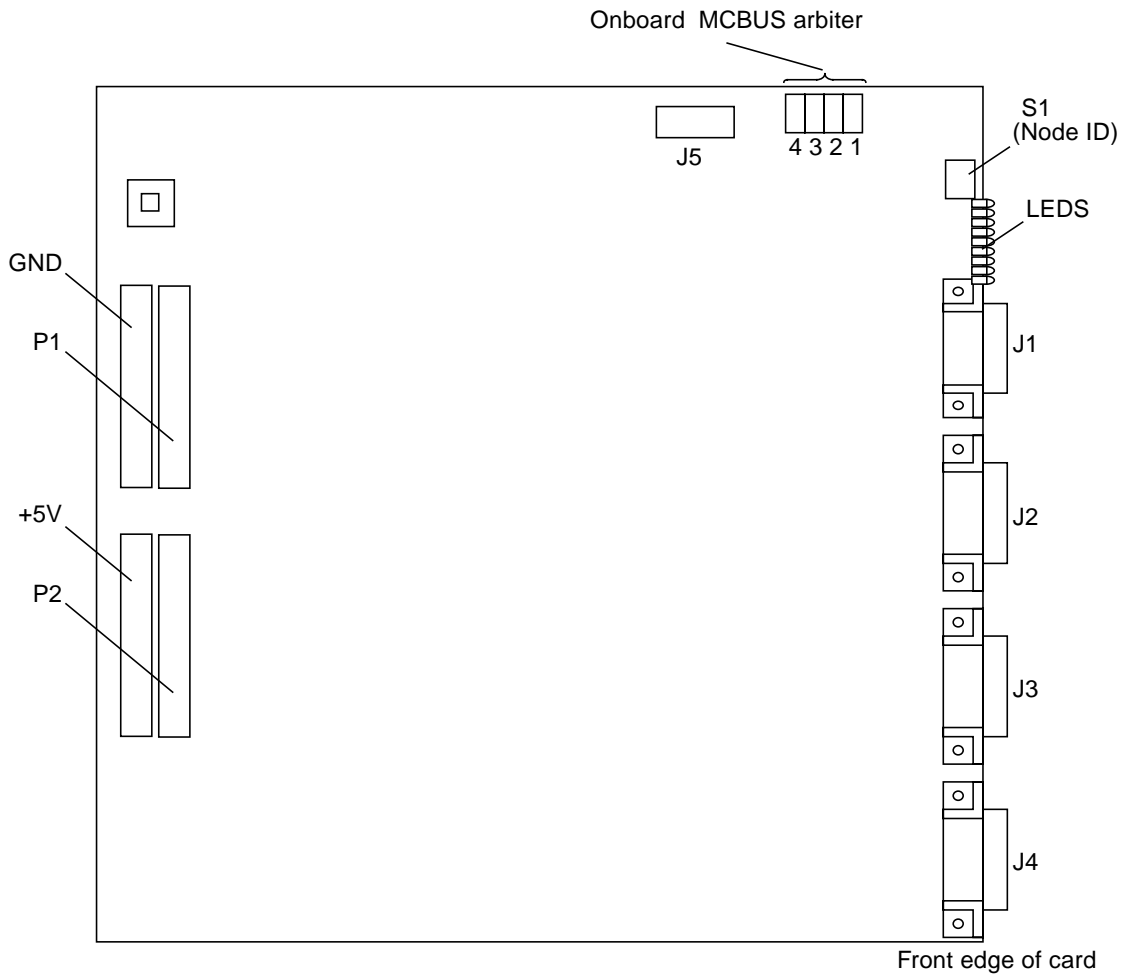
FIGURE 3-5 Cache Memory Card Daughtercard (MCA)

3.3.2 LED Indicators

The front panel has 15 LED indicators; see FIGURE 3-6 and TABLE 3-4. The first six LEDs (MEZREG to ERROR) indicate EDRAM status; the next nine LEDs indicate MCA status. Two LEDs at the top edge of the MCA indicate arbiter status and are described at the end of the table.

TABLE 3-4   Cache Memory Card LED Indicators

LED	When Lighted, Indicates...
MEZREG	Memory is servicing a request from the Mezzanine port
LOCREQ	Memory is servicing a local bus port request
VMEREQ	Memory is servicing a VMEbus port request
LOCAL	The local bus interface is software enabled
VME	The VMEbus interface is software enabled
ERROR	One of the following EDRAM card errors has occurred: • Local bus address parity error • Local bus control parity error • Local bus data bus parity error • VMEbus interface internal bus parity error • Mezzanine interface internal bus parity error • Memory read multibit error
ARBEN	This MCA is the active bus arbiter for this MC bus, controlling the arbitration logic (refer to switch S2, FIGURE 3-5)
ONLIN	Cache is online; MCA can transmit/receive MC bus data
MCTX	The MCA is sending single-word snoop transfers to the MC bus
DMATX	Indicates a DMA read; the MCA is sending DMA transfers to the MC bus
STALL	The MCA will not allow the EDRAM card to accept VME/local bus write transfers; usually because MCA transmit FIFO is full
GBSY	The Global receive FIFO is full or busy
NBUSY	The MCA Local receive FIFO is full or busy
TXHALT	A transmit halt on error condition

TABLE 3-4   Cache Memory Card LED Indicators *(Continued)*

LED	When Lighted, Indicates...
ERROR (red)	Any one of the following conditions exist: • DMA access error • Received multibit error during address phase transfer • Received multibit error during data phase transfer • Receive buffer FIFO overrun • Receive frame error • Write access error • Invalid node ID • Invalid sub-block size • Command overflow • Command sequence error • Transmit FIFO overflow • Unexpected address phase grant • Transmit lost end of block • Transmit lost grant
PRIMARY	This arbiter is a candidate for Primary Arbiter; when not lighted, this LED indicates that this arbiter is a candidate for Secondary Arbiter. See FIGURE 3-9
FAILOVER	This Secondary Arbiter has detected a failure in the Primary Arbiter, and has assumed Primary Arbiter status. See FIGURE 3-9
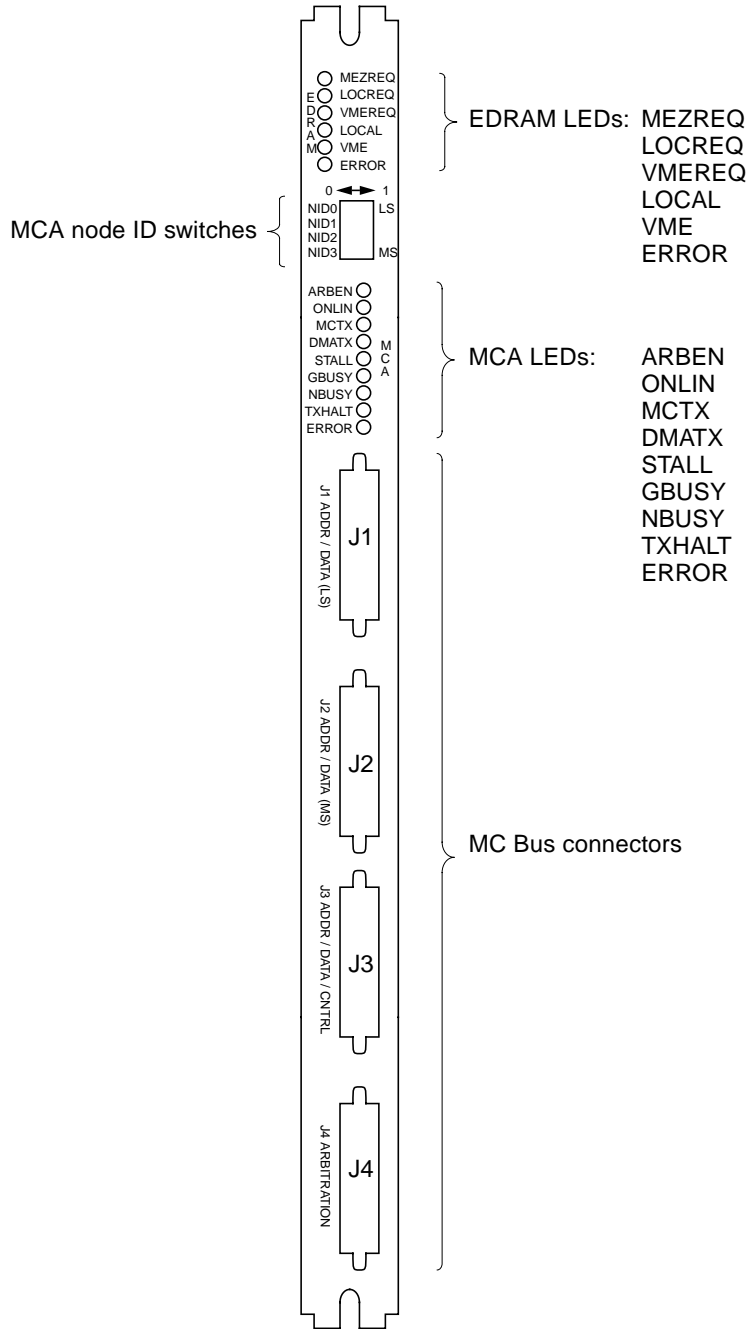
FIGURE 3-6 Cache Memory Card Front Panel

3.3.3   Base Address DIP Switch

The DIP switch S1 on the cache memory card motherboard is used to program the base address in the VME short address space. See FIGURE 3-7. The first cache memory card installed in each chassis has the same base address of 0000 (hex), as installed.

Address 0000

Address 2000

Address 1000

Address 3000
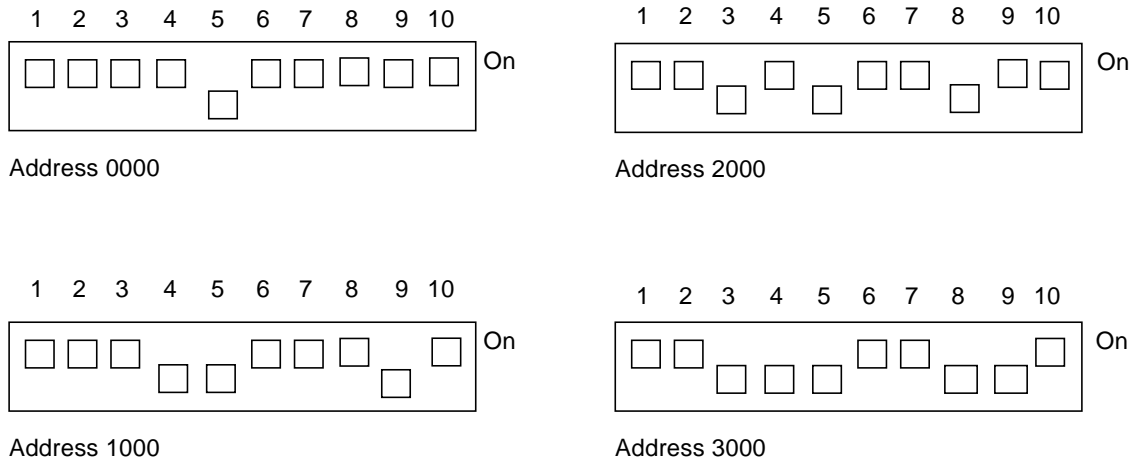
FIGURE 3-7   Cache Memory Card Base Address Settings, Switch S1

3.3.4   Subsystem (Node) ID Switches

The cache memory card in each chassis has its own subsystem (node) ID number, selected using switch S1. The switch is located on the front panel of the daughtercard (MCA; see FIGURE 3-6). For chassis DSP1, the factory set ID number is 1; for chassis DSP2, the factory set ID number is 2. See FIGURE 3-8.

Note – When installing RDC FORM, change the Cache Memory Card daughtercard (MCA) node ID:

If the TMI card bus ID is 1, the DSP1 MCA node ID is 2 and the DSP2 MCA node ID is 3.

If the TMI card bus ID is 2, the DSP1 MCA node ID is 4 and the DSP2 MCA node ID is 5.

See FIGURE 3-34 for TMI card bus ID jumper settings.

Caution – Do not set the Node ID switch while the cache memory card is online.
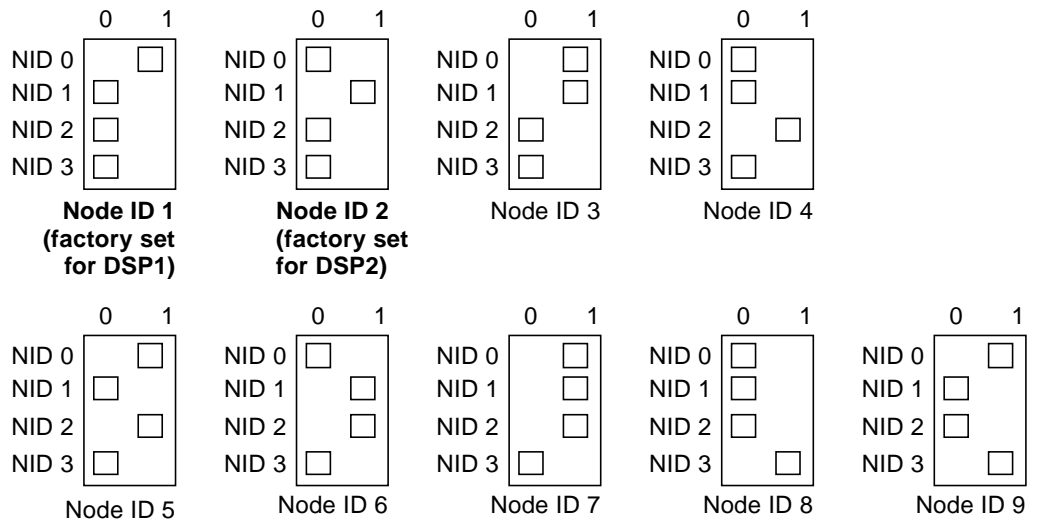
Valid Node IDs are 1 through 9

FIGURE 3-8 Cache Memory Card Subsystem (Node) ID Switch Settings

3.3.5 Jumpers

The EDRAM card has five significant jumpers. FIGURE 3-4 shows where these jumpers are located. The jumpers are set according to the card part number. Refer to TABLE 3-5.

- LLBPRES
- LREFENA
- MODE91
- LCLKIN
- OSC

The MCA (part number 501-5112-xx/160-113344-001) has twelve jumpers located at the top edge of the card. See FIGURE 3-9.

One early version of the MCA (old part number 160-113317-001, -002/no Sun part number) has four jumpers labeled 1, 2, 3, and 4. See FIGURE 3-10.

TABLE 3-5 Cache Memory Card (EDRAM) Jumper Settings

Card Part Number	Old Card Part Number	Jumper (Reference Designator on Card)	Jumper Position
565-1458-xx	118-113081-001	LLBPRES (O3H4)	Installed
565-1459-xx	118-113081-002	LREFENA (O0G7)	Not installed
		MODE91 (O2C8)	Installed
		LCLKIN (O1G7)	Installed
		OSC (O3G7)	Not installed
565-1460-xx	118-113081-005	LLBPRES (O3H4)	Installed
565-1461-xx	118-113081-006	LREFENA (O0G7)	Not installed
	118-113081-011	MODE91 (O2C8)	Installed
565-1462-xx	118-113081-012	LCLKIN (N7G5, pins 2 to3)[1]	Installed
		OSC (N7G5, pins 1 to 2)	Not installed
565-1463-xx	118-113081-013	LLBPRES (O3H4)	Installed
565-1464-xx	118-113081-014	LREFENA (O0G7)	Not installed
		MODE91 (O3C8)	Not installed
		LCLKIN (N7G5, pins 2 to3)[1]	Installed
		OSC (N7G5, pins 1 to 2)	Not installed

1. These cache memory cards combine the OSC and LCLKIN on a single three-pin jumper block, using a single jumper. A jumper installed at pins 1 and 2 enables OSC; a jumper installed at pins 2 and 3 enables LCLKIN. A jumper at pins 2 and 3, enabling LCLKIN, is the factory-installed default for these cards.

FIGURE 3-9 Cache Memory Card Daughtercard (MCA) Jumpers

The figure contains the following labels:

Front of card

EDRAM

MCA

FAILOVER

PRIMARY

60/75NS CLK

ARB ENABLE; see Note 2

Bus turnaround cycles

J9

Burst ID

J7

J6

J8

Inhibit failover

Primary; see Note 1
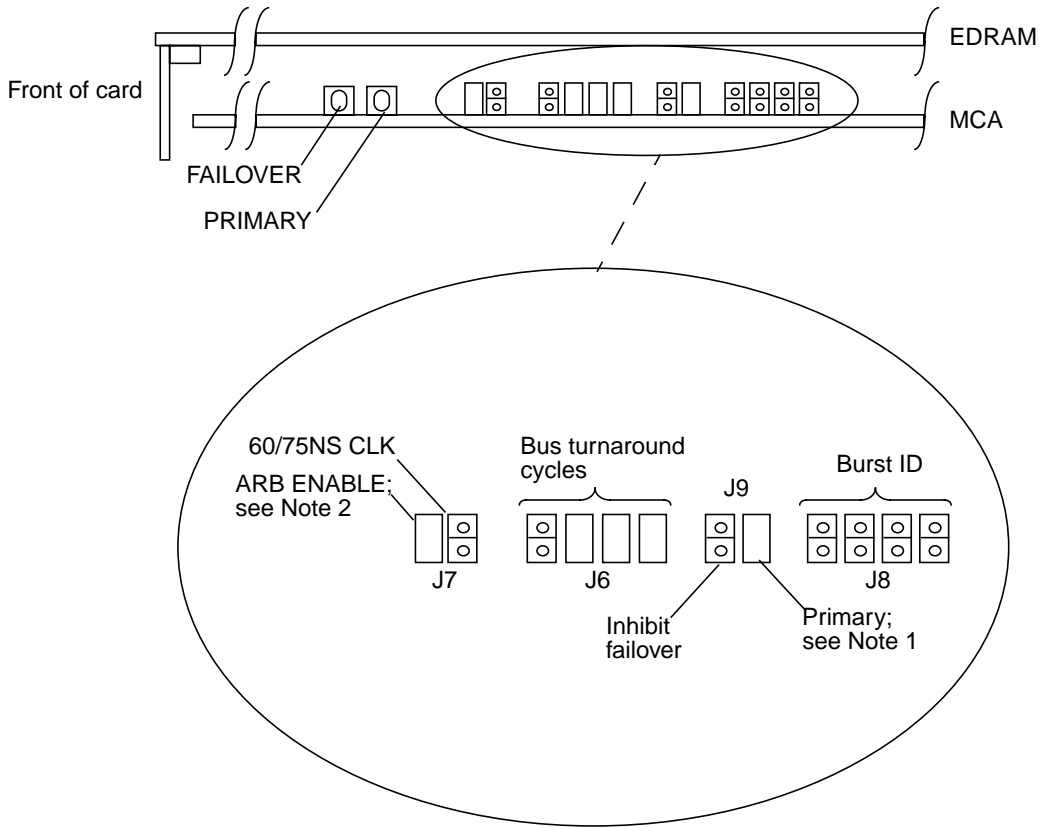
NOTE 1: Remove this jumper from the card in DSP1;
install this jumper on the card in DSP2

NOTE 2: Remove this jumper from cards in DSP1 and DSP2
when RDC FORM is installed

= Jumpers installed

= Jumpers not installed

Front of card

EDRAM

MCA

Bus turnaround
cycles

1 2 3 4

ARB ENABLE;
see Notes 1 and 2

NOTE 1: Remove this jumper from the card in DSP2;
install this jumper on the card in DSP1

NOTE 2: Remove this jumper from cards in DSP1 and DSP2
when RDC FORM is installed

= Jumpers installed

= Jumpers not installed
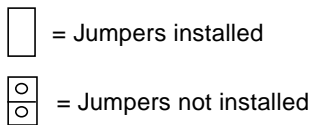
FIGURE 3-10 Cache Memory Card Daughtercard (MCA) Jumpers (Part Number 160-
113317-001∕002)

3.3.6   Cabling

The cache memory card in DSP1 is cabled directly to the cache memory card in DSP2
with daisy-chain bus cables. The J1 through J4 connectors, located on the front edge
of the cache memory card in chassis 1, connect to the J1 through J4 connectors on the
front edge of the cache memory card in chassis 2.

3.4 Quad-Channel Block Multiplexor Channel Card and Driver/Receiver Card

The quad-channel block multiplexor channel (BMC) card (part number 565-1469-xx) consists of a 9U VME PCB occupying a single slot in the StorEdge A7000 chassis. It cables to a driver/receiver card on a transition panel in the I/O bay cabinet. The driver/receiver card connects to bus and tag cables.

Note – The quad-channel BMC card is not qualified to and cannot work in the same chassis/system with cache memory cards of part number 501-5081-xx/160-113343-001. These cache memory cards are typically 64 Mbyte and 256 Mbyte configurations.

3.4.1 Quad-Channel BMC Card

This section describes the connectors, LED indicators, hex display, switch settings, and jumper settings of the quad-channel BMC card.

3.4.1.1 Connectors

Rear of the BMC card—FIGURE 3-11 shows the connectors at the rear of the card:

- P1—VMEbus; mates with backplane connector J1
- P2—VME Extended; mates with backplane connector J2
- P3—power/ground; mates with backplane connector J3

Front of the BMC card—FIGURE 3-12 shows the connectors at the front of the card:

- The front panel connectors consist of four 80-pin channel connectors and one serial port. The channel connectors are cabled to the transition panel holding the driver/receiver board. The serial port provides the BMC with a serial interface for extended diagnostics.

Switch S1

Jumper:
Default is
pins 2 and 3
are jumpered

Channel 0

P1

7-segment
hex display

On
1
8

IOGB
1
2

1
2
3

Channel 1

Channel 2

P2

7-segment
hex display

Channel 3

P3

Front edge of card

Switch S2
(not used)

☐ = Jumpers installed   ⊡ = Jumpers not installed
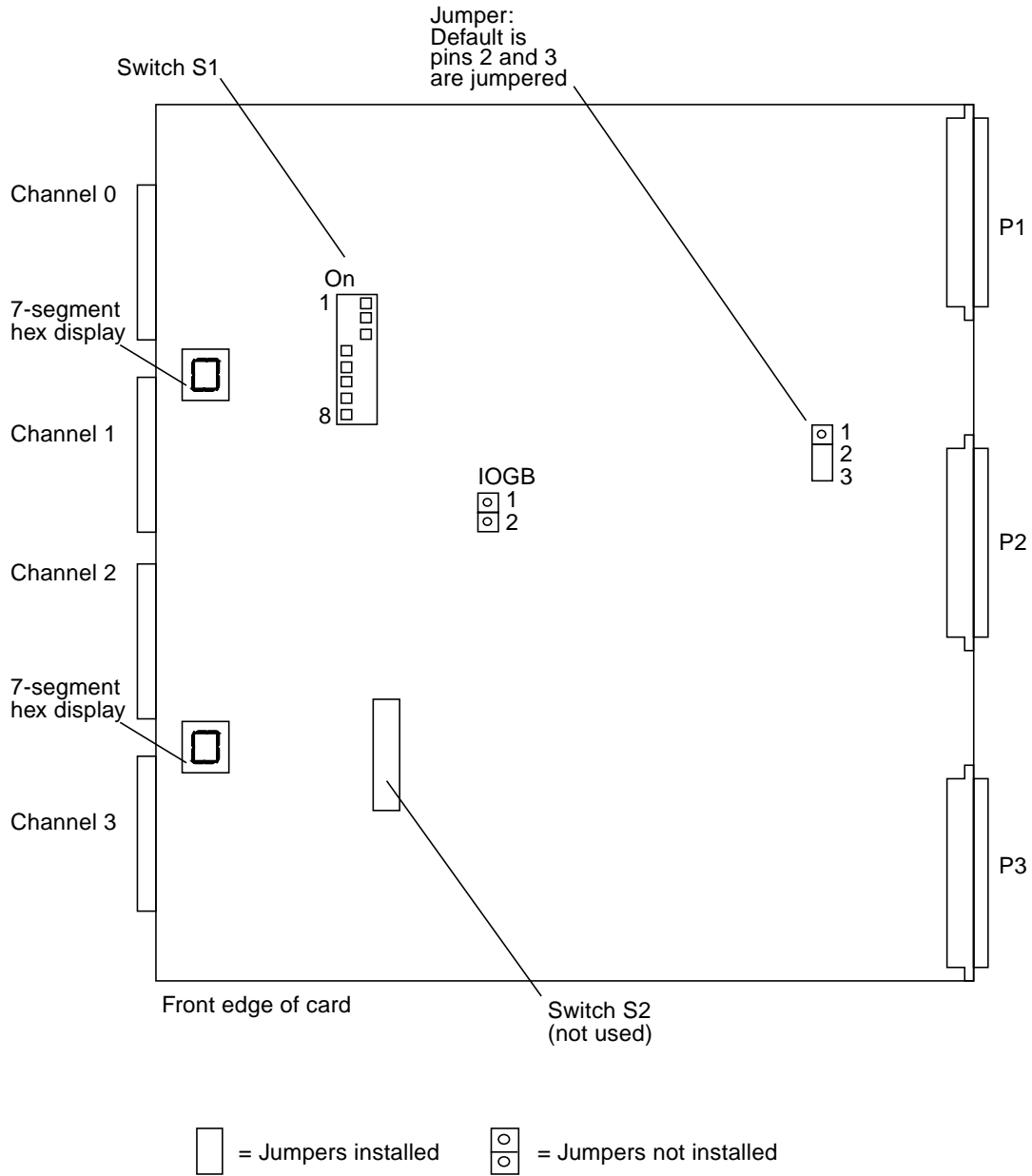
FIGURE 3-11 Quad-Channel BMC Card Layout

3.4.1.2 LED Indicators and Hex Display

The nine LEDs are seen on the card's 9U front panel; see FIGURE 3-12 and TABLE 3-6

TABLE 3-6   Quad-Channel BMC Card LED Indicators

LED	When Lighted, Indicates...
DMA 0, 1, 2, 3	Communication on channel interfaces 0 though 3
VICAB	VMEbus access or transfer
FAIL1	BMC adapter is executing a microdiagnostic test. This LED remains lighted if the test fails; it turns off if the test passes
CPU 1 FAIL	BMC card is executing an internal self-test. This LED remains lighted if the card's i960 microprocessor test fails; it turns off if the test passes
FAIL0	BMC card is executing a microdiagnostic test. This LED remains lighted if the test fails; it turns off if the test passes
CPU 0 FAIL	BMC card is executing an internal self-test. This LED remains lighted if the card's i960 microprocessor test fails; it turns off if the test passes

A seven-segment hex display is on the right side of the card. If a filler card or other option card is next to the quad-channel BMC, it is not visible. TABLE 3-7 shows the display definition.

TABLE 3-7   Quad-Channel BMC Hex Display Definition

Seven Segment Display	Definitions
0	Startup Phase
.0.	Operational Phase
1	Test 1—UART local loopback test
2	Test 2—VIC write/read register test
3	Test 3—BTI-0 write/read register test
4	Test 4— BTI-1 write/read register test
5	Test 5—buffer memory read/write test
6	Test 6—BTI-0 buffer memory/DMA test
7	Test 7—BTI-1 buffer memory/DMA test
8	Test 8—interrupt test

TABLE 3-7   Quad-Channel BMC Hex Display Definition *(Continued)*

Seven Segment Display	Definitions
9	Test 9—timer test
A	Test 10—VME DMA test
B	Test 11—BTI-0 internal loopback test
C	Test 12—BTI-1 internal loopback test
D	Test 13—BTI-0 external loopback test
E	Test 14—BTI-1 external loopback test
F	Test 15—BTI-0 Dataware test
10	Test 16—BTI-1 Dataware test
.C.	Control Store error
.D.	Fatal Interrupt error
.F.	Fatal Fault error
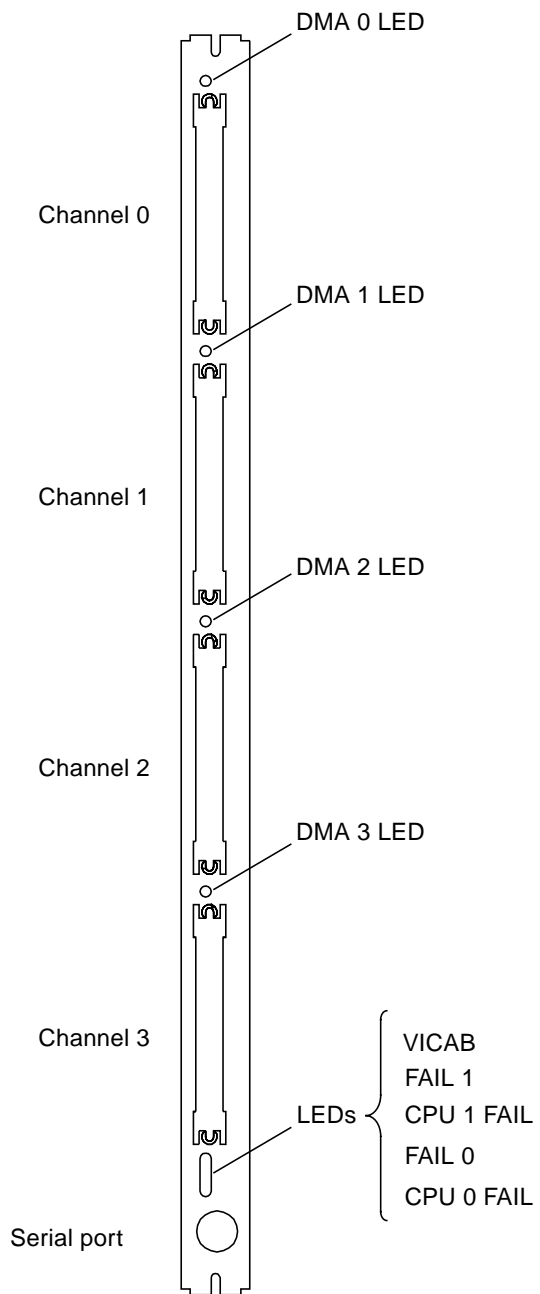
FIGURE 3-12 Quad-Channel BMC Card Front Panel and LEDs

3.4.1.3 Switch Settings

The quad-channel BMC card contains two switches: S1 selects the card base address, S2 is unused. FIGURE 3-11 shows the location of S1. FIGURE 3-13 shows the switch settings for various addresses.

Address E000 Address E400 Address E800

Address EC00 Address F000 Address F400
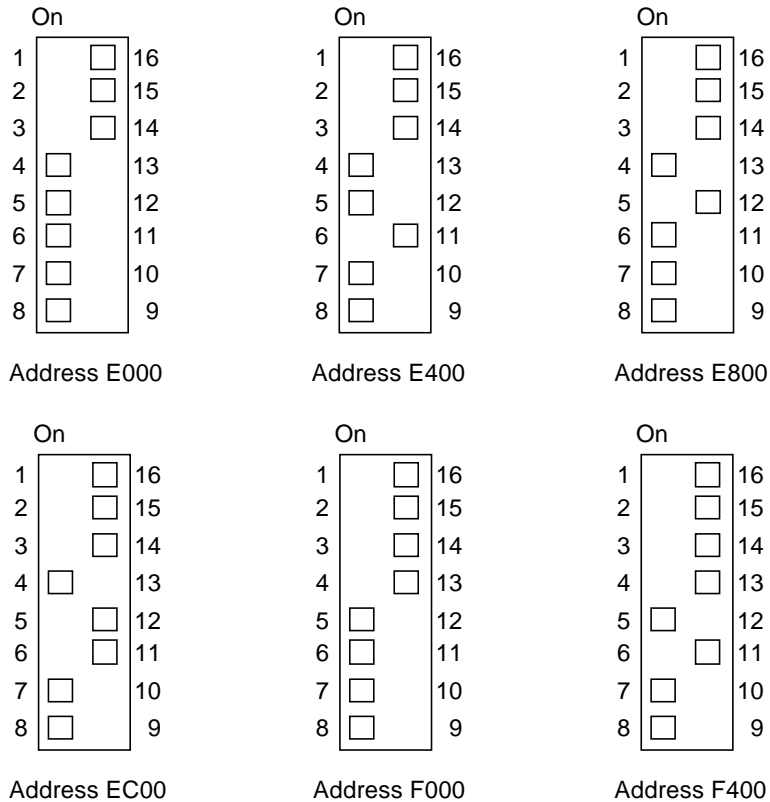
FIGURE 3-13 Quad-Channel BMC Card Base Address Settings

3.4.1.4 Jumper Settings

The quad-channel BMC card contains two jumpers, set as shown in FIGURE 3-11.

3.4.2 Driver/Receiver Card

This section describes the LED indicators, jumper settings, and switch settings of the driver/receiver card.

3.4.2.1 LED Indicators

FIGURE 3-14 shows the LED indicators for the driver/receiver card, inside the I/O bay cabinet. The LEDs for each channel (0 or 1) are defined in TABLE 3-8.

TABLE 3-8   BMC Driver/Receiver Card LED Indicators

LED	When Lighted, Indicates...
PWR	Card is powered on
FAIL	An internal card error or powerup failure
ACTIVE	Channel communication is occurring
XOVR	Channel is driving the crossover/failover function

3.4.2.2 Jumper Settings

FIGURE 3-15 shows the jumper settings for the driver/receiver card mounted on the transition panel, inside the I/O bay cabinet.

3.4.2.3 Switches

Each channel interface of the BMC card contains circuitry for an online/offline switch. This switch, shown in FIGURE 3-14, is located at the driver/receiver card inside the I/O bay cabinet.

Each online/offline switch is a spring-loaded toggle switch that must be in the online position (1) for channel operations to occur in the StorEdge A7000. To put it in either position, pull the switch out and move it up or down. The spring locks the switch into place.

LEDs
(four places)

PWR
FAIL
ACTIVE
XOVR

CH0

PWR
FAIL
ACTIVE
XOVR

CH1

CH0 CH1

OFFLINE
ONLINE

TAG OUT   CH0
TAG IN   CH0
BUS OUT   CH0
BUS IN   CH0
TAG OUT   CH1
TAG IN   CH1
BUS OUT   CH1
BUS IN   CH1

PWR
FAIL
ACTIVE
XOVR

CH0

PWR
FAIL
ACTIVE
XOVR

CH1

CH0 CH1

OFFLINE
ONLINE

(2) Spring-loaded
channel online/offline switches

I/O bay cabinet side
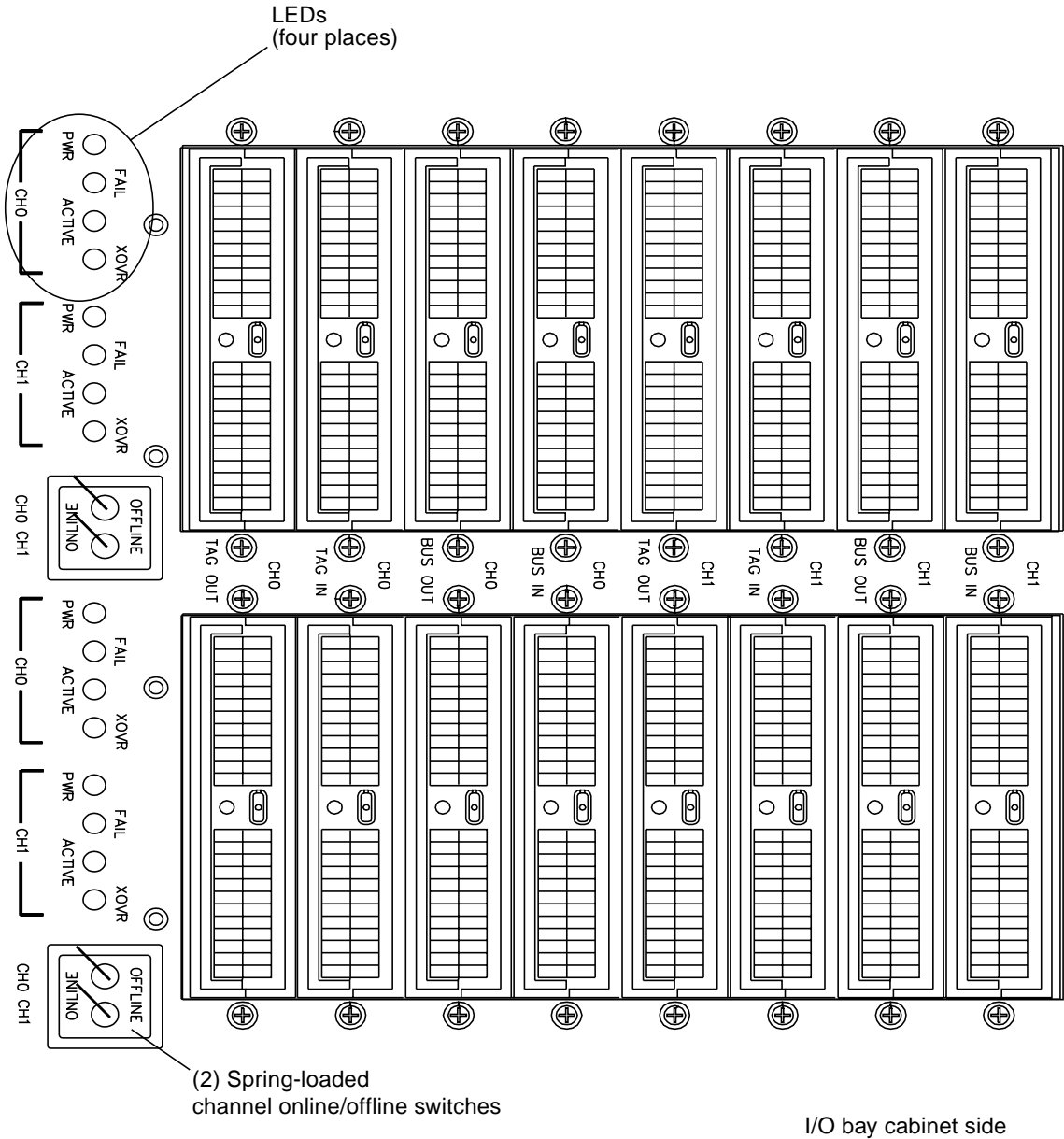
FIGURE 3-14 Bus and Tag Driver/Receiver Card Switches and LEDs

J2, Channel 1

Cabinet side mounted
transition panel (solder side)

J1, Channel 0

Jumper I2A2B
(Channel 1)

Jumper C0A2B
(Channel 0)
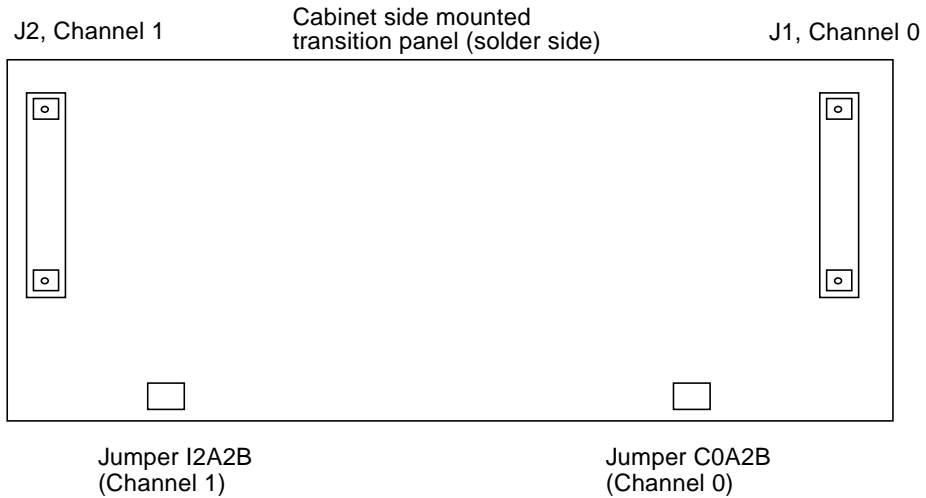
Three different settings for jumpers I2A2B OR C0A2B are:

Pin 1

Pin 1

Pin 1

Low priority

High priority
Use this setting if
your configuration
includes ESCON adapters in the
same chassis

External test
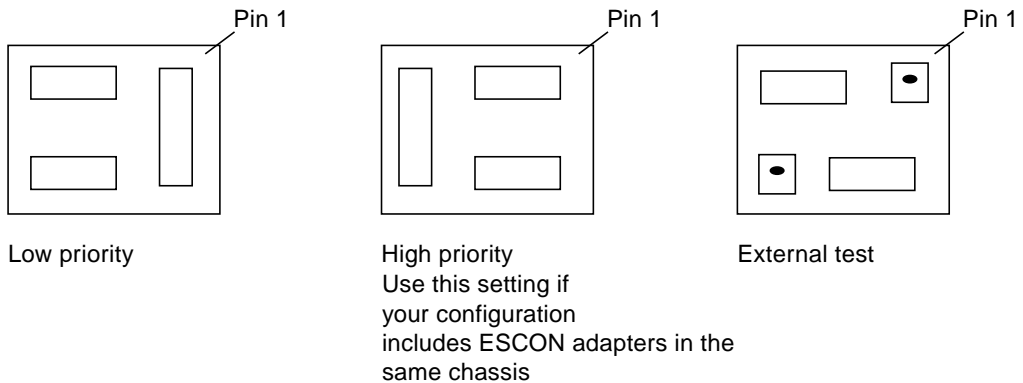
☐ = Jumpers installed

▢• = Jumpers not installed

FIGURE 3-15 Bus and Tag Driver/Receiver Card Jumpers

3.5   Dual-Channel ESCON to VME Card and Interface Panel

Each dual-channel ESCON to VME interface card (part number 501-5075-xx) connects to an interface panel inside the I/O bay cabinet. The card has five front panel connectors, one jumper, and one address switch. The interface panel has connectors, online and fiber optic switches, and status LEDs.

3.5.1   Dual-Channel ESCON to VME Card

This section describes the connectors, LED indicators, hex display, switches, and jumpers of the dual-channel ESCON to VME card.

3.5.1.1   Connectors

Rear of the card—FIGURE 3-16 shows the connectors at the rear of the card:

- P1—VMEbus; mates with backplane connector J1
- P2—VME/local bus; mates with backplane connector J2
- P3—local bus; mates with backplane connector J3

Front of the card—FIGURE 3-17 shows the connectors at the front of the card:

- Diagnostic port—serial port interface for onboard code debugging
- Channel 0/Channel 1 connector—connects the ESCON fiber optic cable to the transceiver
- Control/Status connector—port that connects by ribbon cable to the transition panel

3.5.1.2   LED Indicators and Hex Display

The front panel of the ESCON board has six LEDs; three for channel 0 and three for channel 1; refer to TABLE 3-9.

TABLE 3-9   Dual-Channel ESCON to VME Card LED Indicators

LED	When Lighted, Indicates...
ONLINE	The interface panel online/offline switch is in the online position, for that channel
FAIL	Card channel failed its internal diagnostics
LIGHT	Card Fiber Optic Transceiver is receiving signals; valid only when the channel connection has been brought online by software

Each channel has one hex display. TABLE 3-10 defines the codes.

TABLE 3-10   Dual-Channel ESCON to VME Interface Card Hex Display Definition

Hex Display	Definition
0	Idle, waiting for commands
1	Decoding command byte
2	Waiting for next byte of command packet
C	Operational, Idle loop
8	Operational, Processing Channel Interrupt (flickering indicates normal operation; solid 8 indicates card is hung)
0.	Executing Reset command
1.	Executing Revision command
6.	Executing Diag command
7.	Executing Initialize command
.1	Test 1
.2	Test 2
.3	Test 3
.4	Test 4
.5	Test 5
.6	Test 6
.7	Test 7
.2.	Invalid Command error

TABLE 3-10   Dual-Channel ESCON to VME Interface Card Hex Display Definition

Hex Display	Definition
.6.	Invalid Command error
.0.	Download error
.1.	Control Store error
.2.	Control Store error
.4.	Bus or Parity Error
.5.	Fatal Fault error

Switch S2

Jumper N700
See Detail A below

DIS ▢ EN

P1

8   1   On

P2

P3

Front edge of card

Detail A
1 2 3   Jumper N700
DIS ▢ EN   (Default is pins 1 and 2 jumpered)
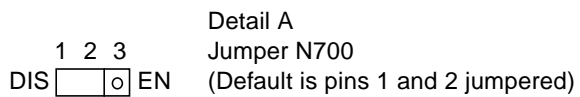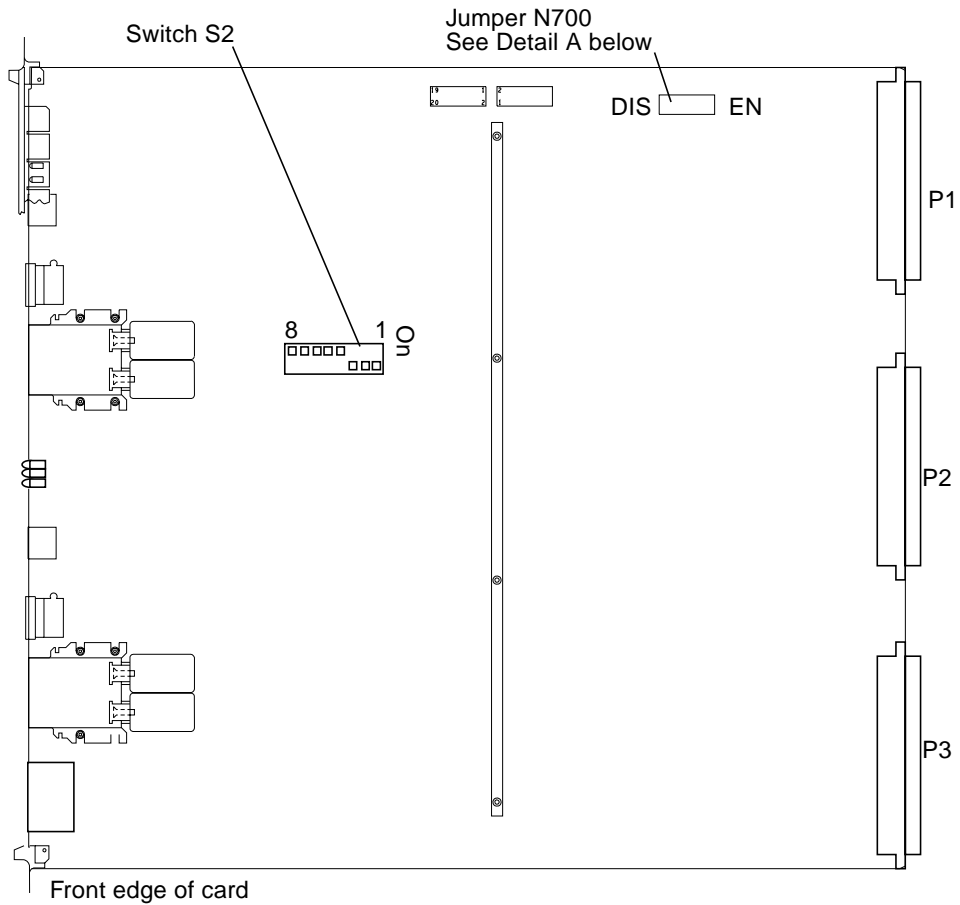
FIGURE 3-16 Dual-Channel ESCON to VME Interface Card Layout
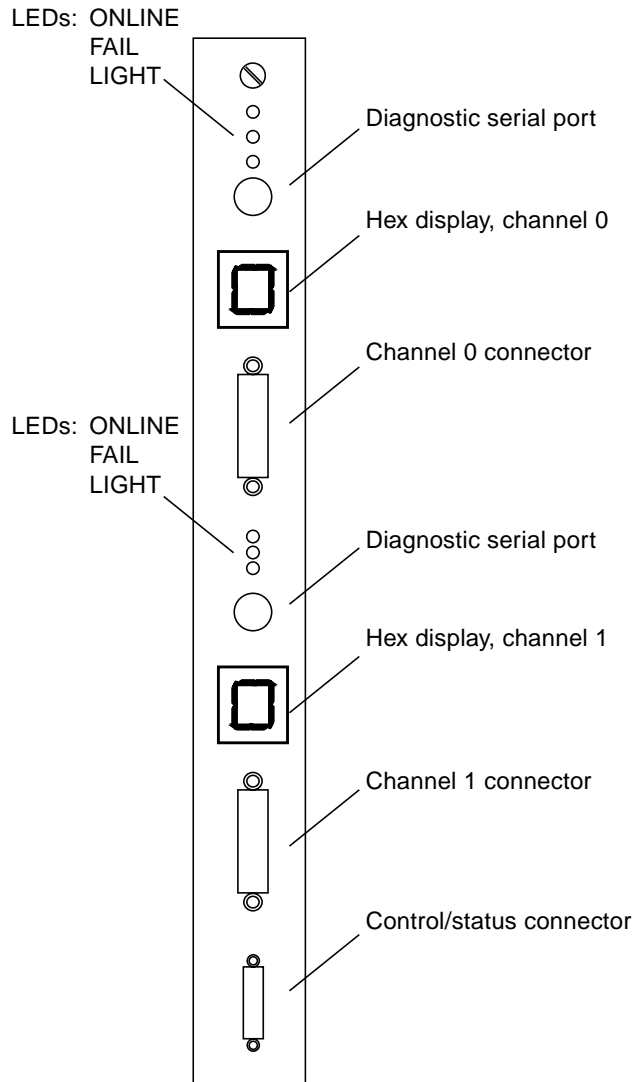
FIGURE 3-17 Dual-Channel ESCON to VME Interface Card Front Panel

3.5.1.3 Switches

The card has an address switch (S2) shown in FIGURE 3-16. FIGURE 3-18 shows the switch settings for various addresses. Typically, if the address of the first card in the StorEdge A7000 configuration is EC00, the second card is EE00, third card is F000, and so on. Set the card's address in multiples of hex 0200 (for example, the address of the first card can be EC00, but the second card can not be ED00—the second card must be set as EE00, and so on).

Address E000   Address E200   Address E400   Address E600

Address E800   Address EA00   Address EC00   Address EE00
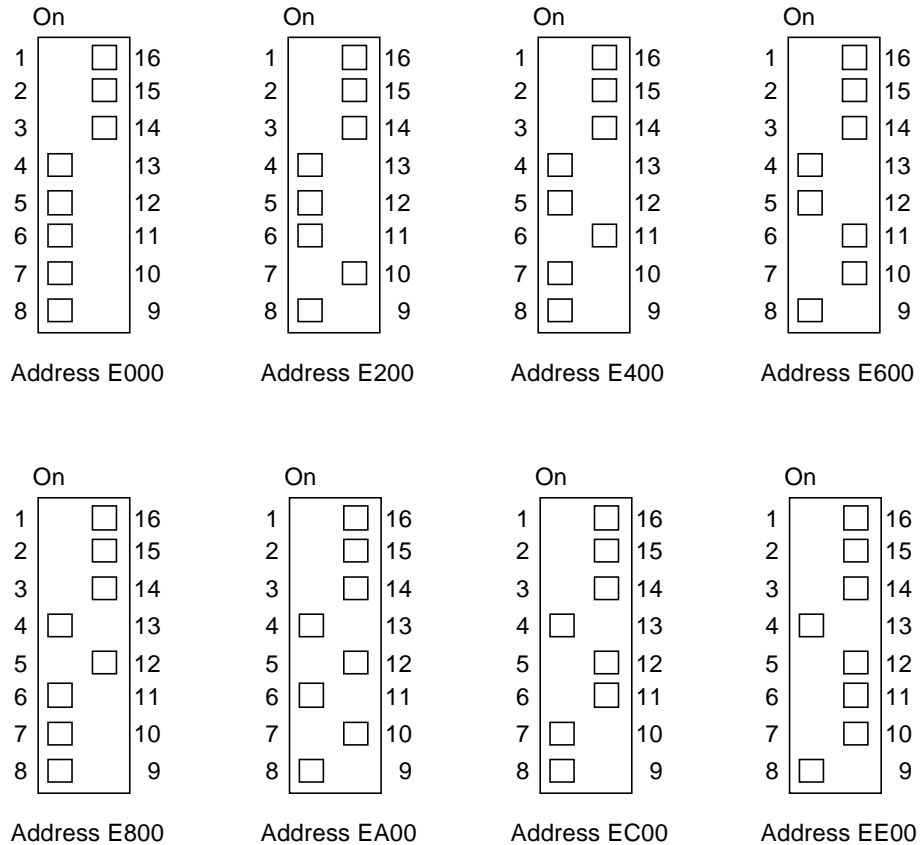
FIGURE 3-18 Dual-Channel ESCON to VME Interface Card Base Address Settings

3.5.1.4 Jumpers

This card has one jumper. See FIGURE 3-16. The default setting is shown, disabling system controller status. Do not change this jumper setting.

3.5.2 ESCON Interface Panel

This section describes the connectors, LED indicates, and switches of the ESCON interface panel.

3.5.2.1 Connectors

Each interface panel has eight internal and eight external channel connectors, as seen from inside the I/O bay cabinet. The internal connectors are cabled to the card; the external connectors are cabled to the mainframe computer.

The rear of the panel has four control/status connectors, as seen from inside the system cabinet. See FIGURE 3-19.

3.5.2.2 LED Indicators

Each channel has two LEDs, as shown in FIGURE 3-19. They are defined in TABLE 3-11.

TABLE 3-11 ESCON Interface Panel LED Indicators

LED	When Lighted, Indicates...
ACTIVE/IDLE	Channel is ready to accept channel communication. When not lighted, this LED indicates a not ready condition
LIGHT/NO LIGHT	Card's Fiber Optic Transceiver is receiving signals. When not lighted, this LED indicates that no signal is being received or the associated channel interface has not been activated by software

3.5.2.3 Switches

Each channel interface of the card has an online/offline switch at the interface panel in the I/O bay cabinet. FIGURE 3-19 shows the switch. Each online/offline switch is a spring-loaded toggle switch that must be in the online position (up) for channel operations. To put it in either position, pull the switch out and move it up or down. The spring locks the switch into place.

External view

Control/status
connectors

Red wires to dsp1
ESCON cards

Orange wires to
channels 1 and 2 below

Blue wires to dsp2
ESCON cards

Green wires to
channels 3 and 4 below

Channel 3 (CH3)
connector

Channel 1 (CH1)
connector

Channel 4 (CH4)
connector

Channel 2 (CH2)
connector
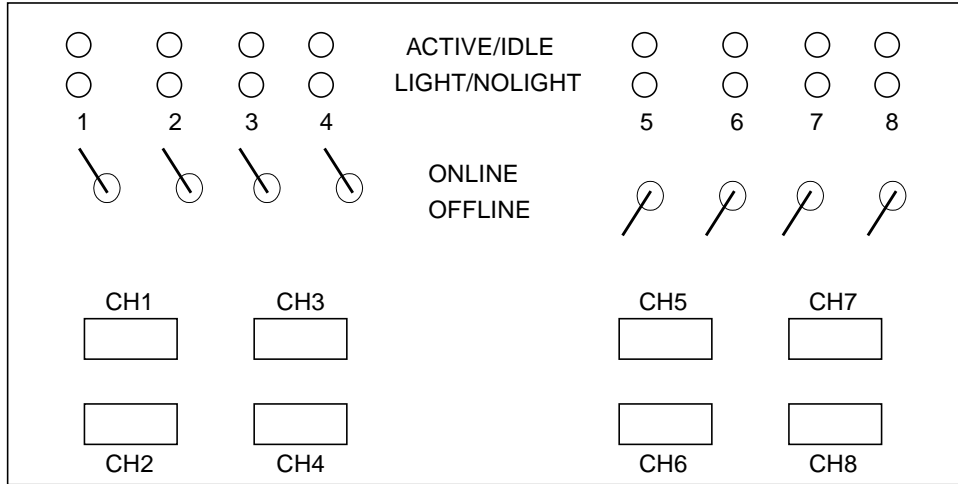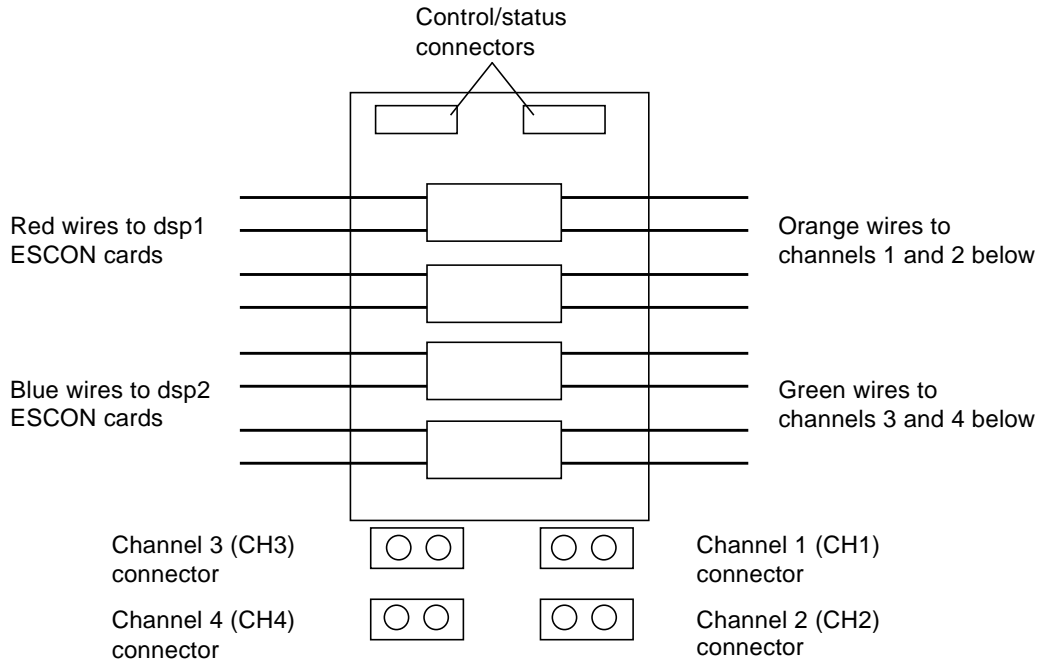
Internal view (inside I/O bay cabinet)

FIGURE 3-19 ESCON Interface Panel (Internal/External Views)

3.6 Integrated Quad-Channel SCSI Controller with RAID

Each integrated quad-channel SCSI controller card (part number 375-0067-xx) is a 9U VME PCB and has four differential SCSI ports on its faceplate. See FIGURE 3-20 for a general layout.

3.6.1 Connectors

Rear of the card—FIGURE 3-20 shows the connectors at the rear of the card:

- P1—VMEbus; mates with backplane connector J1
- P2—VMEbus; mates with backplane connector J2
- P3—VMEbus; mates with backplane connector J3

Front of the card—FIGURE 3-20 shows the connectors at the front of the card:

- The faceplate has four independent differential SCSI ports. Each port is a 68-pin connector

⚠️ **Caution –** You can damage this card if you connect or disconnect cables while termination power is present; jumpers J2, J3, J4, and J5 are factory-installed for termination power.

3.6.2 LED Indicators

Each card has 13 LEDs, visible through the front panel; refer to TABLE 3-12.

TABLE 3-12 Integrated Quad-Channel SCSI-Controller LED Indicators

LED	When Lighted, Indicates...
7, 9, 11, 13, BUSY, Switches	SCSI Bus is busy
6, 8, 10, 12, TPWR	Termination power is available for that port; jumpers J2, J3, J4, and J5 are factory-installed for termination power
5, BDOK	When green, this LED indicates that the card is functioning properly. When red, this LED indicates that the card is not functioning properly. If not lighted, the card is not powered

TABLE 3-12   Integrated Quad-Channel SCSI-Controller LED Indicators *(Continued)*

LED	When Lighted, Indicates...
4, S1	Reserved
3, S2	Reserved
2, S3	Reserved
1, S4	Reserved

3.6.3   Jumpers

FIGURE 3-20 shows the factory-installed jumper settings. FIGURE 3-21 shows the jumper settings for the base address.
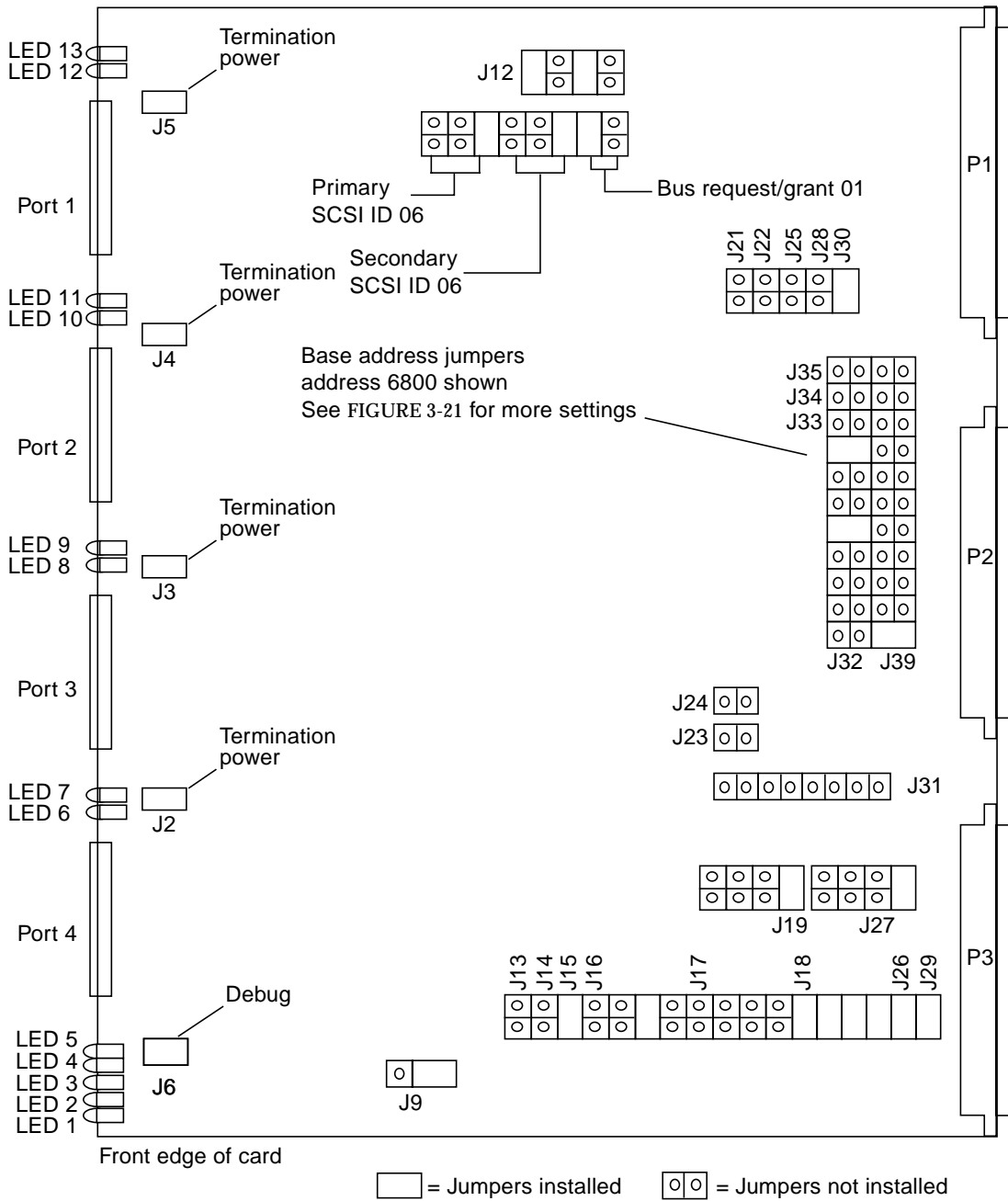
FIGURE 3-20 Integrated Quad-Channel SCSI Controller

J35 J34 J33 J32
Address 6800

J35 J34 J33 J32
Address 7000

J35 J34 J33 J32
Address 7800

J35 J34 J33 J32
Address 8000

J35 J34 J33 J32
Address 8800

J35 J34 J33 J32
Address 9000

J35 J34 J33 J32
Address 9800

J35 J34 J33 J32
Address A000

J35 J34 J33 J32
Address A800

J35 J34 J33 J32
Address B000

J35 J34 J33 J32
Address B800

J35 J34 J33 J32
Address C000

J35 J34 J33 J32
Address C800

J35 J34 J33 J32
Address D000

J35 J34 J33 J32
Address D800

J35 J34 J33 J32
Address E000

J35 J34 J33 J32
Address E800

= Jumpers installed   = Jumpers not installed

FIGURE 3-21 Integrated Quad-Channel SCSI Controller Base Address Jumpers

3.7 Integrated Quad-Channel SCSI Target Mode Controller

Each integrated quad-channel SCSI target mode (STE) controller card (part number 375-0038-xx) is a 9U VME PCB and has four differential SCSI ports on its faceplate. See FIGURE 3-22 for a general layout

3.7.1 Connectors

Rear of the card—FIGURE 3-22 shows the connectors at the rear of the card:

- P1—VMEbus; mates with backplane connector J1
- P2—VMEbus; mates with backplane connector J2
- P3—VMEbus; mates with backplane connector J3

Front of the card—FIGURE 3-22 shows the connectors at the front of the card:

- The faceplate has four independent differential SCSI ports. Each port is a 68-pin connector

Caution – You can damage this card if you connect or disconnect cables while termination power is present; jumpers J2, J3, J4, and J5 are factory-installed for termination power.

3.7.2   LED Indicators

Each card has 13 LEDs, visible through the front panel; see FIGURE 3-22 and TABLE 3-13.

TABLE 3-13   Integrated Quad-Channel SCSI STE Controller LED Indicators

LED	When Lighted, Indicates...
7, 9, 11, 13, BUSY	SCSI Bus is busy
6, 8, 10, 12, TPWR	Termination power is available for that port; jumpers J2, J3, J4, and J5 are factory-installed for termination power
5, BDOK	When green, this LED indicates that the card is functioning properly. When red, this LED indicates that the card is not functioning properly. If not lighted, the card is not powered
4, S1	Reserved
3, S2	Reserved
2, S3	Reserved
1, S4	Reserved

3.7.3   Jumpers

FIGURE 3-22 shows the factory-installed jumper settings. FIGURE 3-23 shows the jumper settings for the base address.
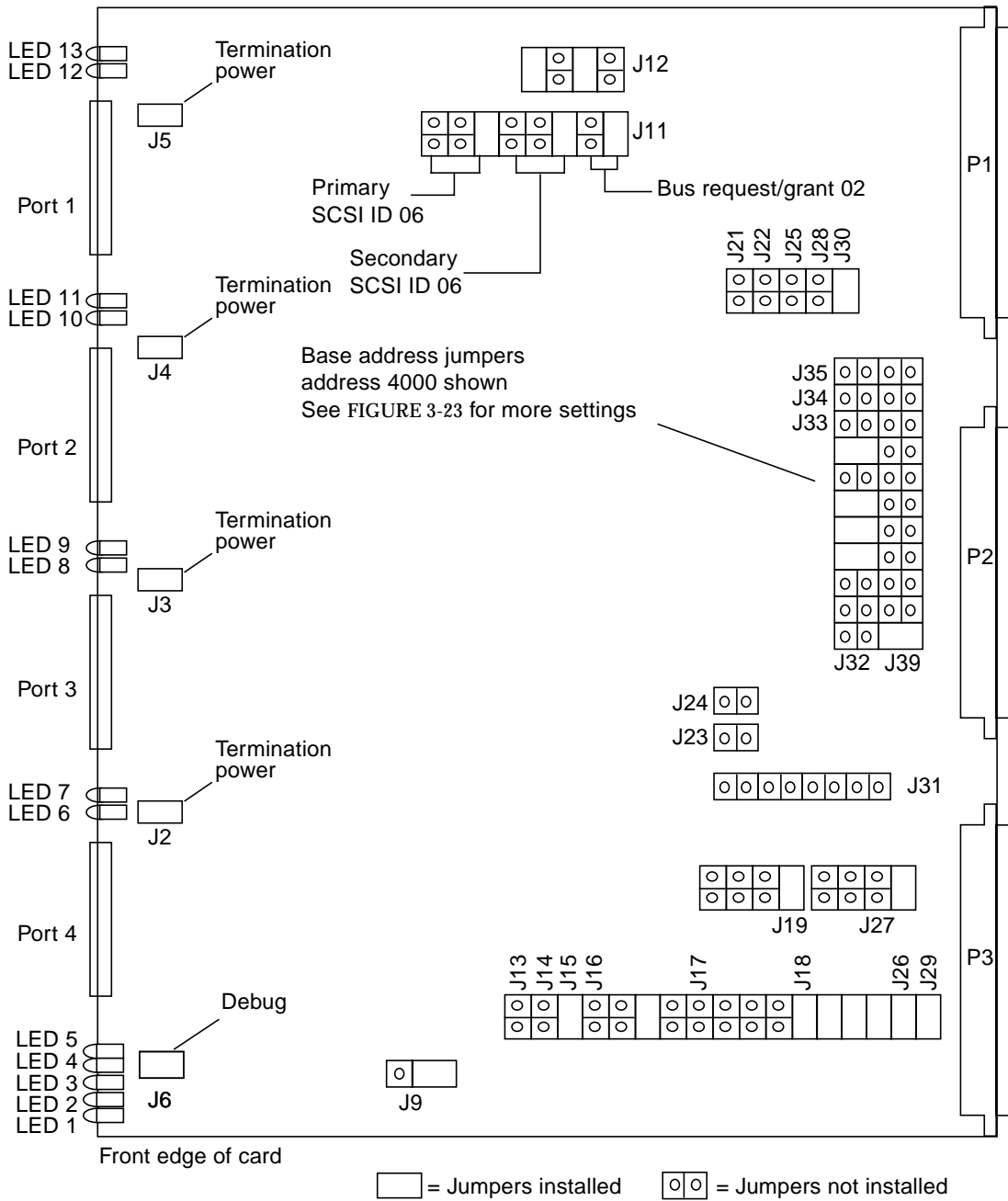
FIGURE 3-22 Integrated Quad-Channel SCSI Target Mode Controller Layout
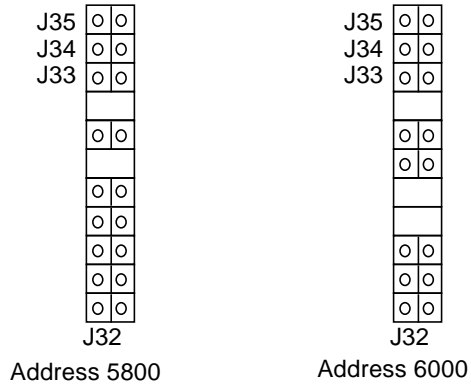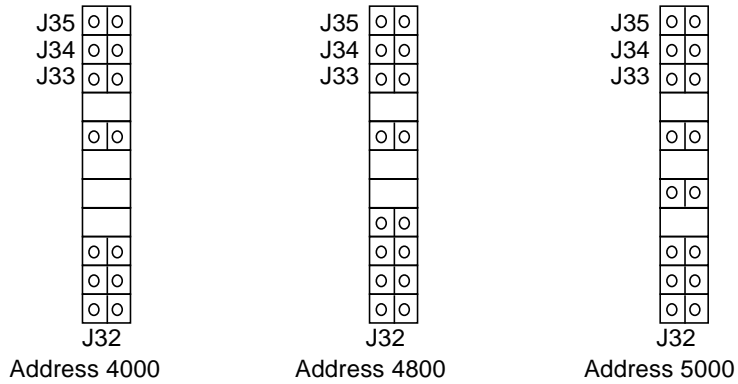
FIGURE 3-23 Integrated Quad-Channel SCSI Target Mode Controller Base Address Jumpers

3.8 Ultra-Wide Quad-Channel SCSI Target Mode Controller

Each ultra-wide integrated quad-channel SCSI target mode (STE) controller card (part number 375-0058-xx) is a 9U VME PCB and has four differential SCSI ports on its faceplate. See FIGURE 3-24 for a general layout.

Note – Two physically-different models of this card exist; one model includes the J6 debug jumper and has its SCSI ID jumper blocks mounted differently. See FIGURE 3-24 and FIGURE 3-25.

3.8.1 Connectors

Rear of the card—FIGURE 3-24 shows the connectors at the rear of the card:

- P1—VMEbus; mates with backplane connector J1
- P2—VMEbus; mates with backplane connector J2
- P3—VMEbus; mates with backplane connector J3

Front of the card—FIGURE 3-24 shows the connectors at the front of the card:

- The faceplate has four independent differential SCSI ports. Each port is a 68-pin connector

Caution – You can damage this card if you connect or disconnect cables while termination power is present; jumpers J2, J3, J4, and J5 are factory-installed for termination power.

3.8.2　LED Indicators

Each card has 13 LEDs, visible through the front panel; see FIGURE 3-24 and TABLE 3-14.

TABLE 3-14　Ultra-Wide Quad-Channel SCSI STE Controller LED Indicators

LED	When Lighted, Indicates...
7, 9, 11, 13, BUSY	SCSI Bus is busy
6, 8, 10, 12, TPWR	Termination power is available for that port; jumpers J2, J3, J4, and J5 are factory-installed for termination power
5, BDOK	When green, this LED indicates that the card is functioning properly. When red, this LED indicates that the card is not functioning properly. If not lighted, the card is not powered
4, S1	Reserved
3, S2	Reserved
2, S3	Reserved
1, S4	Reserved

3.8.3　Jumpers

FIGURE 3-24 shows the factory-installed jumper settings. FIGURE 3-25 shows the jumpers for the SCSI ID; the location of these jumpers depend on the card installed in your system, as shown in FIGURE 3-25.

Note – The SCSI ID jumpers are shown for information only: diagnostic software uses the SCSI ID from these jumpers for default testing purposes; downloaded STE software can override these jumpers and set the ID.

FIGURE 3-26 shows the jumper settings for the base address.
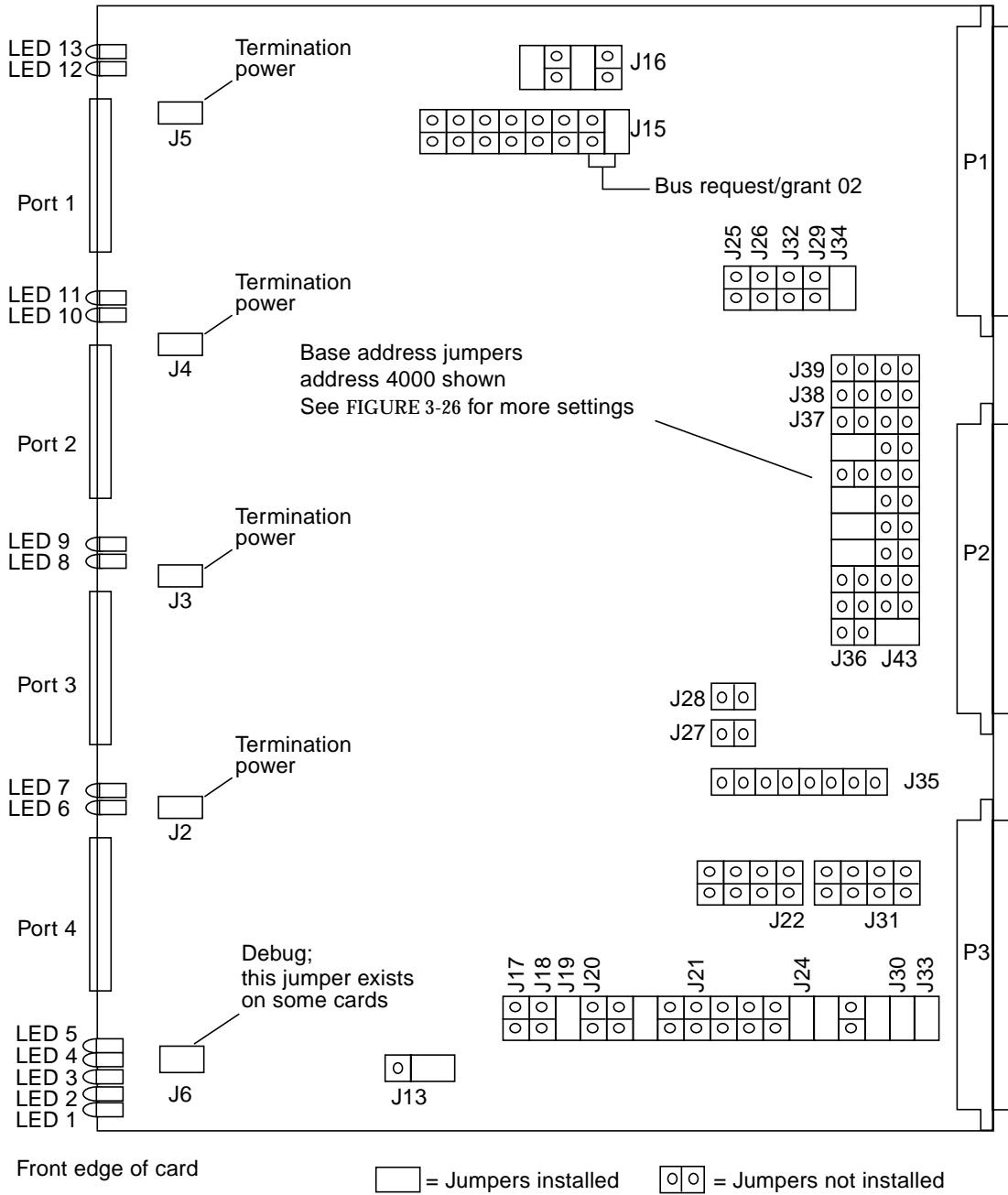
FIGURE 3-24 Ultra-Wide Quad-Channel SCSI Target Mode Controller Layout

SCSI ID 07 (3x or 4x)

This jumper may not
appear on some cards

SCSI ID 07 (4x)

☐ = Jumpers installed |o|o| = Jumpers not installed
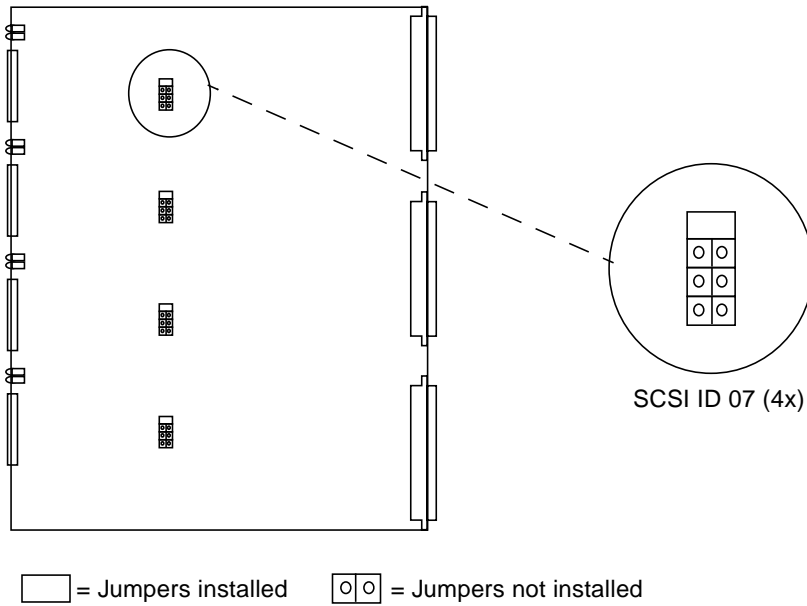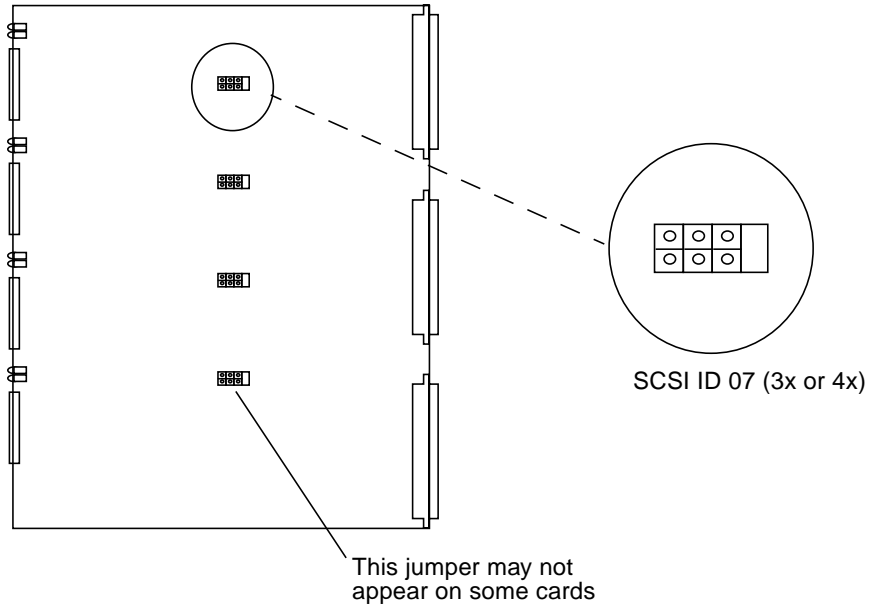
FIGURE 3-25 Ultra-Wide Quad-Channel SCSI Target Mode Controller SCSI ID Jumpers

J39 J38 J37 ... J36 Address 4000	J39 J38 J37 ... J36 Address 4800	J39 J38 J37 ... J36 Address 5000

J39 J38 J37 ... J36
Address 5800

J39 J38 J37 ... J36
Address 6000
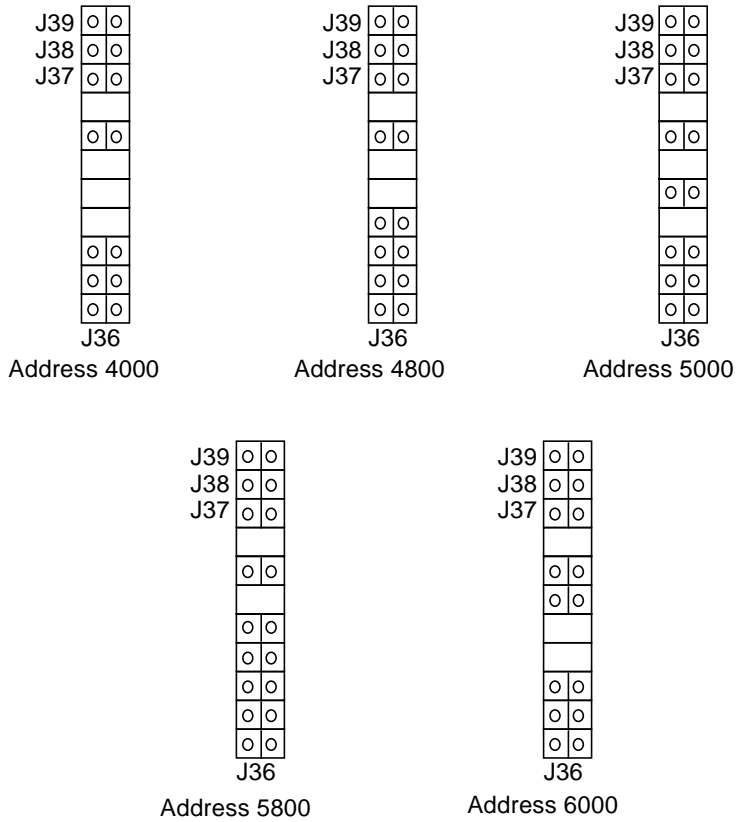
☐ = Jumpers installed |o|o| = Jumpers not installed

FIGURE 3-26 Ultra-Wide Quad-Channel SCSI Target Mode Controller Base Address Jumpers

3.9 SCSI Expander Card

Note – The SCSI expander card is also known as the SCSI splitter card.

The SCSI expander cards are located in a chassis at the bottom rear of the cabinet. There are two different card types in servers in the field: part numbers 375-0044-xx and 375-0042-xx.

3.9.1 Connectors

- **Front and rear of the SCSI Expander Card**—each card has two SCSI connectors, one at the front and the other at the rear of the card. See FIGURE 3-27.

3.9.2 Jumpers

Each card has two identical jumper blocks. One block is at the front of the card and one block is at the rear or the card. Both are set identically to a SCSI ID address of 7.

SCSI connector
(cable from
disk drive backplane)

Power connector
(cable from
SCSI expander
power supply)

SCSI connector
(cable from
disk drive backplane)

SCSI ID
jumpers

SCSI ID
jumper settings
(all cards have
a SCSI ID of 7)

Front view

Rear view

SCSI connector
(cable from
disk drive backplane)

SCSI connector
(cable from
disk drive backplane)

Power connector
(cable from
SCSI expander
power supply)

SCSI ID
jumpers

SCSI ID
jumpers

Front view

Rear view

= Jumpers installed   = Jumpers not installed

FIGURE 3-27 SCSI Expander Card Connectors and Jumpers, Both Card Types

3.10 Transition Module Interface (TMI) Card

The Transition Module Interface (TMI) card (part number 501-5067-xx or 501-5285-xx) is a 6U VME PCB. The TMI resides in any 6U external frame slot in the RDC fiber optic REFLECTIVE MEMORY™ (FORM) chassis. This chassis is installed inside the I/O bay cabinet. FIGURE 3-28 shows the card layout with jumpers, transmit/receive connectors, and LEDs.

3.10.1 Connectors

FIGURE 3-29 shows the TMI card connectors on the faceplate. FIGURE 3-28 shows the other connectors and resistors.

- MEMORY CHANNEL (MC) bus connectors—the four D-connectors for the MC Bus Data, Address, Control, and Expansion cables are located on the faceplate of the TMI card; see also Section 3.3 "Cache Memory Card" on page 3-10:
  - Cable A—address/data
  - Cable B—address/data
  - Cable C—control
  - Cable D—arbitration/expansion
- MC bus termination resistors—when the TMI is used to terminate the MC Bus, termination resisters are placed in the positions behind the MC Bus D-connectors; always installed
- External LED connector—this connector is cabled to the Fiber Transition Module (FTM) card. The FTM card has the LED indicators for the TMI on its faceplate
- Coax connectors—receive (RX) and transmit (TX) COAX connectors. The coaxial cables connect to the FTM card with no cross-over (RX to RX and TX to TX). Two TMIs can be connected directly but the cables must be crossed (RX to TX and TX to RX)
- Power connector—the TMI card requires +5 volts from the system power supply. FIGURE 3-30 shows the details of the power connector
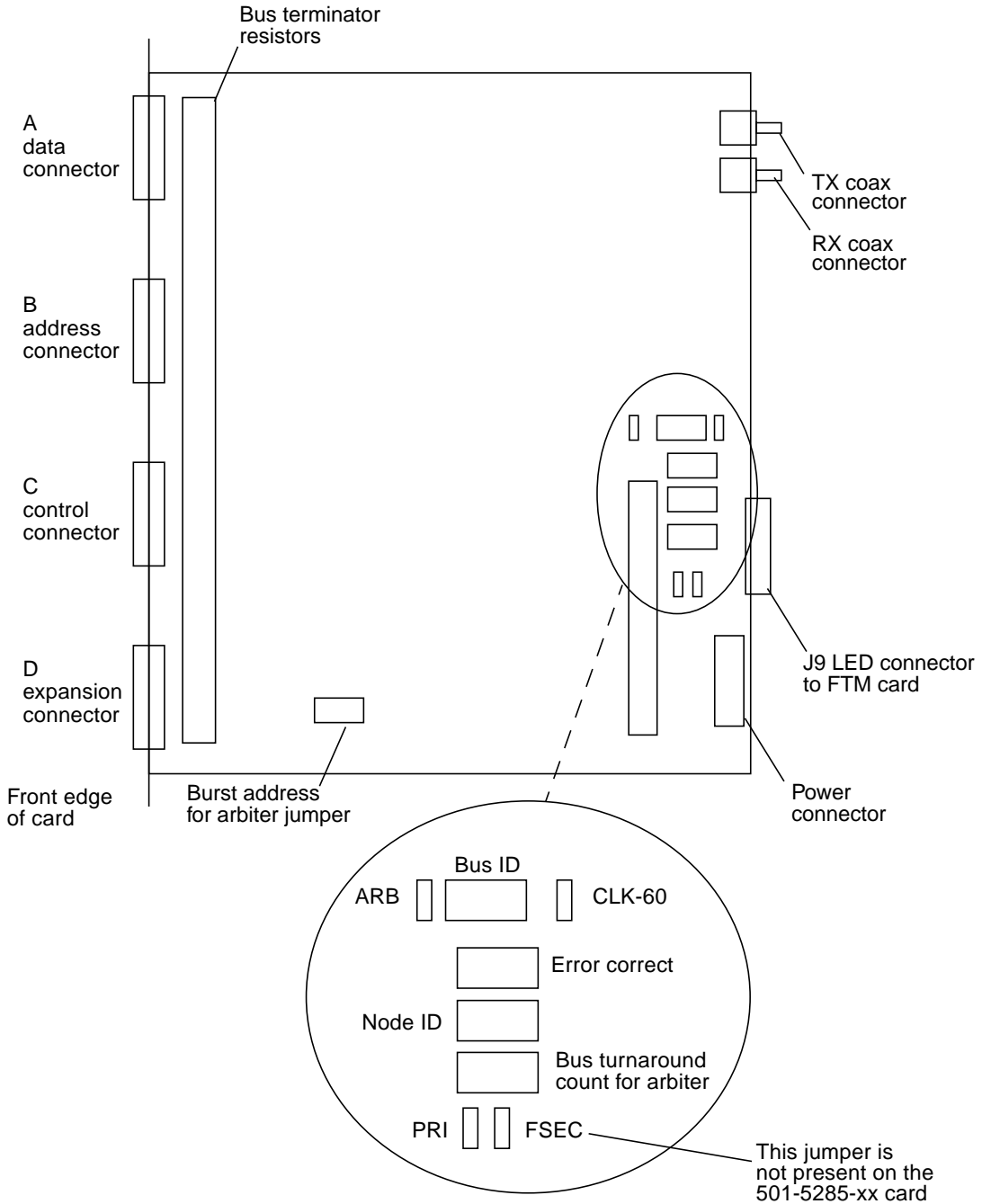
FIGURE 3-28 Transition Module Interface (TMI) Card Layout
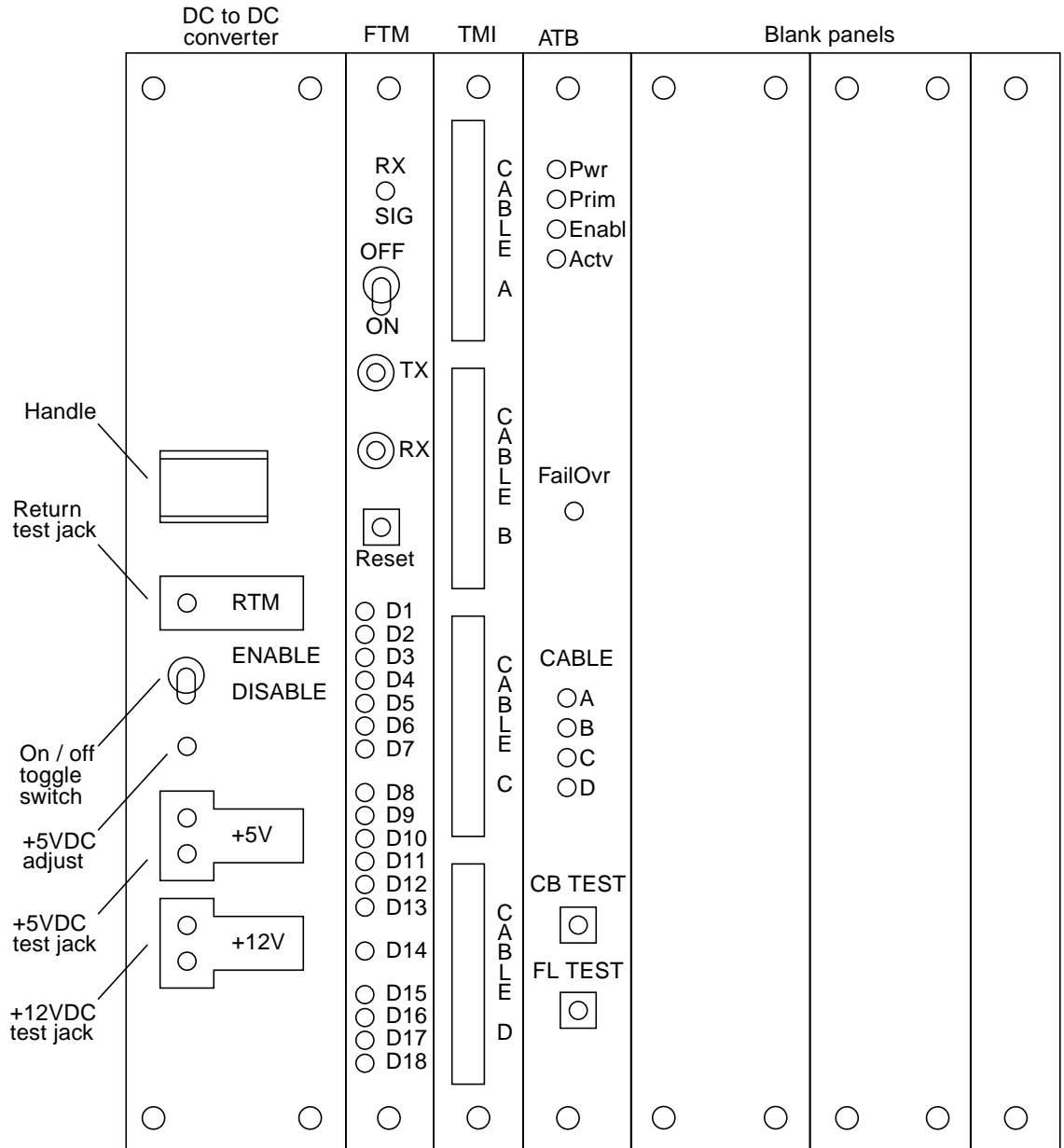
FIGURE 3-29 RDC FORM Hardware Front Panels

3.10.2 LED Indicators

A ribbon cable connects the TMI card connects to the FTM board LED indicators; the FTM board has LED indicators for the TMI board. Refer to TABLE 3-15.

TABLE 3-15 TMI Card LED Indicators (As Seen on the FTM Front Panel)

LED	When Lighted, Indicates...
RX SIG	Indicates that card is detecting light on the receiver
D1, PRI (Primary)	This TMI is the primary arbiter on the MC Bus
D2, FAL OVER (Failover)	Primary arbiter has failed or been deactivated. The secondary arbiter has taken control
D3, RX SYNC (Receive sync)	Receiver on the serial hose is receiving valid characters
D4, LNK FAIL (Link fail)	Data cannot be sent or received by the TMI
D5, IDLE (Idle)	Idle characters are being received on the receive side of the link. LED turns off when data is being transmitted
D6, DWN FLOW (Down flow)	Local TMI receive FIFOs are almost full and the remote TMI is unable to transmit
D7, UP FLOW (Up flow)	Remote TMI receive FIFOs are almost full ant the local TMI is unable to transmit
D8, GLB BUSY (Global busy)	MEMORY CHANNEL receive FIFOs are almost full and the Global Busy bus signal is being driven by the local TMI
D9, BST REQ (Burst request)	Local TMI is requesting a burst grant from the arbiter
D10, SGL REQ (Single request)	Local TMI is requesting a single grant from the arbiter
D11, BLK REQ (Block request)	Local TMI is requesting a block grant from the arbiter
D12, GRNT (Grant)	TMI is receiving a grant from the arbiter
D13, ARB ENB (Arbiter enable)	Local TMI primary or secondary arbiter is enabled and active
D14, STA ERR (Status error)	Error bit has been set in the TMI status register
D15, NID3 (Node ID 3)	Local TMI present node ID for the MC Bus

TABLE 3-15   TMI Card LED Indicators (As Seen on the FTM Front Panel) *(Continued)*

LED	When Lighted, Indicates...
D16, NID2 (Node ID 2)	Local TMI present node ID for the MC Bus
D17, NID1 (Node ID 1)	Local TMI present node ID for the MC Bus
D18, NID0 (Node ID 0)	Local TMI present node ID for the MC Bus

3.10.3   Jumpers

FIGURE 3-28 shows the jumper locations.

- FIGURE 3-31—shows the burst address for arbiter jumper node ID. Default is 1
- FIGURE 3-32—shows the bus turnaround count jumpers. Default is 3
- FIGURE 3-33—shows the node ID jumpers. Default is 1
- FIGURE 3-34—shows the bus ID jumpers. Default is 1 (primary TMI card) or 2 (secondary TMI card)

Note – When installing RDC FORM, change the Cache Memory Card daughtercard (MCA) node ID:

If the TMI card bus ID is 1, the DSP1 MCA node ID is 2 and the DSP2 MCA node ID is 3.

If the TMI card bus ID is 2, the DSP1 MCA node ID is 4 and the DSP2 MCA node ID is 5.

See FIGURE 3-8 for MCA node ID jumper settings.

- FIGURE 3-35—shows the arbiter enable and error correct jumpers

---

Note – Installing a jumper for the PRI jumper block (location F2C6) configures the TMI card as a secondary arbiter. The factory default is no jumper installed.
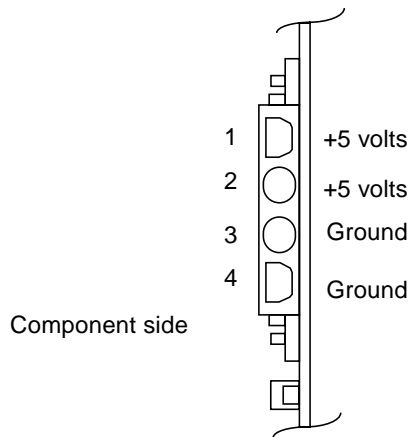
FIGURE 3-30 TMI Card Power Connector

BRT3
BRT2
BRT1
BRT0 [o|o]
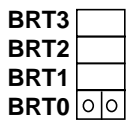
**Burst address
for arbiter jumper;
node ID = 1
(factory default)**

BRT3
BRT2
BRT1 [o|o]
BRT0

Burst address
for arbiter jumper;
node ID = 2

BRT3
BRT2
BRT1 [o|o]
BRT0 [o|o]
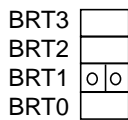
Burst address
for arbiter jumper;
node ID = 3

BRT3
BRT2 [o|o]
BRT1
BRT0
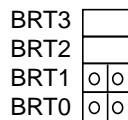
Burst address
for arbiter jumper;
node ID = 4

BRT3
BRT2 [o|o]
BRT1
BRT0 [o|o]
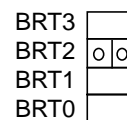
Burst address
for arbiter jumper;
node ID = 5

BRT3
BRT2 [o|o]
BRT1 [o|o]
BRT0

Burst address
for arbiter jumper;
node ID = 6

BRT3
BRT2 [o|o]
BRT1 [o|o]
BRT0 [o|o]

Burst address
for arbiter jumper;
node ID = 7

BRT3 [o|o]
BRT2
BRT1
BRT0
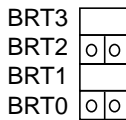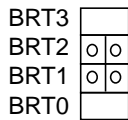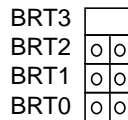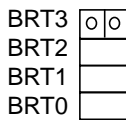
Burst address
for arbiter jumper;
node ID = 8

BRT3 [o|o]
BRT2
BRT1
BRT0 [o|o]
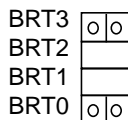
Burst address
for arbiter jumper;
node ID = 9

[ ] = Jumpers installed

[o|o] = Jumpers not installed

Reference designators for
jumpers found on the underside of the card:
C9A5, D0A5, D1A5, D2A5

FIGURE 3-31 Burst Address for Arbiter Jumper (Node ID)

TR3
TR2
TR1 [o|o]
TR0 [o|o]
Bus turnaround count = 3 (factory default)

TR3
TR2
TR1
TR0
Bus turnaround count = 0

TR3
TR2
TR1
TR0 [o|o]
Bus turnaround count = 1

TR3
TR2
TR1 [o|o]
TR0
Bus turnaround count = 2

TR3
TR2 [o|o]
TR1
TR0
Bus turnaround count = 4

TR3
TR2 [o|o]
TR1
TR0 [o|o]
Bus turnaround count = 5

TR3
TR2 [o|o]
TR1 [o|o]
TR0
Bus turnaround count = 6

TR3
TR2 [o|o]
TR1 [o|o]
TR0 [o|o]
Bus turnaround count = 7

TR3 [o|o]
TR2
TR1
TR0
Bus turnaround count = 8

[ ] = Jumpers installed

[o|o] = Jumpers not installed

Reference designators for jumpers found on the underside of the card: F1D0, F2D0, F3D0, F4D0

FIGURE 3-32 Bus Turnaround Count for Arbiter Jumper

N3
N2
N1
N0 [o|o]
Node ID = 1 (factory default)

N3
N2
N1 [o|o]
N0
Node ID = 2

N3
N2
N1 [o|o]
N0 [o|o]
Node ID = 3

N3
N2 [o|o]
N1
N0
Node ID = 4

N3
N2 [o|o]
N1
N0 [o|o]
Node ID = 5

N3
N2 [o|o]
N1 [o|o]
N0
Node ID = 6

N3
N2 [o|o]
N1 [o|o]
N0 [o|o]
Node ID = 7

N3 [o|o]
N2
N1
N0
Node ID = 8

N3 [o|o]
N2
N1
N0 [o|o]
Node ID = 9

[ ] = Jumpers installed

[o|o] = Jumpers not installed

Reference designators for jumpers found on the underside of the card: F1D4, F2D4, F3D4, F4D4
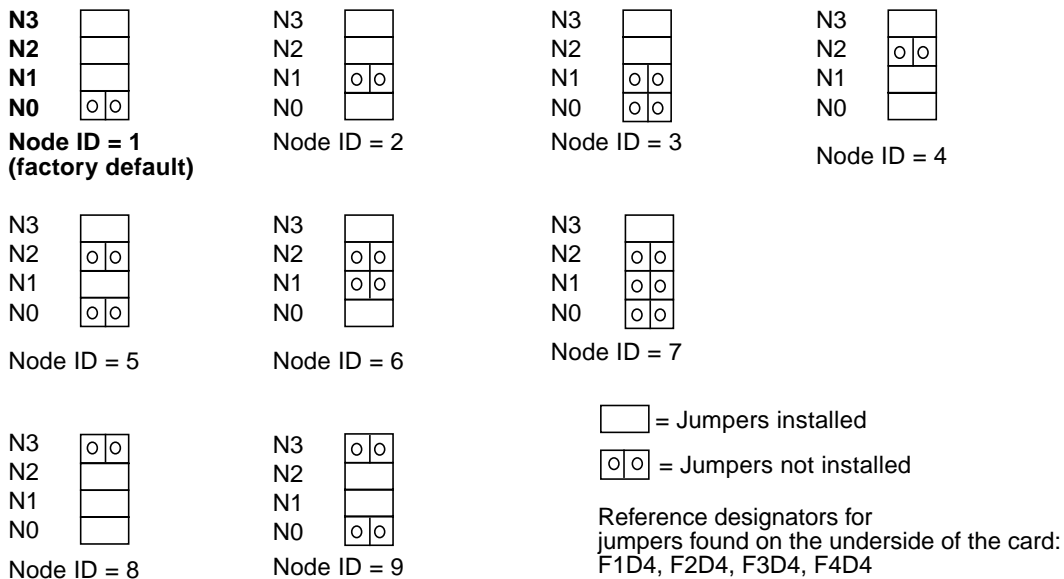
FIGURE 3-33 TMI Card Node ID Jumpers

B3
B2
B1
B0 [o|o]
Bus ID = 1
(factory default)

B3
B2
B1 [o|o]
B0
Bus ID = 2
(factory default)

B3
B2
B1
B0
Bus ID = 0

B3
B2
B1 [o|o]
B0 [o|o]
Bus ID = 3

B3
B2 [o|o]
B1
B0
Bus ID = 4

B3
B2 [o|o]
B1
B0 [o|o]
Bus ID = 5

B3
B2 [o|o]
B1 [o|o]
B0
Bus ID = 6

B3
B2 [o|o]
B1 [o|o]
B0 [o|o]
Bus ID = 7

B3 [o|o]
B2
B1
B0
Bus ID = 8

[ ] = Jumpers installed

[o|o] = Jumpers not installed

Reference designators for
jumpers found on the underside of the card:
F1E2, F2E2, F3E2, F4E2
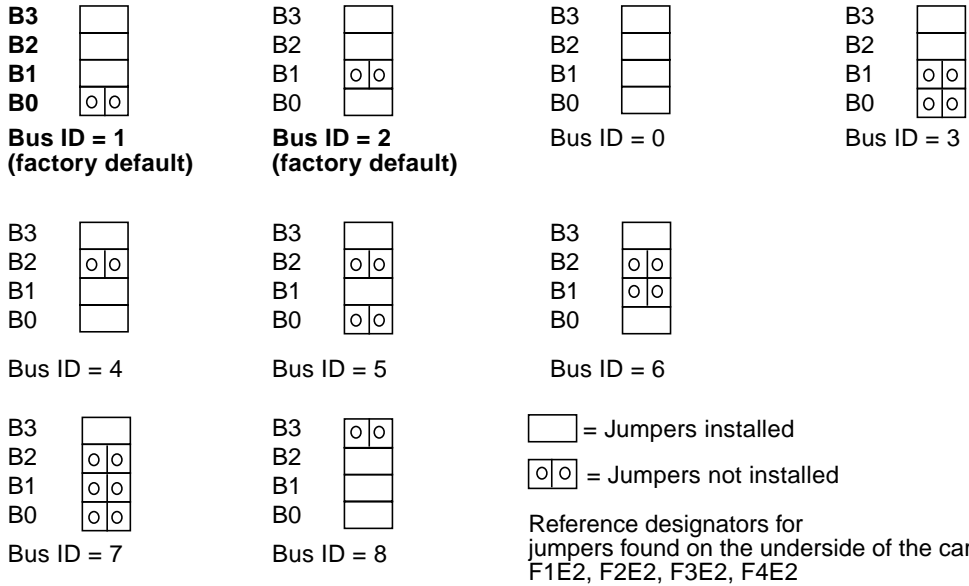
FIGURE 3-34 TMI Card Bus ID Jumpers

MC [o|o]
SBE [o|o]
BDIS [ ]
RES [o|o]
Error correct jumpers
(factory default)

ARB
Factory default [ ]

Bus ID
[ ]   [o|o] CLK-60
        [o]

Error correct
[ ]

[ ] Node ID

Bus turnaround
count for arbiter [ ]

This jumper is
not present on the
501-5285-xx card

PRI
Factory default [o|o] [o|o] FSEC

Arbiter enable jumpers
(ARB/PRI factory default)

[ ] = Jumpers installed

[o|o] = Jumpers not installed

Reference designators for
jumpers found on the underside of the card:
E9E2 (ARB), F7E2 (CLK-60), F2C6 (PRI), F5C6 (FSEC)

FIGURE 3-35 TMI Card Arbiter Enable and Error Correct Jumpers

3.11 Fiber Transition Module (FTM) Card

⚠ **Caution –** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The Fiber Transition Module (FTM) card (part number 501-5068-xx) is a 6U VME PCB. The FTM resides in any 6U external frame slot in the RDC FORM chassis. This chassis is installed inside the I/O bay cabinet. FIGURE 3-36 shows the card layout with transmit/receive connectors and LEDs.

3.11.1 Connectors

FIGURE 3-29 shows the FTM card connectors on the faceplate. FIGURE 3-36 shows the other connectors.

- Coax connectors—receive (RX) and transmit (TX) COAX connectors. The coaxial cables at the rear of the FTM card connect to the TMI card with no cross-over (RX to RX and TX to TX). The coaxial cables at the front of the card connect to the FTM card in the remote StorEdge A7000 with cross-over (RX to TX)

- Power connector—the FTM card requires +5 volts from the system power supply. FIGURE 3-37 shows the details of the power connector

3.11.2 LED Indicators

The FTM faceplate has 19 LED indicators. See TABLE 3-15.

3.11.3 Switches

The FTM card has two switches: a reset switch and an transmit enable (ON)/ transmit disable (OFF) switch.
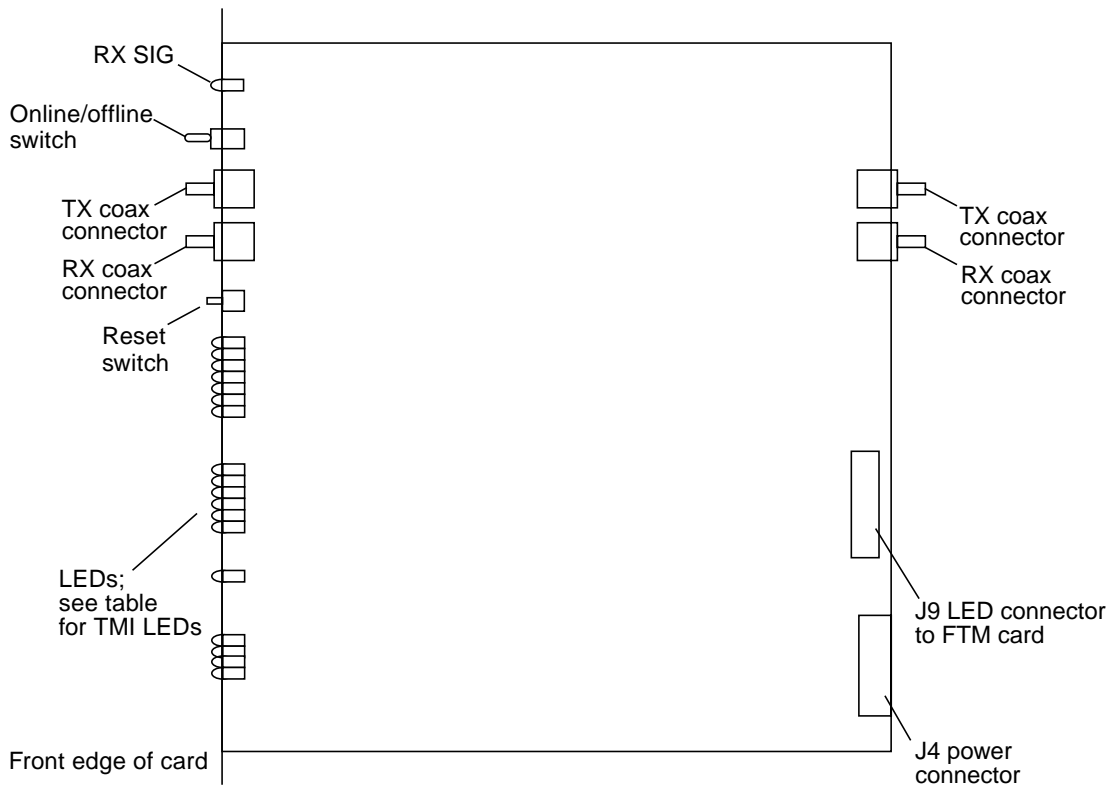
FIGURE 3-36 Fiber Transition Module (FTM) Card Layout
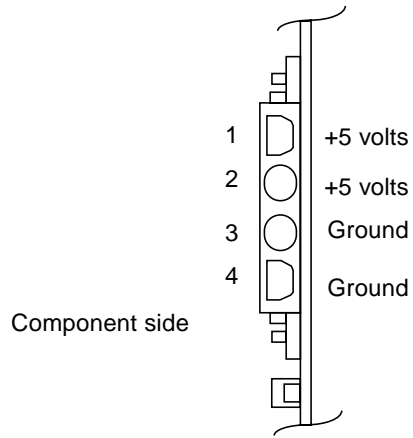
FIGURE 3-37 FTM Card Power Connector

3.12 Arbitration Termination Board

The Arbitration Termination Board (ATB) (part number 501-5076-xx) is a 6U VME PCB. The ATB resides in any 6U external frame slot in the RDC FORM chassis. This chassis is installed inside the I/O bay cabinet. FIGURE 3-38 shows the card layout.

3.12.1 Connectors

FIGURE 3-38 shows the ATB connectors.

- J1, J2, J3, and J4, MEMORY CHANNEL (MC) bus connectors—four connectors for the MC Bus Data, Address, Control, and Expansion cables; see also Section 3.3 "Cache Memory Card" on page 3-10:
  - J1—address/data
  - J2—address/data
  - J3—control
  - J4—arbitration/expansion
- Power connector—the ATB card requires +5 volts from the system power supply. FIGURE 3-39 shows the details of the power connector

3.12.2 LED Indicators

The ATB faceplate has nine LED indicators. See FIGURE 3-29, FIGURE 3-38, and TABLE 3-16.

TABLE 3-16 ATB LED Definition

LED	When Lighted, Indicates...
PWR	DC Power is OK
PRIM	This arbiter is a candidate for Primary Arbiter. When the LED is off, the arbiter is a Secondary Arbiter
ENABL	This arbiter has the Arbiter enable jumper installed (location D4A4) and is not in test mode. This arbiter is the Primary or Secondary Arbiter as determined by the Primary Arbiter jumper (location D4A2) and the state of the failover logic
ACTV	This arbiter is the Active arbiter. Only one Active arbiter is allowed per MC Bus. One of two arbiters must be active. Power on causes the Primary Arbiter to be selected as the Active arbiter

TABLE 3-16   ATB LED Definition *(Continued)*

LED	When Lighted, Indicates...
FAILOVR	A Failover has occurred and that the Secondary Arbiter is now the Active Arbiter
CABLE A	Used during an MC Bus Cable Test. When lighted, this LED indicates that all 60 signal lines (30 signal pairs), associated with J1 (Cable A) are being received by this arbiter
CABLE B	Used during a MC Bus Cable Test. When lighted, this LED indicates that all 60 signal lines (30 signal pairs), associated with J2 (Cable B) are being received by this arbiter
CABLE C	Used during a MC Bus Cable Test. When lighted, this LED indicates that all 60 signal lines (30 signal pairs), associated with J3 (Cable C) are being received by this arbiter
CABLE D	Used during a MC Bus Cable Test. When lighted, this LED indicates that all 60 signal lines (30 signal pairs), associated with J4 (Cable D) are being received by this arbiter

3.12.3   Switches

The ATB card has two switches:

- Failover test switch—press this momentary switch to test the failover logic and functions on the primary (local) and secondary (remote) ATBs
- Cable test switch—press this momentary switch to being MC Bus cables tests

Caution – Use of the TEST switch will disrupt any activity on the MC Bus; do not use this switch when the system is online.

3.12.4   Jumpers

FIGURE 3-38 shows the jumper locations.
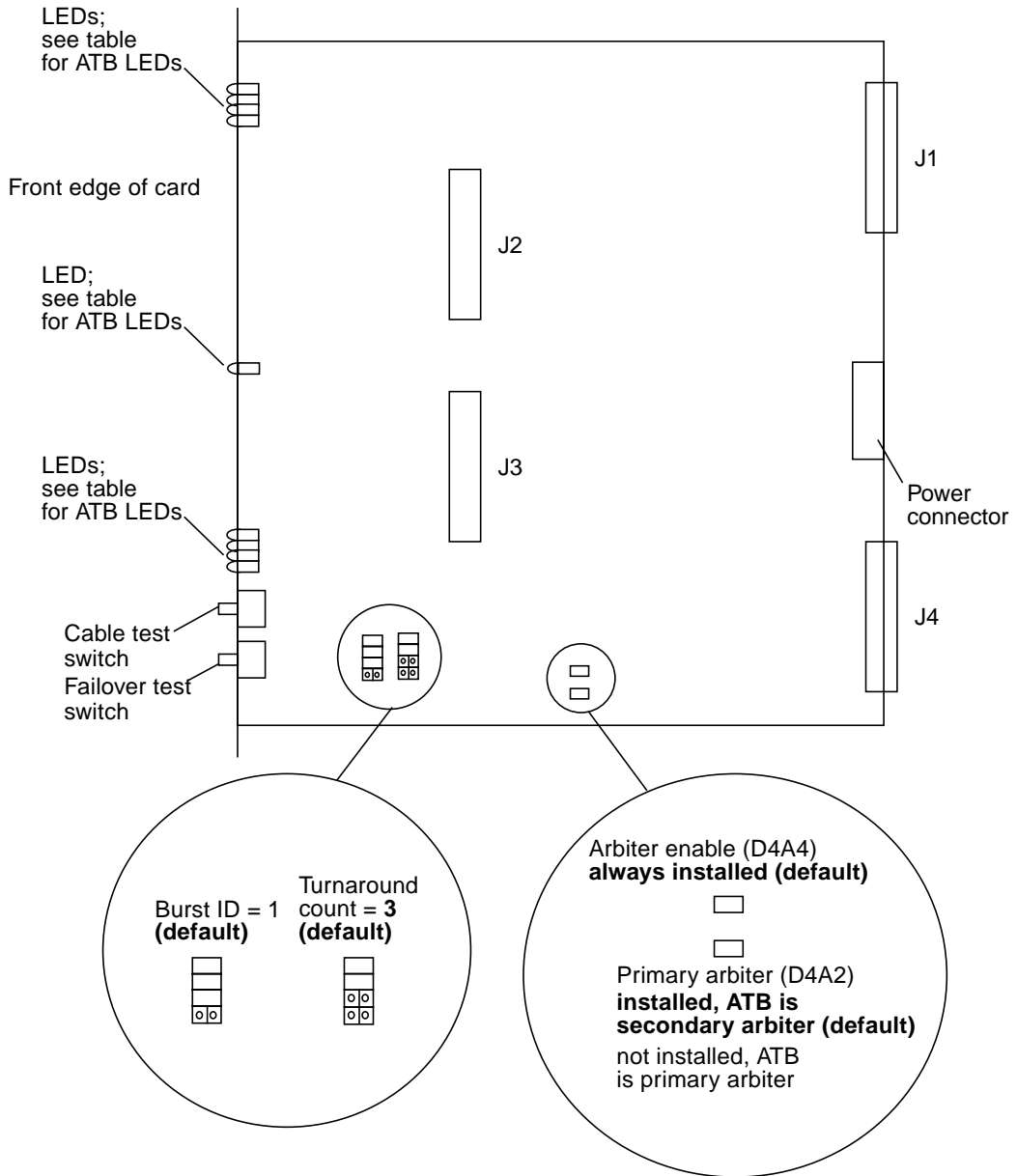
FIGURE 3-38 Arbitration Termination Board (ATB) Layout
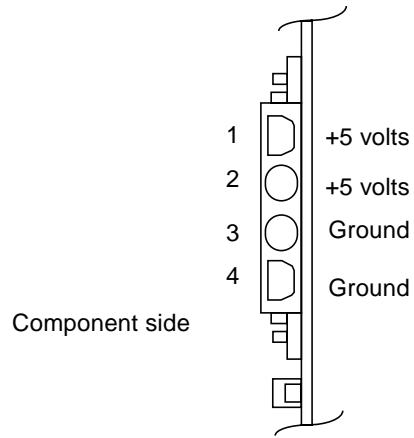
FIGURE 3-39 ATB Power Connector

Standalone Diagnostics

This chapter identifies the standalone diagnostics that test the Sun StorEdge A7000 system components. It also describes how to execute diagnostics and recognize successful and unsuccessful diagnostic operation. The chapter includes the following topics:

- Automatic Testing—page 4-2
- Using Diagnose—page 4-13
    - To Expand the Busview—page 4-14
    - To Select a Subsystem—page 4-14
    - To Select a Subsystem Card—page 4-15
    - To Select a Device—page 4-16

Sun StorEdge A7000 operating procedures are described in Chapter 7.

4.1 Automatic Testing

By default, the Sun StorEdge A7000 executes diagnostic tests and initializes and checks the hardware configuration during each poweron and reset sequence. The diagnostics verify the Sun StorEdge A7000 integrity. They also detect and isolate any hardware component that is causing a malfunction.

The following diagnostic test levels execute during the automatic testing sequence:

- Hardware Confidence tests
- Built-in self-tests (BISTs)
- Extended Diagnostics (slots)

Note – Procedures for enabling and disabling automatic testing are provided in Chapter 7.

4.1.1 Hardware Confidence Tests

Hardware Confidence tests are built into the Processor cards and execute automatically each time the cards are powered on or reset. These tests reset the Processor card hardware, initialize on-board cache, initialize serial I/O ports, and clear the on-board memory used by the ROM Monitor. During the Hardware Confidence tests, the Processor card front panel light-emitting diodes (LEDs) display codes as each test starts. If a test is successful, its code is cleared from the LEDs. If it fails, the LED code freezes or blinks depending on the failing test.

FIGURE 4-1 shows the LEDs on the Processor card front panel. The Hardware Confidence tests also display a moving figure on the System Console screen once the serial channel between the System Console and Processor card initializes.

When the Hardware Confidence tests complete, control passes to the ROM Monitor program. This program reports the configuration and initializes the CPUs and the devices on the CPU SCSI Bus during a poweron or reset sequence. During these operations, a series of messages display on the System Console. The values in these messages vary depending on the configuration.
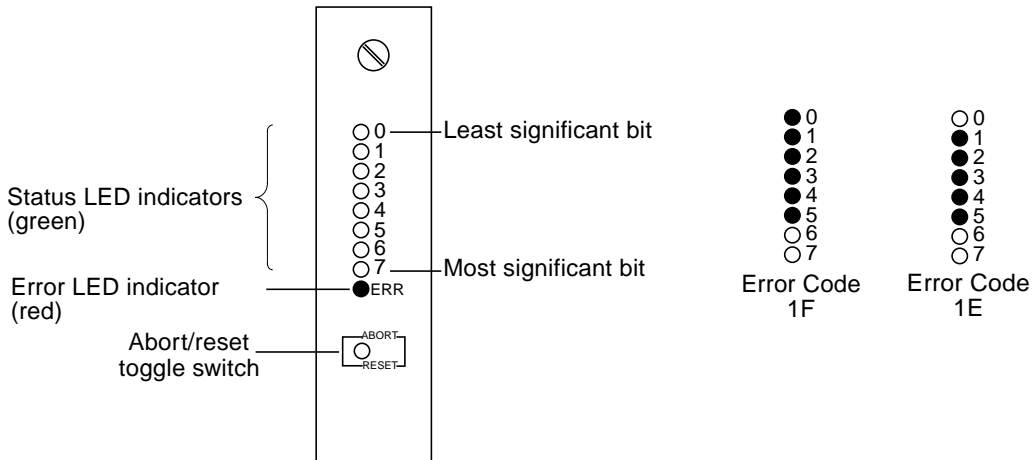
FIGURE 4-1   Processor Card LED Labeling Scheme

4.1.2   Built-In Self-Tests (BISTs)

The autotest default groups are core, qmem, and slots. The slots test group executes Extended Diagnostics; refer to Section 4.1.3 "Extended Diagnostics (slots test group)" on page 4-4 for more information.

BISTs automatically execute during the poweron or reset sequence. The Sun StorEdge A7000 executes two groups of BISTs:

- core test group—executes Core Logic tests, testing the operation of the CPUs, counter I/O controllers (CIOs), Ethernet interface and controller, VME interrupts, EPROM, NVRAM, and other Processor card components and functions
- qmem test group—executes Quick Memory tests, verifying the DRAM on the Processor card and cache memory cards

When autotest is enabled, the following message displays on the System Console after the ROM Monitor startup sequence completes:

```
Automatic test enabled, 3 seconds to break
```

4.1.3   Extended Diagnostics (slots test group)

The Extended Diagnostics reside in the header partition of the Sun StorEdge A7000 boot disk and in the /tftpboot directory on the System Console disk. These diagnostics extend the testing philosophy of the BISTs to other cards in the Sun StorEdge A7000.

Like the BISTs, the Extended Diagnostics execute automatically during a powerup or reset sequence if automatic testing (autotest) is enabled. The Extended Diagnostics for autotest are included in the slots test group.

TABLE 4-1 lists the Extended Diagnostics used to test other cards in the Sun StorEdge A7000 and the imagenames associated with each Extended Diagnostic.

Note – There are no Extended Diagnostics for CPU or memory testing.

TABLE 4-1   Extended Diagnostics (slots)

Cards	Extended Diagnostic	imagenames[1]
BMC adapter	VME Block Mux Channel Adapter	bmcadiag bmca.image
Quad block mux channel adapter	VME Quad Block Mux Channel	qbmcdiag qbmc.image
Dual-channel ESCON to VME interface controller	VME Dual Channel ESCON	escondiag escon.image
Quad-channel or dual-channel SCSI controller	VME SCSI Controller	scsidiag scsi.image
Cache memory card	MEMORY CHANNEL IV System	mc4diag mc4.image

1. Each Extended Diagnostic has two imagenames. The first imagename listed in the table is the name of the diagnostic image on the boot disk. The second imagename is the name of the diagnostic image on the System Console disk.

4.1.4　Automatic Testing Success Indications

The following paragraphs describe the indications of successful automatic testing completion.

4.1.4.1　Hardware Confidence Tests

If the Hardware Confidence tests execute successfully, all the Processor card LEDs are reset and the System Console displays ROM Monitor startup messages.

During normal operation, the green LEDs vary depending on the Processor card activity; these displays do not represent error indications.

4.1.4.2　Built-In Self-Tests

The following messages indicate that the BISTs are starting to execute:

```
Slot 0: Running Built In Tests
Test levels selected: core qmem slots
```

As each BIST starts, it displays a start message on the System Console. Some BISTs also display milestone messages during test execution. If the test executes successfully, it displays PASS on the System Console. CODE EXAMPLE 4-1 and CODE EXAMPLE 4-2 are example messages displayed during BIST execution. The values in the messages are for example only and vary according to the Sun StorEdge A7000 configuration.

The following message displays after the BIST core and qmem test execution is completed:

```
Testing Backplane Cards
```

At this time, Extended Diagnostics execute on the other cards on the backplane (refer to Section 4.1.5.3 "Extended Diagnostics" on page 4-10).

CODE EXAMPLE 4-1 core Tests Example

```
Testing CPU Card
Starting EPROM checksum test:
CPU 0, Read checksum 4073d550 calculated 4073d550...PASS
Starting Parameter prom checksum test:
CPU 0, calc checksum fffffb0e, stored fffffb0e...PASS
Starting DRAM Parity test:
...PASS
Starting SRAM Parity test:
...PASS
Starting TS80 X-cpu int test:
CPU 1 interrupting: CPU 0, CPU 1, CPU 2, CPU 3...PASS
CPU 3 interrupting: CPU 0, CPU 1, CPU 2, CPU 3...PASS
CPU 0 interrupting: CPU 0, CPU 1, CPU 2, CPU 3...PASS
CPU 2 interrupting: CPU 0, CPU 1, CPU 2, CPU 3...PASS
Starting TS80 int test:
CPU 1 testing xint 0, 1, 2, 3, 4, 5, 6, 7, ...PASS
CPU 3 testing xint 0, 1, 2, 3, 4, 5, 6, 7, ...PASS
CPU 0 testing xint 0, 1, 2, 3, 4, 5, 6, 7, ...PASS
CPU 2 testing xint 0, 1, 2, 3, 4, 5, 6, 7, ...PASS
Starting TS80 int cpu test:
Cpu = 1, Timer: 0, 1, 2, 3, 4, 5...PASS
Cpu = 0, Timer: 0, 1, 2, 3, 4, 5...PASS
Cpu = 2, Timer: 0, 1, 2, 3, 4, 5...PASS
Cpu = 3, Timer: 0, 1, 2, 3, 4, 5...PASS
Starting TS80 Timer int test:
CPU: 1, Timer: 0, 1, 2, 3, 4, 5...PASS
CPU: 2, Timer: 0, 1, 2, 3, 4, 5...PASS
CPU: 0, Timer: 0, 1, 2, 3, 4, 5...PASS
CPU: 3, Timer: 0, 1, 2, 3, 4, 5...PASS
Starting RTC increment test:
CPU 0: First read of seconds = 44, second read = 45...PASS
Starting NVRAM memory test:
...PASS
Starting CIO interrupt test:
CPU 0: Testing CIO 0: Port A Port B ...PASS
Starting Watchdog abort test:
CPU 0: Testing CIO 1: ...PASS
qmem tests execute, then return to core
.
.
.
Starting Ethernet interrupt test:
...PASS
Starting Ethernet controller chip test:
```

CODE EXAMPLE 4-1 core Tests Example *(Continued)*

```
...PASS
Starting Ethernet internal loopback test:
...PASS
Starting Ethernet external loopback test:
...PASS
Starting VME intr bsy test:
...PASS
Starting VME interrupt test:
CPU 0 testing vme interrupt: 1 2 3 4 5 6 7 ...PASS
Starting SCC internal loopback test:
port: 0 ....RESERVED (console port)
port: 1 ....PASS
port: 2 ....PASS
port: 3 ....PASS
Starting SCSI regs test:
CPU 0 reading icode istat dmastat stat0 stat2 ID ...PASS
```

CODE EXAMPLE 4-2 qmem Tests Example

```
Starting DRAM DATA=est:
DRAM DATA=ADDR 3f100000-40000000 with 4 CPUs
cpu 0 testing 3932160 bytes starting at 3f100000
cpu 1 testing 3932160 bytes starting at 3f4c0000
cpu 2 testing 3932160 bytes starting at 3f880000
cpu 3 testing 3932160 bytes starting at 3fc40000
fill, chk...PASS
Starting DRAM address line test:
DRAM address line BYTE, from 3f100000-40000000...PASS
DRAM address line WORD, from 3f100000-40000000...PASS
DRAM address line LONG, from 3f100000-40000000...PASS
```

4.1.4.3   Extended Diagnostics

As each Extended Diagnostic loads and executes, a series of messages displays on the System Console. These messages provide the following information:

- Card slot number
- Diagnostic image assigned to this card
- Diagnostic name and revision
- CRS address, the starting and ending address of the memory address range assigned to this card
- Other card-specific information, if applicable

If the diagnostic's autotests execute successfully, PASS displays on the System Console. CODE EXAMPLE 4-3 shows examples of messages displayed by some Extended Diagnostics if autotest is successful. The values displayed in the messages are for example only and vary according to the Sun StorEdge A7000 configuration.

Note – The diagnostic image name will vary depending on the source of the image: System Console disk or boot disk.

CODE EXAMPLE 4-3   Extended Diagnostic Autotest Execution Messages

```
Slot 2: Loading extended image mc4diag
Extended Memory Channel IV Diagnostic
Diagnostic Revision: 1.3
Slot: 2, MCA Board CSR Addr: 0xfff40000 - 0xfff407ff
EDRAM Board CSR Addr: 0xfff40800 - 0xfff40fff
PASS

Slot 5: Loading extended image bmcadiag
Extended Block Mux Channel Adapter Diagnostic
Diagnostic Revision: 1.8
Slot: 5, Board CSR Addr: 0xfff4e800 - 0xfff4e8ff
PASS

Slot 12: Loading extended image scsidiag
Extended SCSI/Printer Diagnostic
Diagnostic Revision: 1.20
Slot: 12, Board CSR Addr: 0xfff48800 - 0xfff48fff
PASS
```

4.1.5 Automatic Testing Failure Indications

The following paragraphs describe failure/error indications during automatic testing.

4.1.5.1 Hardware Confidence Tests

One of the following indicates a failure in the Hardware Confidence tests:

- The System Console does not display a moving figure—if no moving figure is displayed on the System Console, there is a problem in the Processor card or the System Console connection (LED code 1F; see FIGURE 4-1)
- The System Console does not display ROM Monitor messages—if no ROM Monitor messages are displayed, the most probable cause of the failure is the Processor card (LED code 1E)
- The Processor card front panel LEDs show an error code—if any error code other than 1F or 1E is displayed, the Processor card is at fault and must be replaced

4.1.5.2 Built-In Self-Tests

The following conditions indicate a failing BIST:

- The System Console displays FAIL
- The System Console displays a test-specific error message
- The red error LED on the Processor card front panel is lighted
- The System Console displays a card/slot failure message

If an error occurs during the core logic tests, no further testing is performed. core logic test errors indicate a faulty Processor card. The ROM Monitor displays the card/slot failure message in the following format:

```
************************************************************
Card in slot n (CPU) failed diagnostics
************************************************************
```

This message indicates that you should replace the Processor card in the specified slot n.

4.1.5.3   Extended Diagnostics

If an Extended Diagnostic failure is detected during autotest, the System Console displays FAIL, followed by two error messages:

- An Extended Diagnostic error message
- A card/slot failure message

The Extended Diagnostic error message consists of an error header and a diagnostic-specific message. The diagnostic-specific message is unique to the failing program. The error header message identifies the failing diagnostic and test in the following format:

Error[*x-y*]:Slot *n*: CPU 0: *name*: Test *t* [*s*]: *testname*

TABLE 4-2 describes the error message format.

TABLE 4-2   Extended Diagnostic Error Message Format Definition

Error Message Item	Definition
x-y	The error log numbering information
n	The slot number of the card executing the diagnostic when the failure occurred
name	The mnemonic of the diagnostic reporting the failure: SCSI—VME SCSI Controller BMCA—VME Block Mux Channel QBMC—VME Quad Block Mux Channel ESCON—VME Dual Channel ESCON MC4—MEMORY CHANNEL IV System
t	The failing test number
s	The failing subtest letter, if applicable
testname	The failing test name

The following card/slot failure message identifies a failing card:

```
Card in slot n failed extended diagnostic: imagename
```

TABLE 4-3 describes the card/slot failure message format.

TABLE 4-3   Card/Slot Failure Message Format Definition

Error Message Item	Definition
n	The slot number of the card executing the diagnostic when the failure occurred
imagename	The name of the diagnostic image executing on the card in slot n: `scsidiag` or `scsi.image`—VME SCSI Controller `bmcadiag` or `bmca.image`—VME Block Mux Channel Adapter Diagnostic `qbmcdiag` or `qbmc.image`—VME Quad Block Mux Channel Diagnostic `escondiag` or `escon.image`—VME Dual Channel ESCON Diagnostic `mc4diag` or `mc4.image`—MEMORY CHANNEL IV System Diagnostic

- The diagnostic image name varies according to the image source: System Console disk or system boot disk

- The most probable cause of an Extended Diagnostic failure during autotest is the card under test; however, manually test the card before replacing it (refer to Section 4.2 "Using Diagnose" on page 4-13)

- Test 8, SCSI Configuration, of the VME SCSI Controller Diagnostic displays a table of the configured devices that the diagnostic detects. Undetected devices are not listed. Compare this table with the Sun StorEdge A7000 configuration. A failure in this test could be related to one of the devices. If Test 8 fails, manual testing is required (refer to Section 4.2 "Using Diagnose" on page 4-13)

- Extended Diagnostic failures may also be caused by incorrect jumpering. Before replacing or moving a controller or device, make sure that the jumpers are installed correctly on the controller. Refer to Chapter 3 for card jumpering information

4.1.6 Automatic Testing Completion Messages

After all BISTs and Extended Diagnostics are complete, the ROM Monitor displays the following message if autoboot is enabled.

```
You have n seconds to terminate the autoboot sequence...
```

The time interval n in this message is determined by the subsystem under test; 7 seconds for subsystem dsp1 and 33 seconds for subsystem dsp2.

You can abort the autoboot sequence by pressing any key on the System Console. If you abort autoboot, the ROM Monitor prompt (ROM >>) is displayed. If autoboot is allowed to continue, operating system boot messages are displayed, followed by the operating system login prompt.

If autoboot is disabled, the System Console displays the ROM Monitor prompt (ROM >>).

4.2 Using Diagnose

Note – Before using Diagnose testing procedures, make sure that the subsystem containing the card or device to be tested is in ROM Monitor mode. Chapter 7 describes how to enter ROM Monitor mode.

You may test Sun StorEdge A7000 components using the Diagnose program to execute diagnostics. The Diagnose program provides a graphical mouse-driven interface for executing system component diagnostic tests through the System Console software.

Use Diagnose when:

- Adding a new card or device to the system
- Replacing a suspected failing card or device
- Moving a card to a different slot on the backplane
- An Extended Diagnostic fails during automatic testing

Diagnose indicates a pass/fail condition by changing the color of the graphic displayed on the System Console, as follows:

- Clear—component testing was successful
- Light blue—component is under test
- Red—component failed testing
- Yellow—a marginal component is present in the subsystem

Refer to TABLE 4-4.

TABLE 4-4   Diagnose Program Test Condition Colors

Item Under Test (Light Blue During Test)	Successful Condition (PASS)	Failure Condition (FAIL)
Subsystem	Clear	Red—Processor card failed (this failure is fatal to subsystem operation)
		Yellow—component/card in the subsystem failed; failed component/card graphic is red
Component/Card[1]	Clear	Red
Device	Clear	Red

1. When you select a SCSI controller card, the card and its connected disk drives are tested.

Using Diagnose to execute diagnostics tests includes the following steps:

- Expanding the Busview to see all items for testing
- Selecting a subsystem, an individual subsystem component, or an individual device for testing and starting Diagnose

4.2.1   To Expand the Busview

1. **Choose Utilities on the System Console Application Menu Bar and click.**

2. **Drag the mouse pointer to MCD and release the left mouse button to display the MCD (Master Configuration Data) Menu Bar.**

3. **Choose View on the MCD Menu Bar. Drag the mouse pointer to Bus View and release the left mouse button.**

   A graphical view of the top-level system component connectivity is displayed, referred to as Busview. At this time, select a subsystem, an individual subsystem component, or an individual device for testing.

4.2.2   To Select a Subsystem

1. **Move the mouse pointer to the graphic representing the subsystem to test (dsp1 or dsp2) and click the left mouse button to select it.**

2. **With the mouse pointer on the selected component, click and hold the right mouse button.**

3. **Choose Diag.**

4. **Drag the mouse pointer to the right to the Diagnose selection.**

5. **Release the right mouse button.**

4.2.3 To Select a Subsystem Card

> **Note –** If you select a SCSI Controller for testing, all the configured disk drives on that controller are also tested.

> **Note –** Different types of cache memory cards exist. The cards displayed in the expanded Busview are determined by the system configuration.

1. **Move the mouse pointer to the graphic of the subsystem (dsp1 or dsp2) containing the card to test.**

2. **Double-click on the subsystem with the left mouse button. Busview expands to show a more detailed diagram of the cards in the selected subsystem. Use the scroll bar to display more cards. The cards are labeled in the following format:** `name-number`. TABLE 4-5 **describes the format.**

3. **Move the mouse pointer to the card to test and click the left mouse button to select it.**

4. **With the mouse pointer on the selected card, click and hold the right mouse button.**

5. **Choose Diag.**

6. **Drag the mouse pointer to the right to the Diagnose selection.**

7. **Release the right mouse button.**

TABLE 4-5   Diagnose Program Busview System Card Description

`Busview` **Item** `name`	Definition
`cpu`	88100 Processor card
`vipcpu`	88110 Processor card
`adapter`	processor Adapter card
`mc4`	cache memory card
`edram`	cache memory card motherboard
`ckd`	VME block mux channel adapter card
`encbmc`	VME quad block mux channel adapter card
`escon`	dual channel ESCON to VME interface card
`m328`	SCSI controller card
`m328tm`	dual or quad target mode SCSI controller card
`Busview` **Item** `number`	Definition
`(name-)number`	`number` is a a number indicating that particular card in the subsystem. (`name` is the Busview item `name`, above.) For example, there can be more than one cache memory card in a subsystem chassis: `mc4-0` is the first cache memory card in the subsystem, `mc4-1` is the second card in the same subsystem.

4.2.4   To Select a Device

The Processor cards and SCSI controller cards interface to devices. You must expand the Busview twice before selecting a device for testing. To select a device:

1. **Move the mouse pointer to the graphic of the subsystem (**dsp1 **or** dsp2**) containing the component to test.**

2. **Double-click on the subsystem with the left mouse button. Busview expands to show a more detailed diagram of the cards in the selected subsystem. Use the scroll bar to display more cards.**

3. **Move the mouse pointer to the graphic of the Processor card or controller interfacing to the device to test.**

4. **Double-click the left mouse button on the Processor card or controller. Busview expands to show the configured devices. Use the scroll bar to display more devices.** TABLE 4-6 **describes the device names.**

5. **After you display the devices on the selected SCSI Controller or Processor card, move the mouse pointer to the device to test.**

6. **Click the left mouse button on the device to select it.**

7. **With the mouse pointer on the selected device, click and hold the right mouse button.**

8. **Choose Diag.**

9. **Drag the mouse pointer to the right to the Diagnose selection.**

10. **Release the right mouse button.**

TABLE 4-6   Diagnose Program Busview Device Name Description

Device name	Definition
rmt/number	Tape unit; number indicates a sequential number for each tape unit. For example, rmt/0, rmt/1.
addr/bus/target	Disk drive connected to the SCSI bus of SCSI controller; addr indicates the SCSI controller address, bus indicates the SCSI bus port on the controller, and target indicates the physical SCSI target number of the device on the SCSI bus. An example device name is 88/p2/4, where this device is disk drive 4 on port p2 of the SCSI controller at address 0x8800.

4.2.5   Diagnose Messages

When you use Diagnose to execute diagnostics, a start message similar to the following displays in the text box at the bottom of the Busview screen and the graphic changes color to light blue:

```
Diagnose <13184> : <Started>
```

When Diagnose testing is complete, the following type of message displays:

```
Diagnose <13184> : <Completed>
```

Installing the RDC FORM Hardware

Note – Before you begin the procedures in this chapter, power off the Sun StorEdge A7000, as described in Chapter 7.

Note – Change the ARB ENABLE and node ID jumpers on the Cache Memory Card daughtercard (MCA) before you install this hardware. See Chapter 3 for jumper information.

This chapter describes how to install the Remote Dual Copy (RDC) Fiber Optic REFLECTIVE MEMORY (FORM) hardware and configure the operating system software in the Sun StorEdge A7000. The hardware consists of:

- Transition Module Interface (TMI) card
- Fiber Transition Module (FTM) card
- Arbitration Termination Board (ATB)
- DC/DC converter power supply card
- 6U 10-slot chassis with blank front panels
- Fan chassis subassembly
- I/O panels
- cables

Caution – When working with the FTM card, avoid exposure to the front panel fiber opening and connectors. Laser radiation emits from this opening. To prevent laser radiation and contact with your eyes, place the transmit Enable (ON)/Disable (OFF) switch in the Disable (OFF) position.

Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

5.1 Steps for Installation

The order of installation is:

1. **Power off the Sun StorEdge A7000, as described in Chapter 7**

2. **Default Settings and Configuration**

3. **Installing the Card Cage and I/O Panels**

4. **Installing the Card Cage Fan**

5. **Installing the DC/DC Converter**

6. **Installing and Connecting the TMI and FTM Cards**

7. **Installing the ATB**

8. **Connecting Power**

9. **Connecting the MC Bus Cables to the I/O Panel and ATB**

10. **Connecting the Jumper Cables to the TMI Card and I/O Panel**

11. **Connecting the Local FTM Card to the Remote FTM Card**

12. **Power On the RDC FORM Hardware and Sun StorEdge A7000**

13. **Configuring the Operating System Software for RDC**

5.2 Default Settings and Configuration

Chapter 3 contains card layout and jumper information for the ATB, TMI, and FTM cards. TABLE 5-1 describes the RDC FORM hardware default settings.

TABLE 5-1 RDC FORM Hardware Default Settings

Local/Primary RDC FORM Hardware	Remote/Secondary RDC FORM Hardware
Burst address for arbiter jumper node ID is 1	Burst address for arbiter jumper node ID is 1
Bus turnaround count is 3	Bus turnaround count is 3
Node ID is 1/ATB node ID is 1	Node ID is 1/ATB node ID is 1
Bus ID is 1	Bus ID is 2

5.3 Installing the Card Cage and I/O Panels

FIGURE 5-1 shows the I/O bay cabinet. The TMI 10-slot 6U card cage installs in one of the two bottom 6U openings. Use the opening closest to the rear of the machine, to cable the HDSA power supply taps to the DC/DC converter.

1. **Remove the faceplates from the two 6U openings on the mounting plate in the I/O bay cabinet.**

2. **Insert the rear of the card cage through the opening. Align the frame assembly bracket with the screw holes on the mounting plate. See** FIGURE 5-2**.**

3. **Attach the frame assembly bracket to the mounting plate, using the four screws for the bracket.**

4. **For ease of cabling, unscrew and remove all the blank panels from the card cage.**

5. **Install the I/O panels in the opening above the card cage.**
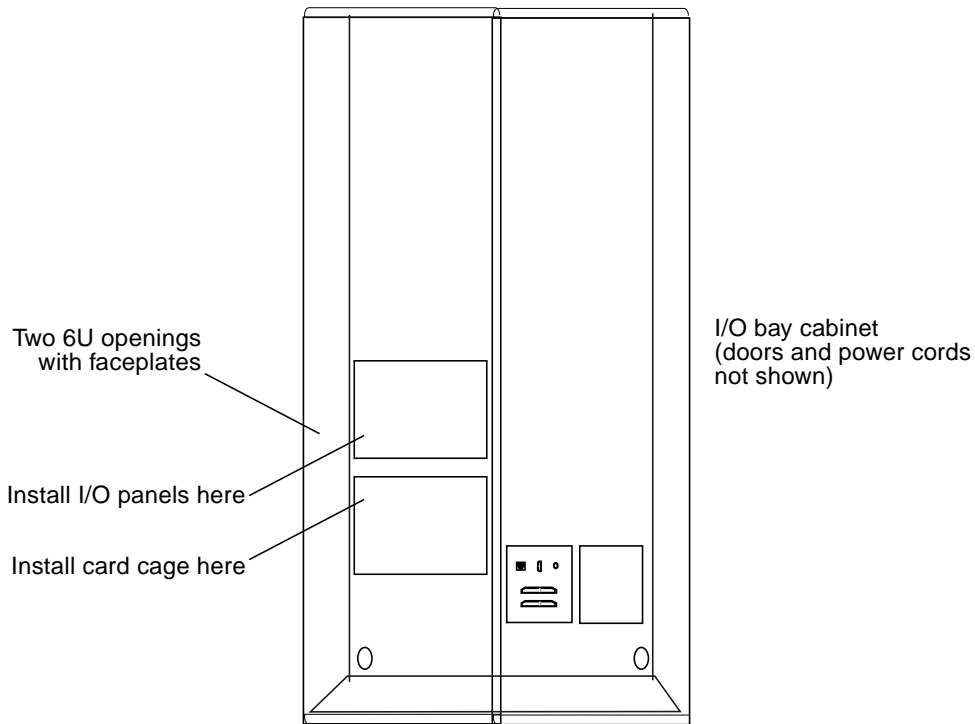
FIGURE 5-1   6U Openings in the I/O Bay Cabinet

Frame assembly bracket

Screws (4x)

Blank panels

Mounting plate
in I/O bay cabinet

Screws (2x)

Fan subassembly faceplate

Fan chassis
subassembly

Retaining screws (2x)
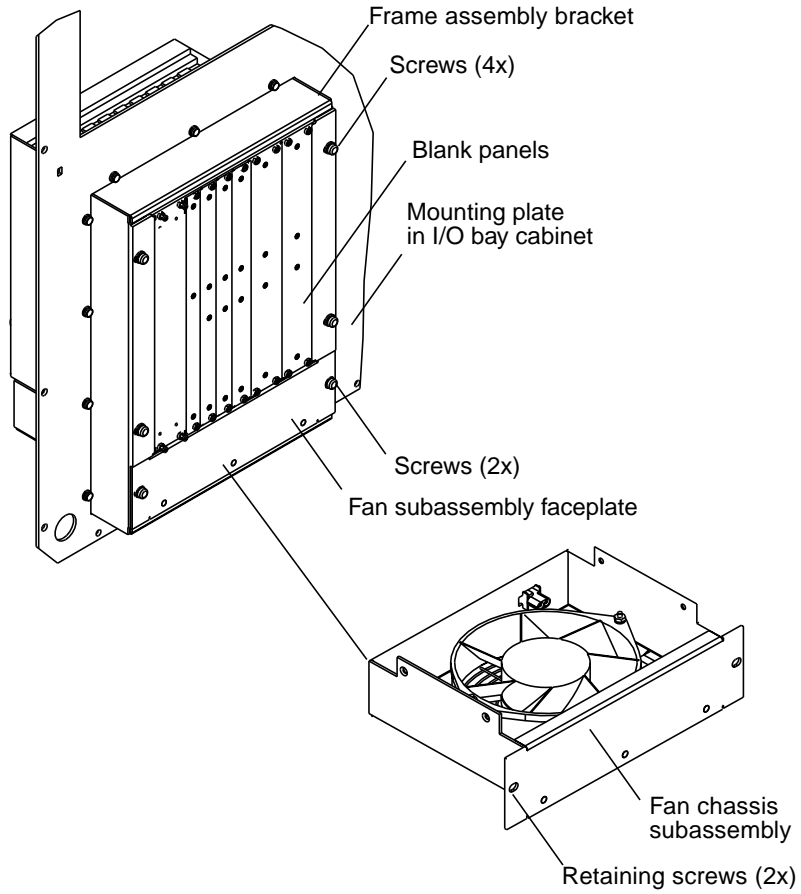
FIGURE 5-2 6U Card Cage and Fan Installation

5.4 Installing the Card Cage Fan

1. **See** FIGURE 5-2**. Remove the fan assembly face plate from the 6U card cage by removing the face plate retaining screws.**

2. **Insert the fan chassis subassembly into the tracks in the card cage.**

3. **Secure the fan chassis subassembly to the card cage with the retaining screws.**

5.5 Installing the DC/DC Converter

The DC/DC converter supplies +5VDC to the 6U cards installed in the card cage and +12 VDC to the card cage fan. It resides in the two adjacent leftmost slots. See FIGURE 5-3.

1. **See** FIGURE 5-4**. Slide the DC/DC converter into two adjacent slots in the 6U card cage.**

2. **Secure the DC/DC converter with the four retaining screws on the front of the converter.**

5.6 Installing and Connecting the TMI and FTM Cards

FIGURE 5-3 shows the default slot assignments for the ATB, TMI, and FTM cards. This step requires:

- Two (2) coax cables, part number 370-3498-xx
- One (1) LED ribbon cable, part number 370-3497-xx

1. **See** FIGURE 5-4**. Slide the FTM card into the card slot to the right of the DC/DC converter. Once it is seated in the slot, tighten the captive mounting screws on the card front panel.**

2. **Slide the TMI card into the card slot to the right of the FTM card. Once it is seated in the slot, tighten the captive mounting screws on the card front panel.**

3. **Go to the inside rear of the Sun StorEdge A7000 cabinet. Using one short coax cable, connect one end to the TMI RX connector. Connect the other end to the FTM card RX connector. See** FIGURE 5-5**.**

4. **Using the other coax cable, connect one end to the TMI TX connector. Connect the other end to the FTM TX connector.**

5. **Connect one end of the LED ribbon cable to the remote LED connector on the rear edge of the TMI card. Connect the other end to the LED connector on the rear edge of the FTM card. See** FIGURE 5-5**.**

5.7   Installing the ATB

1. **See** FIGURE 5-4**. Remove a blank panel from the 6U card cage to expose a card slot.**

2. **Slide the ATB into the card slot to the right of the I/O Panel (TMI card). Once it is seated in the slot, tighten the captive mounting screws on the card front panel.**
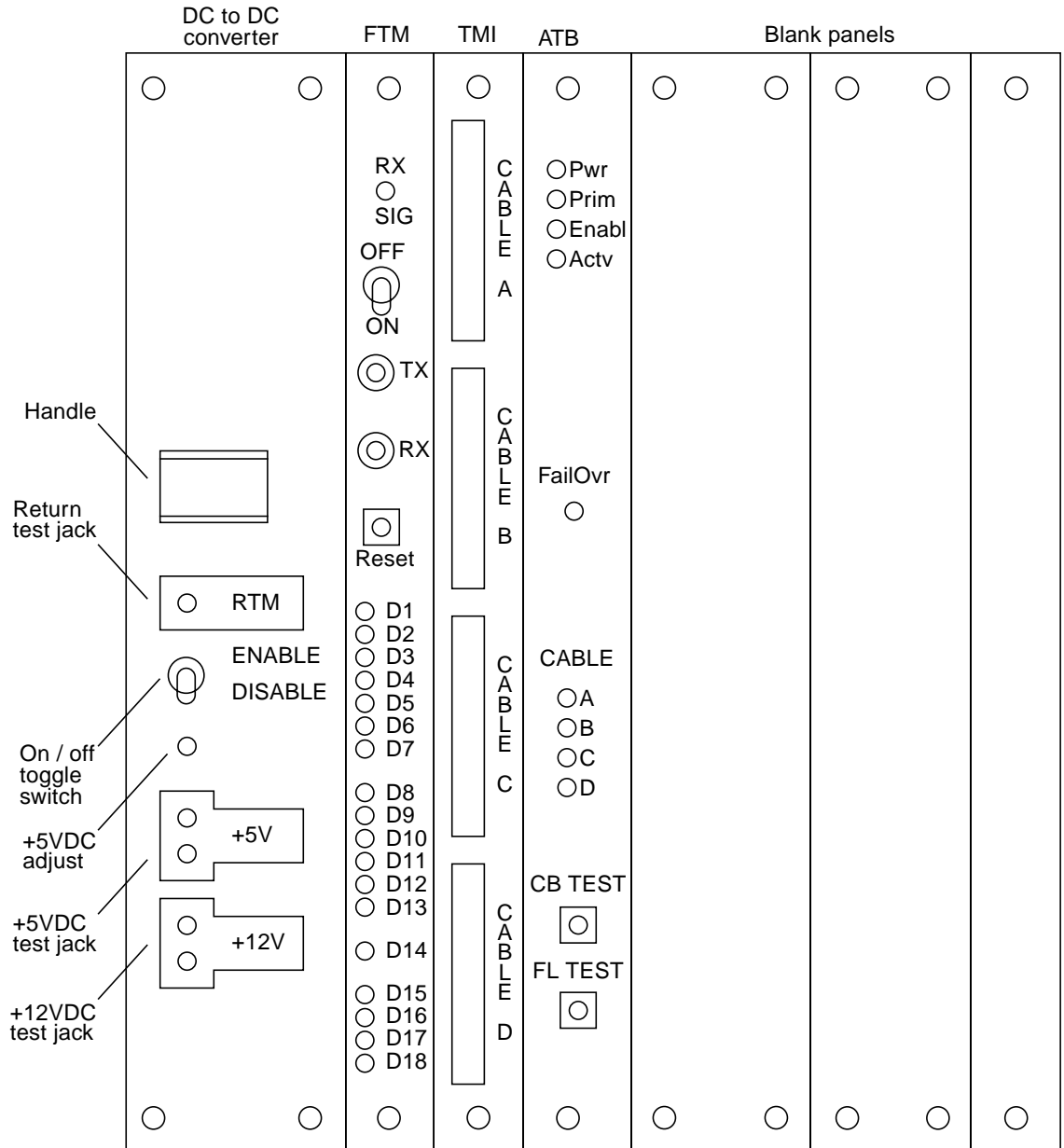
FIGURE 5-3   RDC FORM Hardware Front Panels and Slot Assignments
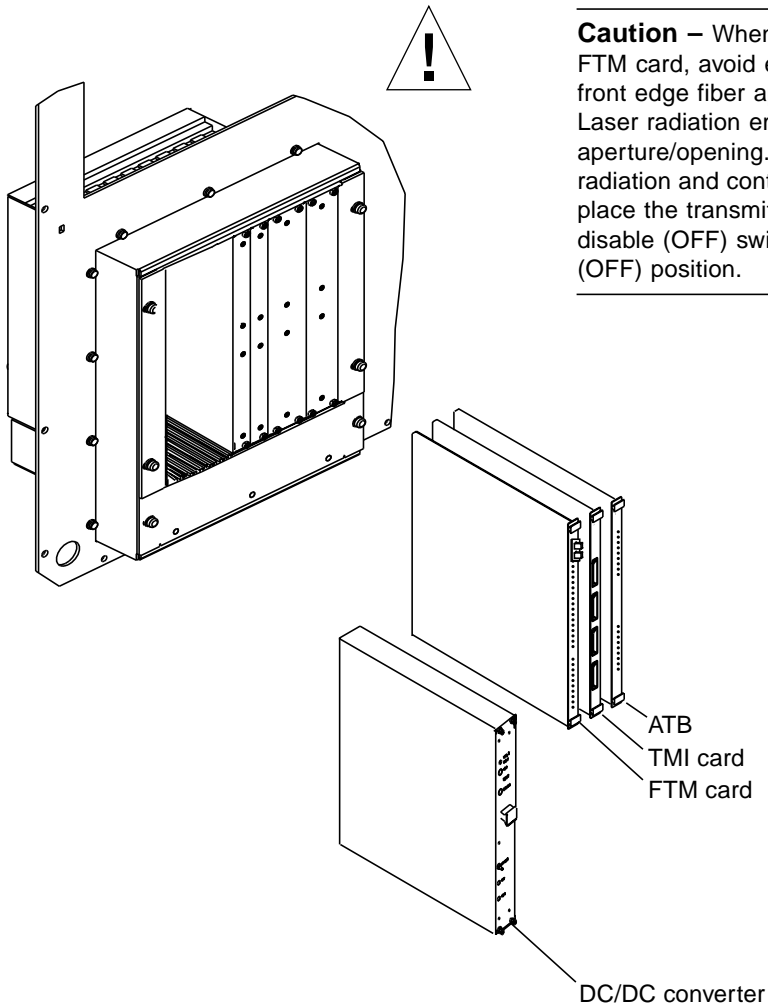
Caution – When working with the FTM card, avoid exposure to the front edge fiber aperture/opening. Laser radiation emits from this aperture/opening. To prevent laser radiation and contact with your eyes, place the transmit enable (ON)/disable (OFF) switch in the Disable (OFF) position.

ATB

TMI card

FTM card

DC/DC converter

FIGURE 5-4 FTM Card, TMI Card, ATB, and DC⁄DC Converter Installation

TX coax
connectors

RX coax
connectors

LED cable
connectors

360VDC

360VDC

DC
OUT

DC
OUT

DC
OUT

DC
OUT

FAN

TMI

FTM

Inside rear of cabinet
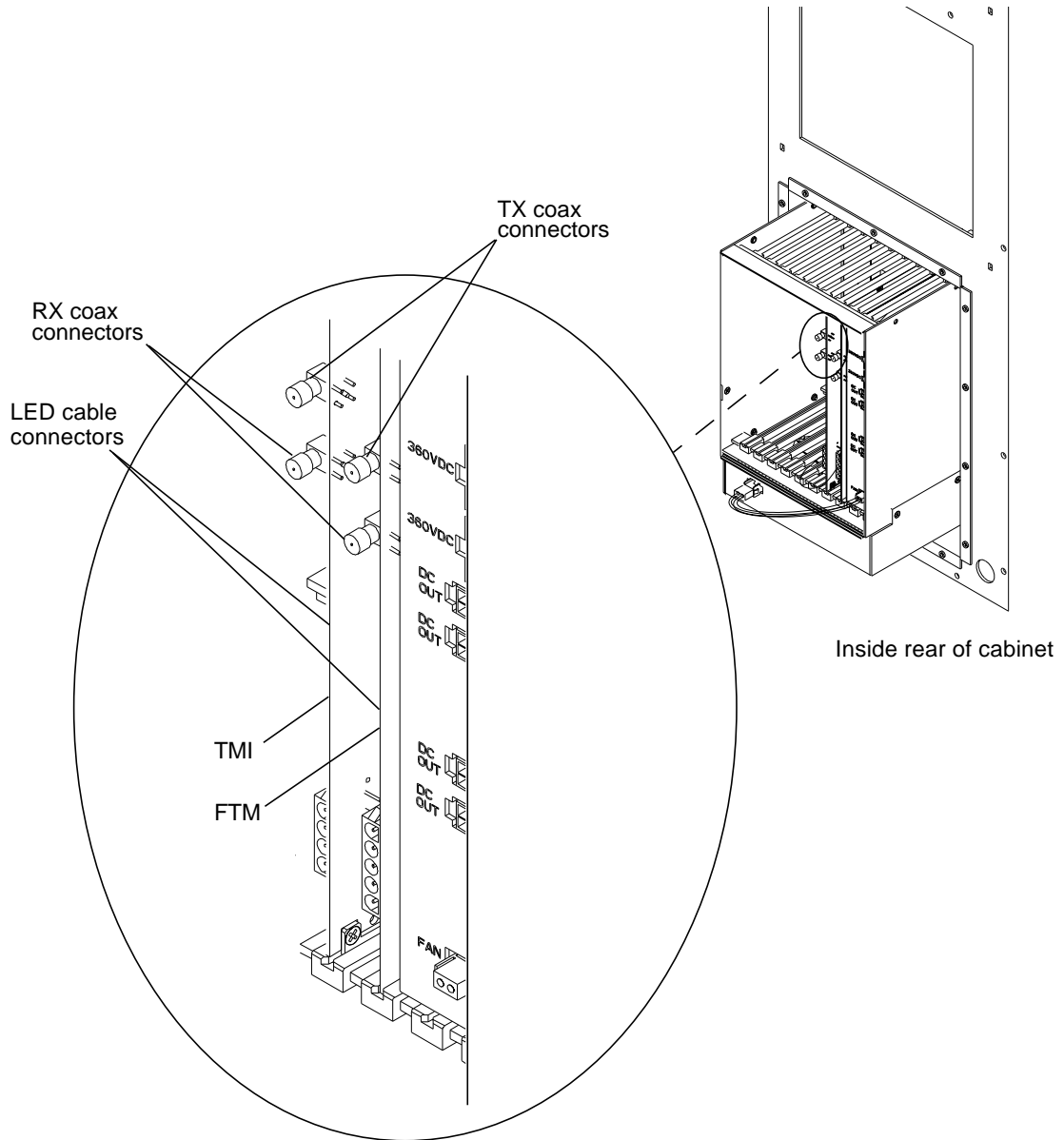
FIGURE 5-5 TMI and FTM Card RX/TX Connectors, Inside Rear of Cabinet

5.8 Connecting Power

FIGURE 5-6 is a power connection diagram. You need the following power cables:

- Cable part number 370-3473-xx to connect power from the high density storage array (HDSA) power supply to the DC/DC converter card. Two of these cables are already installed at the HDSA power supply output power connector
- DC/DC to TMI/FTM, part number 370-3507-xx
- DC/DC to ATB, part number 370-3507-xx
- DC/DC to fan, 370-3502-xx

1. **Two cables providing redundant power for the DC/DC converter card are located at the rear of the high density storage array (HDSA) power supply. See** FIGURE 5-7. **(These dual-plug cables also provide power to the disk drives in the HDSA drawer.) Connect one five-pin plug to the top connector at the rear of the DC/DC converter card. Connect the other five-pin plug to the connector just below the top connector at the rear of the DC/DC converter card. See** FIGURE 5-6.

2. **Allow some slack and secure the cables to the 360VDC cable standoff on the top rear of the DC/DC converter. Dress the cable run.**

3. **Use cable part number 370-3507-xx to connect the DC/DC converter to the TMI and FTM cards in the 6U card cage. This cable has dual plugs at one end to connect to the TMI and FTM cards. Connect the single-plug end to the +5VDC connector on the rear of the converter.**

4. **At the dual-plug end of the cable, connect one plug to the TMI power connector and the other plug to the FTM power connector J4.**

5. **Use cable part number 370-3507-xx to connect the DC/DC converter to the ATB. This cable has dual plugs at one end, but use only one plug to connect to the ATB. Connect the single-plug end to the +5VDC connector on the rear of the converter. Connect the other end to the ATB power connector J4.**

6. **Connect one end of the fan power cable (part number 370-3502-xx) connector to the +12VDC connector on the bottom rear of the DC/DC converter. Connect the other end to the power connector on the rear of the fan chassis subassembly.**

7. **Check the connections and Make sure the DC/DC converter Enable (ON)/Disable (OFF) switch is set to Disable (OFF).**

360VDC power
from HDSA
power supply

360VDC power
from HDSA
power supply

360VDC

360 RTN

GROUND

360VDC

360 RTN

GROUND

ATB

TMI   FTM

+5 VDC

+5 RTN

+5VDC for
TMI/FTM/ATB

C SHARE

SEN+

SEN-

+12 RTN

+12 VDC

+12VDC power
to fan

Fan power connector
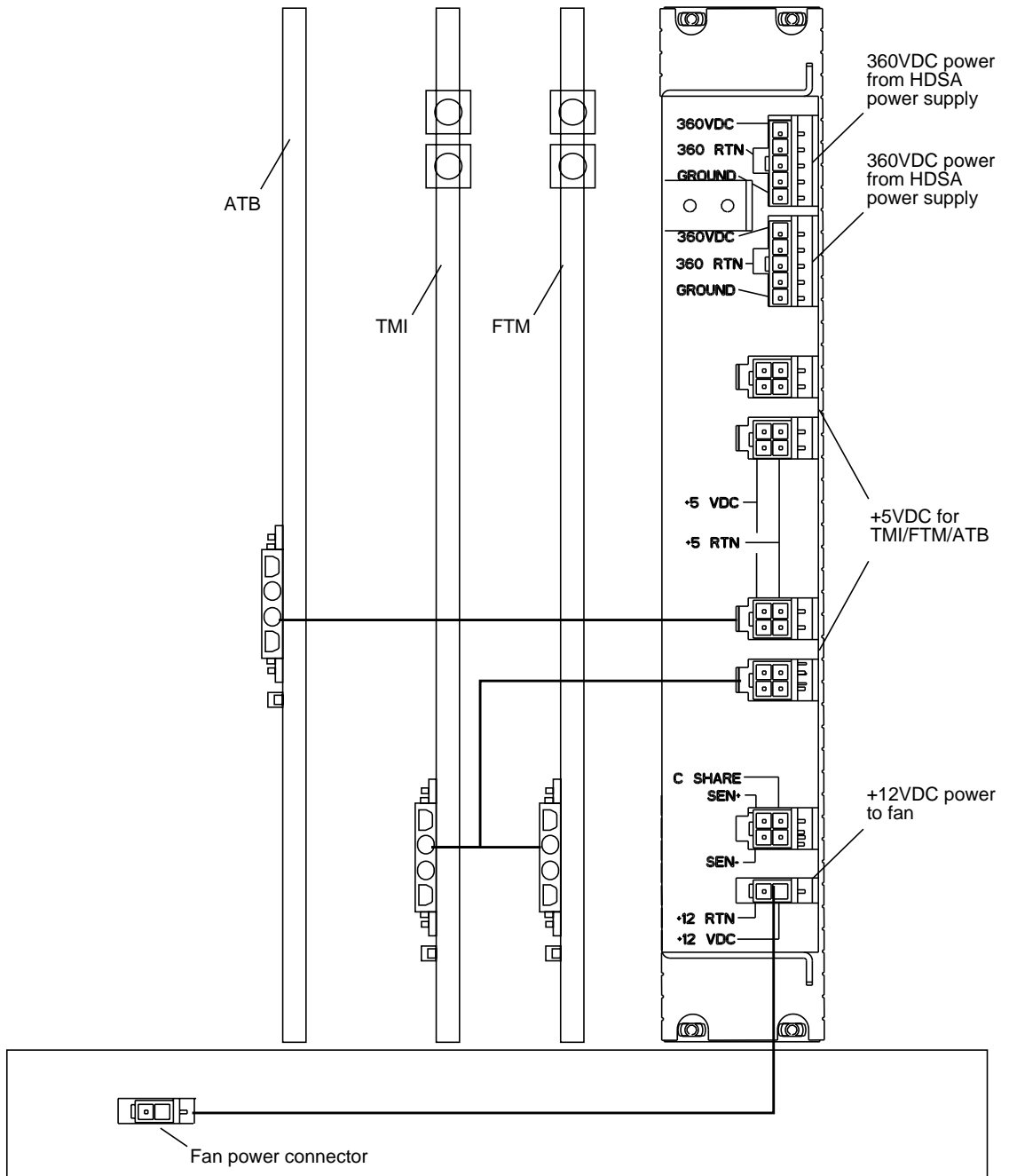
FIGURE 5-6   Power Connection Diagram

Cable to
one 360VDC connector
at the rear of
the DC/DC converter card

Cable to
one 360VDC connector
at the rear of
the DC/DC converter card

Rear of cabinet
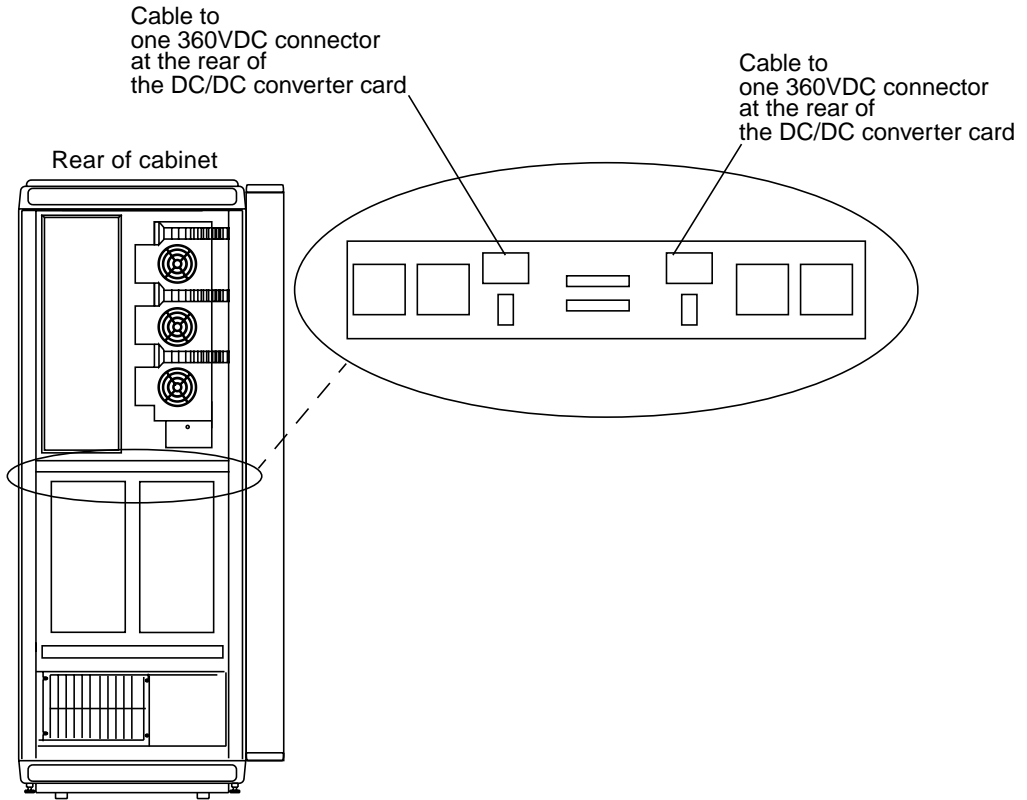
FIGURE 5-7   HDSA Power Supply Connections

5.9 Connecting the MC Bus Cables to the I/O Panel and ATB

Note – These sections and drawings do not show the cache memory cards in the Sun StorEdge A7000 subsystems cabled together, for clarity; they are also cabled together to form the MC bus.

TABLE 5-2 describes the cable connection from subsystems DSP1 and DSP2 inside the Sun StorEdge A7000 cabinet. FIGURE 5-8 is a connection block diagram.

TABLE 5-2 MEMORY CHANNEL Bus Connections, I/O Panel and ATB

Subsystem/Cache Memory Card Connector	Connects To...
DSP1/J1	Right opening, top I/O panel
DSP1/J2	Left opening, top I/O panel
DSP1/J3	Right opening, bottom I/O panel
DSP1/J4	Left opening, bottom I/O panel
DSP2/J1	ATB, connector J1
DSP2/J2	ATB, connector J2
DSP2/J3	ATB, connector J3
DSP2/J4	ATB, connector J4
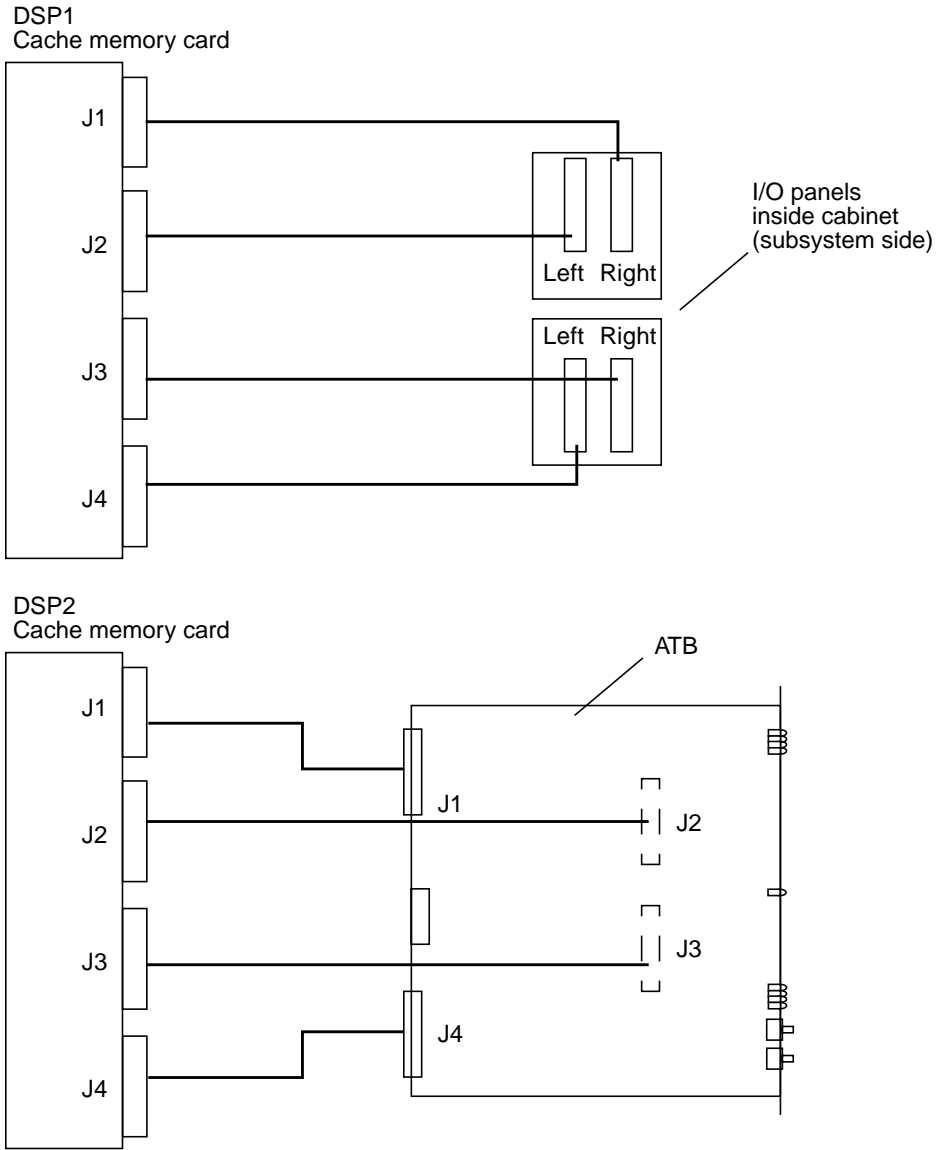
FIGURE 5-8 MEMORY CHANNEL Bus Connection Block Diagram

5.10 Connecting the Jumper Cables to the TMI Card and I/O Panel

TABLE 5-3 describes the cable connection from the TMI front panel to the I/O panels. FIGURE 5-9 and FIGURE 5-10 show the connection diagrams.

TABLE 5-3 Jumper Cable Connections, TMI Card and I/O Panel

TMI Card Front Panel Connector	Connects To...
Cable A	Left opening, top I/O panel
Cable B	Right opening, top I/O panel
Cable C	Left opening, bottom I/O panel
Cable C	Right opening, bottom I/O panel
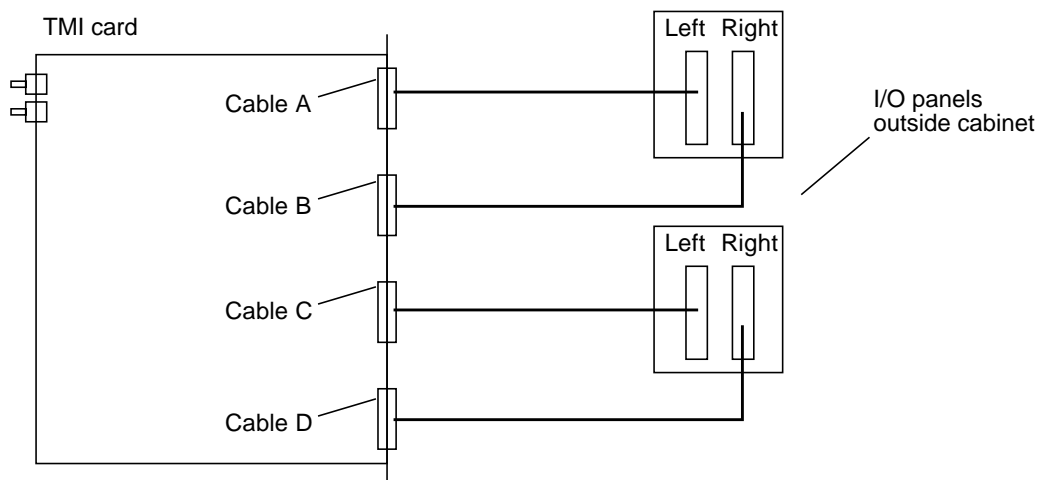
FIGURE 5-9 TMI Card to I/O Panel Connection Block Diagram
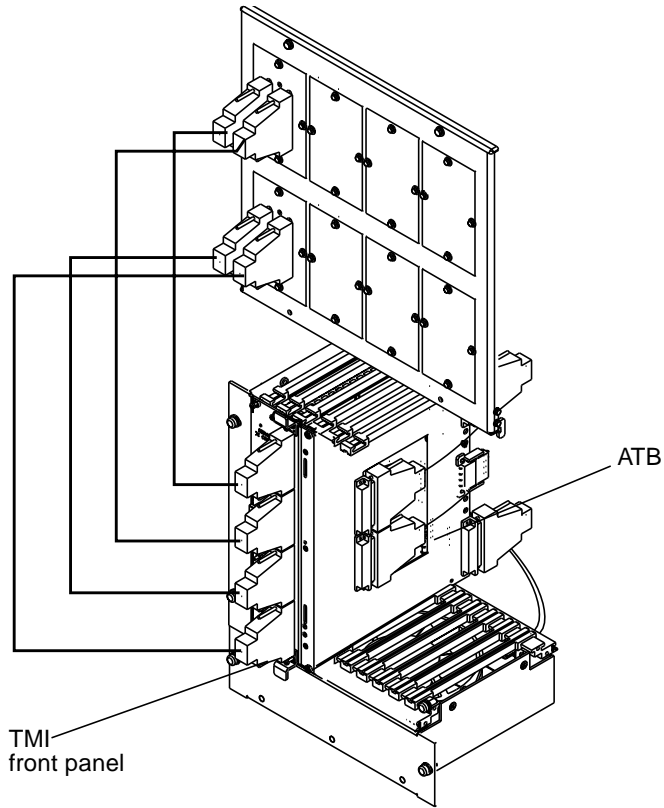
FIGURE 5-10 TMI Card Front Panel to I/O Panel Connection Diagram, Cutaway Version

5.11 Connecting the Local FTM Card to the Remote FTM Card

FIGURE 5-11 shows the FTM card connection diagram. Note the crossover connection of the coax connectors: TX to RX.
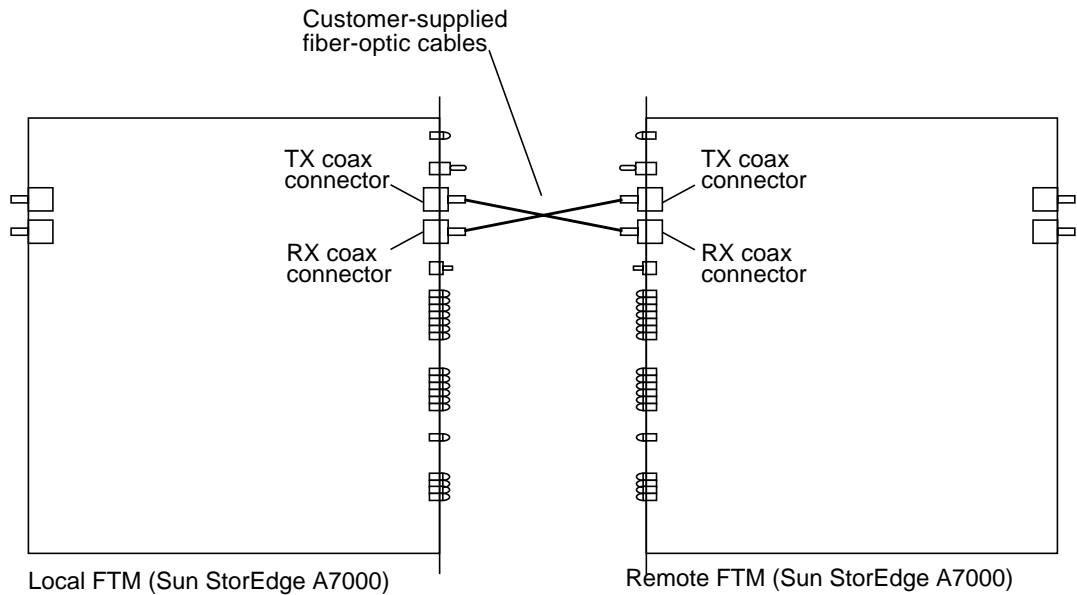
FIGURE 5-11 Local FTM Card to Remote FTM Card Connection Diagram

5.12 Power On the RDC FORM Hardware and Sun StorEdge A7000

Caution – Avoid exposure to the FTM front-edge fiber aperture. Laser radiation is emitted from this aperture. Avoid contact with eyes. To prevent laser radiation exposure, place the transmit enable/disable switch in the disable position.

---

1. **Put the DC/DC converter Enable (ON)/Disable (OFF) switch in the ENABLE (ON) position.**

2. **Power on the Sun StorEdge A7000, as described in Chapter 7.**

5.13 Configuring the Operating System Software for RDC

Sun StorEdge A7000 servers running operating system software version 3.6.4 and later compatible versions require that you configure this software to accept RDC. As shipped, these servers have the RDC software capability turned off.

1. **At the subsystem dsp1 window, start the configuration utility:**

```
# /usr/install/scm/configure_scm
```

2. **The utility displays a series of prompts. Answer the prompts as shown in boldfaced text.**

```
Verifying Execution Environment
Is this machine part of a 4-node configuration (y/n) [n] n

Is this machine running Campus-Wide or Metropolitan
Remote Dual Copy (RDC) (y/n) [n]: y

The following information will be used to build the default
configuration files.

    CPU type: 88110
    CPU memory size: 32 MB
    Subsystem id: 2
    System boot device is defined as type: MSD
    Disk drawers enabled (Gateway is 0): 2
    VME SCSI drives begin at address: 0x6800
    VME SCSI board is a: Quad
    Memory Channel: 1 ECCMCS (512M) board

    Is this correct (y/n) >> n
```

```
Enter the Processor Type
Valid entries are : 88100 or 88110
    [88110]: 88110

Enter the Processor Memory Size (MB)
Valid entries are : 32 or 128
    [32]: 32

Enter the Subsystem Id
Valid entries are : 2 to 5
    [2]: 4

Enter the Boot Device Location
Valid entries are : MSD or VME
    [MSD]: MSD

Enter the number of Disk Drawers
Enter 0 for a Gateway machine
Valid entries are : 0 to 6
    [2]: 2

Enter the VME SCSI Starting Address
Valid entries are : 0x6800 or 0x8800
    [0x6800]: 0x6800

Enter the SCSI board Type
Valid entries are : Quad (4 ports using one VME address)
or Dual (4 ports using two VME addresses)
    [Quad]: Quad

Enter the Memory Channel Type
Valid numeric entries are :
1 is None
2 is MCS III (256M)
3 is MCS III (512M)
4 is 1 ECCMCS (256M) board
5 is 2 ECCMCS (256M) boards
6 is 1 ECCMCS (512M) board
7 is 2 ECCMCS (512M) boards
8 is 3 ECCMCS (512M) boards
9 is 4 ECCMCS (512M) boards
    [6]: 6
```

```
The following information will be used to build the
default configuration files.

CPU type: 88110
CPU memory size: 32 MB
Subsystem id: 4
System boot device is defined as type: MSD
Disk drawers enabled (Gateway is 0): 2
VME SCSI drives begin at address: 0x6800
VME SCSI board is a: Quad
Memory Channel: 1 ECCMCS (512M) board


   Is this correct (y/n) >> y

Backed up /etc/system to /etc/system.980922
Backed up /etc/memcf to /etc/memcf.980922
Backed up /etc/sd.cf to /etc/sd.cf.980922
```

3. **Rebuild and install a new operating system kernel:**

```
# cd /usr/src/uts/OBJ
# make VER=.scm
# mv /unix /unix.back
# cp unix.scm /unix.scm
# ln /unix.scm /unix
```

4. **Repeat Step 1 to Step 3 for subsystem dsp2.**

5.14   Extending Link Distances Using Fiber-Optic Converters

> **Note –** A full power down of the Sun StorEdge A7000 may not be necessary when installing equipment to extend the link distance. If it is required, power off the Sun StorEdge A7000, as described in Chapter 7.

You can extend the FORM link using customer-supplied fiber-optic converters (FOC) and cables. The extended distance should not exceed 50 kilometers (km), depending on the FOC used. The FOC connects to the transmit (TX) and receive (RX) converters on the FTM card in each Sun StorEdge A7000. FIGURE 5-12 is a block diagram showing two Sun StorEdge A7000s connecting using this scheme.
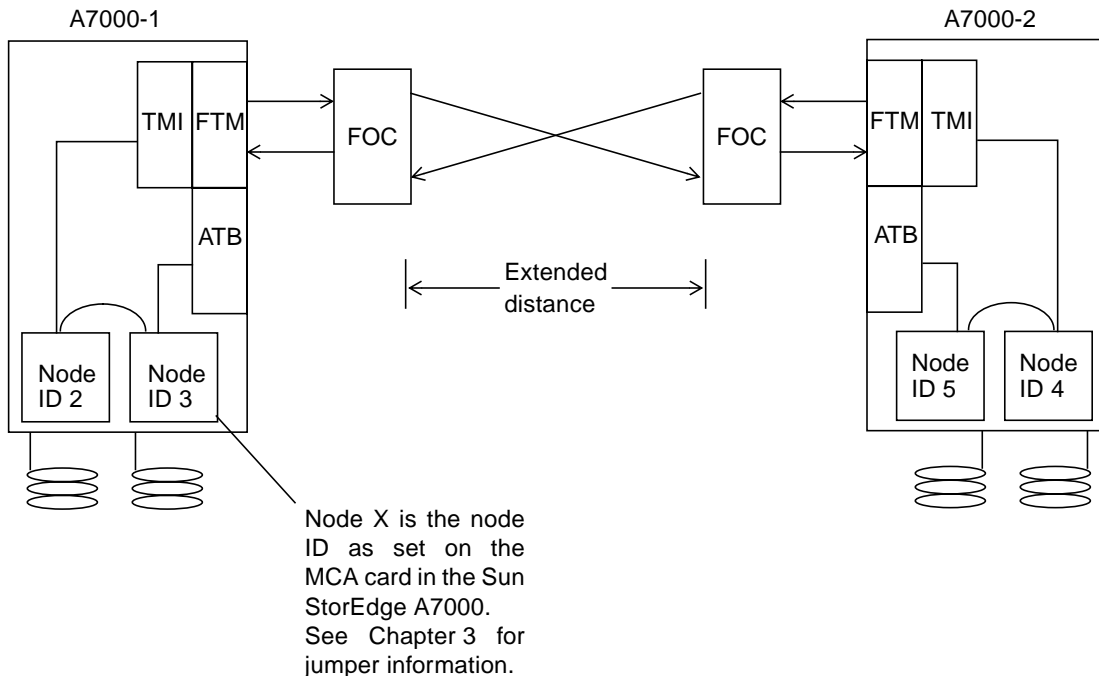
FIGURE 5-12 Fiber-optic Converter Connection Scheme Block Diagram

For extending distances from 3 km to 12 km, use the TMI card, part number 501-5067-xx. For distances from 3 km to 50 km, use TMI card, part number 501-5285-xx. For TMI card installation, see Section 5.6 "Installing and Connecting the TMI and FTM Cards" on page 5-5.

FIGURE 5-13 shows the connections between the FTM card and FOC.

1. **Make all connections as shown in** FIGURE 5-13**.**

2. **If you have powered the Sun StorEdge A7000 off, see Section 5.12 "Power On the RDC FORM Hardware and Sun StorEdge A7000" on page 5-18.**
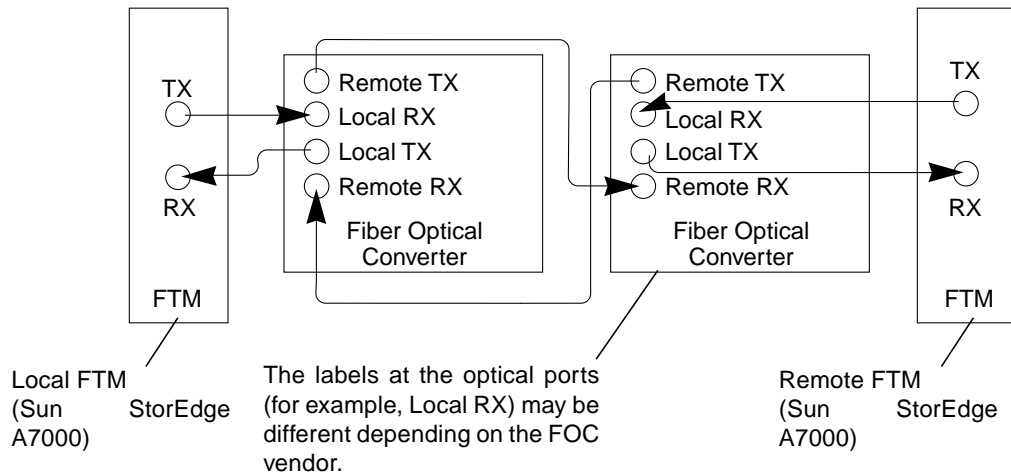
FIGURE 5-13 Connections Between the FTM Card and Fiber-optic Converters

CHAPTER **6**

FRU Removal and Replacement

⚠ **Caution –** Before performing any removal or replacement procedures (especially before turning power off), check with the customer site or system administrator to arrange for possible power off of the StorEdge A7000 or host computer.

⚠ **Caution –** Do not move or attempt to move the StorEdge A7000 cabinet with the high-density storage array (HDSA) drawer extended or open in any way. The cabinet could become unbalanced and topple if you try to move it incorrectly. Make sure the cabinet is properly level at all times. Section 6.7 "Leveling the Cabinet Before and After Disk Installation" on page 6-15 describes how to level the cabinet. Do not remove or retract the main cabinet leveler feet if the HDSA drawer contains disk drive modules.

This chapter describes removal and replacement procedures for the StorEdge A7000 field-replaceable units (FRUs). This chapter also describes or notes software procedures to perform after removing and replacing system components. Topics include:

- Section 6.1 "System Maintenance Types" on page 6-2
- Section 6.2 "Preparing for Service" on page 6-4
- Section 6.3 "Running Diagnostic Software" on page 6-5
- Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5
- Section 6.5 "Adjusting the Linear Actuator Device" on page 6-11
- Section 6.6 "Adjusting the HDSA Drawer" on page 6-13
- Section 6.7 "Leveling the Cabinet Before and After Disk Installation" on page 6-15
- Section 6.8 "Disk Drive (Linear)" on page 6-17
- Section 6.9 "Disk Drive (RAID 5)" on page 6-24
- Section 6.10 "System Console" on page 6-28
- Section 6.11 "Subsystem Power Supply" on page 6-38
- Section 6.12 "Balancing and Adjusting the Power Supplies A and B" on page 6-42
- Section 6.13 "HDSA Power Supply Module" on page 6-51

6.1 System Maintenance Types

You can perform two types of maintenance on the Sun StorEdge A7000 system:

- Concurrent maintenance
- Maintenance that requires partial or total Sun StorEdge A7000 power removal

See TABLE 6-1.

TABLE 6-1   Sun StorEdge A7000 FRUs Needing Concurrent and Other Maintenance

Power Off the Entire Sun StorEdge A7000 To Service or Replace This Field Replaceable Unit (FRU)...
High Density Storage Array (HDSA) power supply module chassis
Linear actuator device (LAD)
LAD/SCSI expander power supply
AC power distribution unit with AC box and terminal block
SCSI expander (splitter) cards and chassis
Quad-Channel block mux channel (BMC) card
Quad-Channel SCSI controller
Dual-Channel ESCON to VME card

TABLE 6-1   Sun StorEdge A7000 FRUs Needing Concurrent and Other Maintenance

Power Off the Entire Sun StorEdge A7000 To Service or Replace This Field Replaceable Unit (FRU)...

Chassis card cage with backplane

Power Off the Subsystem of the FRU to Service or Replace This FRU...

Subsystem power supply (requires AC box power off also)

Processor card: adapter and processor boards

Cache memory card

Quad-Channel SCSI Target Mode controller

No Power Off Necessary to Service or Replace This FRU....

High Density Storage Array (HDSA) power supply module

Disk drives

Disk drive array chassis

System Console notebook computer

Cabinet blower fan

CPU transceiver and loopback cable

HDSA drawer fan

6.2 Preparing for Service

This section describes notes and required tools to service the Sun StorEdge A7000.

6.2.1 Notes

When performing the procedures in this chapter:

- Verify that connectors and printed circuit boards (PCBs) are properly seated.
- Fasten screws securely, but avoid overtightening them.
- Do not loosen screws not applicable to the procedure.
- Record periodic inspection data, error conditions, and error processing procedures for future reference.
- Use a grounding wrist strap when handling PCBs to avoid electrostatic discharge damage.
- Check switch and jumper pin settings on PCBs when PCBs are replaced.
- Plug PCBs and disk drives into their specified locations.
- Handle disk drives with care.
- Label cables as needed.

6.2.2 Required Tools

You need the following tools, plus those normally found in a Field Engineer's toolkit:

- Nonconductive insulated adjustment Phillips screwdriver
- Fluke i410 Current Clamp or equivalent
- Stepladder (for HDSA drawer adjustment only, Section 6.6 "Adjusting the HDSA Drawer" on page 6-13)

6.3 Running Diagnostic Software

Chapter 4 identifies and describes the standalone diagnostics used to test the Sun StorEdge A7000 system components; it also describes how to run diagnostics and recognize successful and unsuccessful diagnostic operation.

After performing removal or replacement procedures for subsystems, cards, and disk drives, run the diagnostic software described in Chapter 4. Run diagnostics manually when:

- Adding a new disk drive, card, or other device to the system
- Replacing a suspected failing card or disk drive
- Moving a card to a different slot on the backplane
- An Extended Diagnostic fails during automatic powerup testing

This section describes any additional or applicable software procedures.

6.4 Entering Serial Numbers in the Master Configuration Database (MCD)

Note – Always note the component's serial number before you install it. On some cards, serial numbers are printed along the component or solder side of the PCB.

After performing removal and replacement procedures, certain FRUs require that you enter their serial number in the Master Configuration Database (MCD) to keep the MCD correct and up to date. The software tool used to change serial numbers is the MCD Hardware Modification Tool, available from the service selection of the System Console Application Menu bar.

6.4.1 Back Up the Current MCD to a Subsystem

After performing the removal and replacement procedure and before entering the new component serial number, use the System Console to back up the current MCD to a subsystem.

> **Note –** On the System Console with trackpad mouse, move the pointer by putting your finger on the trackpad; the pointer moves as your finger moves over the trackpad.

1. **If System Console display screen is blank, press any key to reactivate it.**

2. **Put the mouse pointer in any open area on the root window display area.**

3. **Press and hold the left mouse button.**

4. **A menu is displayed. Drag the mouse pointer to EXIT MWM. Release the left mouse button.**

5. **Choose OK on the QUIT MWM dialog box; click Yes.**

   The display goes blank momentarily, then the `Console Login:` prompt reappears.

6. **Log in to the System Console:**

   ```
   Console Login: root
   ```

   The system responds with a `Password:` prompt.

7. **Press the Enter key. The system prompt (#) is displayed.**

8. **Type:**

   ```
   # subsysbak -x mcdsavedata
   ```

9. **To restart the graphical user interface (GUI):**

   ```
   # system_console &
   ```

   The above command also restarts the System Console Application Menu bar:
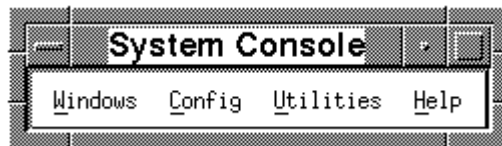
6.4.2　Starting the MCD Hardware Modification Tool

1. At a System Console window, type:

```
# xmcdhwmod
```

The MCD Hardware Modification Tool is displayed, as shown in FIGURE 6-1.

2. Click the left mouse button on an item to select that item.

3. Double-click the left mouse button on an item (like dsp1) to display all items within that item.

4. Click the right mouse button on an item to display a pop-up menu of operations you can perform on that item.
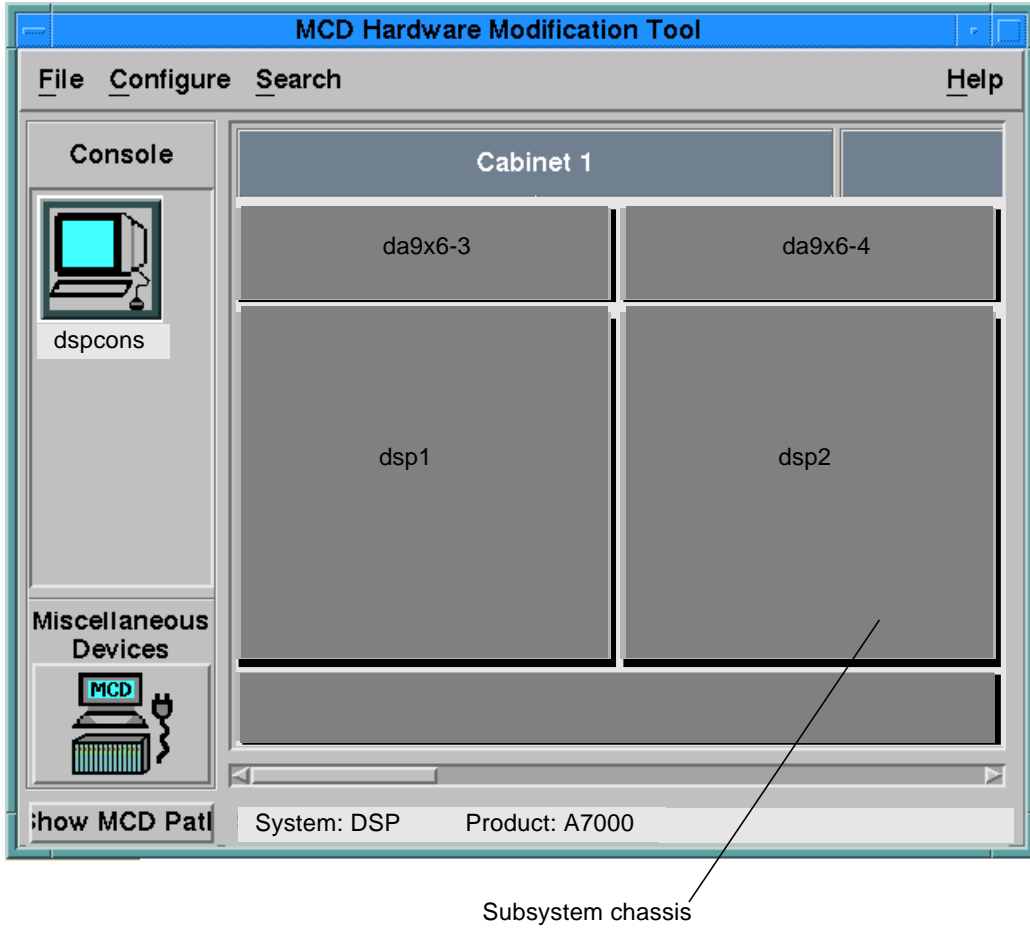
FIGURE 6-1 MCD Hardware Modification Tool

6.4.3　Example: Enter a Card's Serial Number

Note – Always note the component's serial number before you install it. On some cards, serial numbers are printed along the component or solder side of the PCB.

The following example describes how to enter a card's serial number in the MCD database. The procedure is the same for disk and tape drives.

1. **In the MCD Hardware Modification Tool window (**FIGURE 6-1**), move the mouse pointer to dsp1 and double-click the left mouse button. A window showing all the cards in the dsp1 chassis is displayed. See** FIGURE 6-2**.**

2. **Move the mouse pointer to the card you have replaced or installed. Press the right mouse button and select MCD Info→Modify→Serial Number. The Change Serial Number window is displayed.**

3. **Put the mouse pointer in the text box below the Serial Number: title; use the Backspace key to erase the current serial number. Type the new number.**

4. **Click Change using the left mouse button.**

5. **Move the mouse pointer to File. Click the left mouse button and choose Save.**

6. **Move the mouse pointer to File. Click the left mouse button and choose Exit. Click Yes to update the MCD database.**

7. **Back up the MCD database to a subsystem, as described in Section 6.4.1 "Back Up the Current MCD to a Subsystem" on page 6-5.**
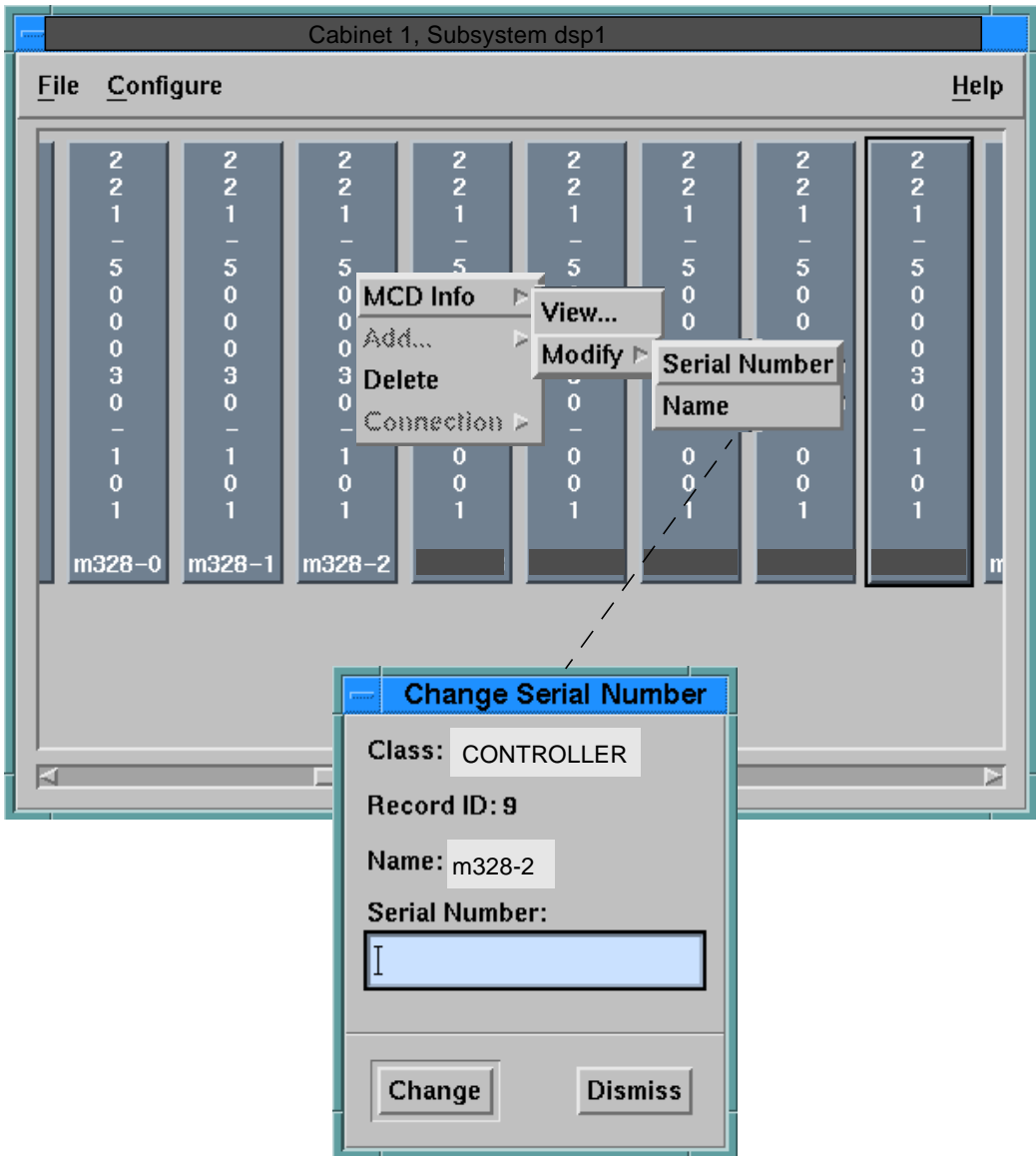
FIGURE 6-2 Changing the Serial Number

6.5 Adjusting the Linear Actuator Device

The Linear Actuator Device lead screw will need lubrication if the HDSA drawer starts to squeak audibly when it opens or closes:

1. **Press the left HDSA drawer open/close switch shown in** FIGURE 6-3. **The drawer assembly slowly slides forward.**

2. **Open the cabinet rear door. The Linear Actuator Device lead screw is the long large screw that runs the length of the shaft support assembly. It is inside the assembly, exposed and accessible from the top of the assembly. See** FIGURE 6-4.

   Using a silicone grease or spray, lubricate the lead screw. Take care not to get the grease or spray on any other component or assembly in the cabinet.

3. **Press the left HDSA drawer open/close switch to close the drawer.**

4. **Repeat Step 1 to Step 3 for the right HDSA drawer.**

5. **Close the rear door.**
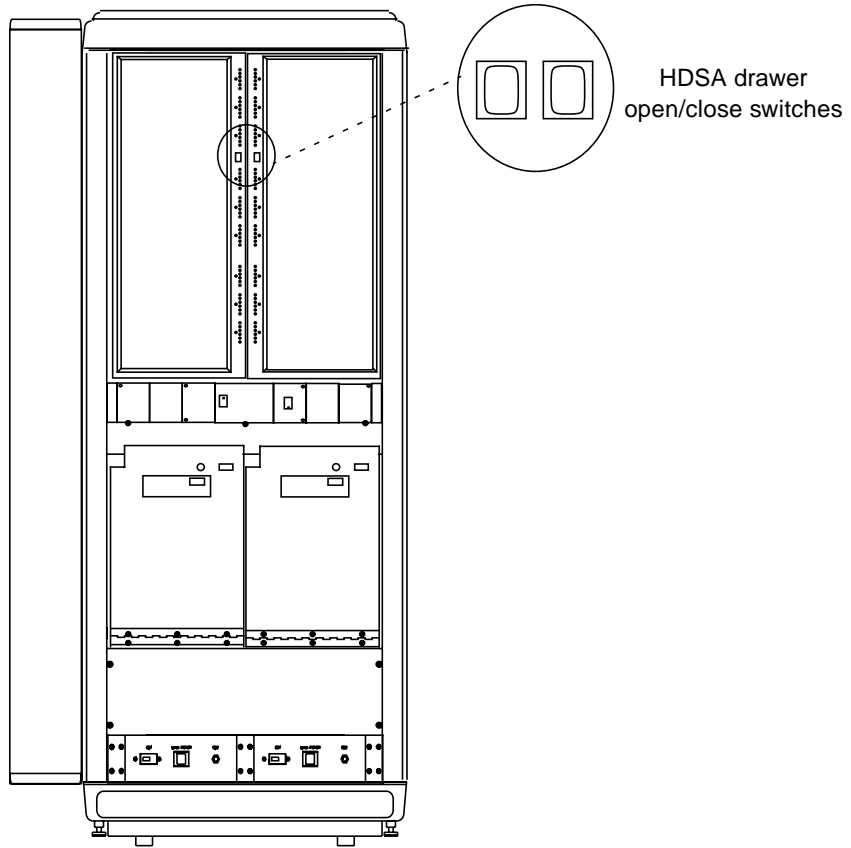
FIGURE 6-3 HDSA Drawer Open/Close Switch
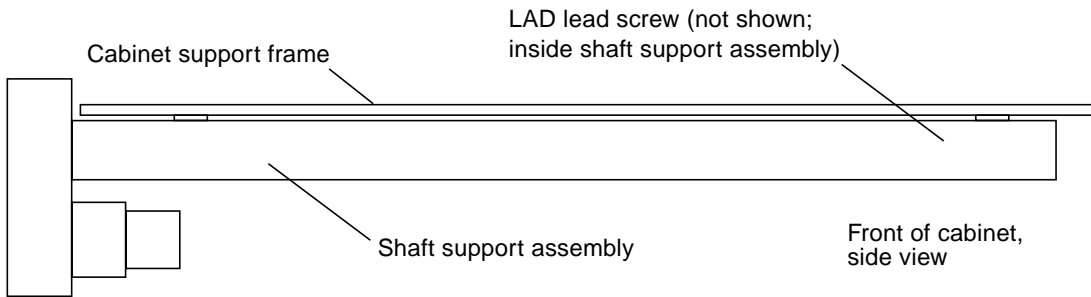
FIGURE 6-4 Linear Actuator Device Lead Screw Lubrication

6.6 Adjusting the HDSA Drawer

The HDSA drawer is adjusted at the factory; it may need readjustment after installation because of flooring differences between the factory and customer site.

Note – You will need a stepladder to reach the top of the drawer.

---

1. **Press the HDSA drawer open/close switch to fully extend the drawer. If the drawer will not extend on its own, pull it all the way forward.**

2. **At the top of the drawer is the nylon channel guide, shown in** FIGURE 6-5**. Seven screws hold the channel guide in place. Loosen all seven screws. Note that the channel guide is now loose and moves from side to side.**

   For this adjustment, assume the last screw near the rear of the drawer is Screw 7 and the first screw near the front is Screw 1. The rest of the screws are 6, 5, 4, 3, 2, back to front.

3. **Center the channel guide to the channel bracket. Tighten Screw 7 only.**

4. **Press the open/close switch so that the drawer starts to close. Stop the drawer (press the switch) so that Screw 6 is the rearmost screw. Adjust and center the channel guide to the channel bracket again. Tighten Screw 6.**

5. **Repeat step 4 for Screws 5 through 1, until the channel guide is adjusted and all screws are tight.**

Channel bracket inside cabinet

Nylon channel guide
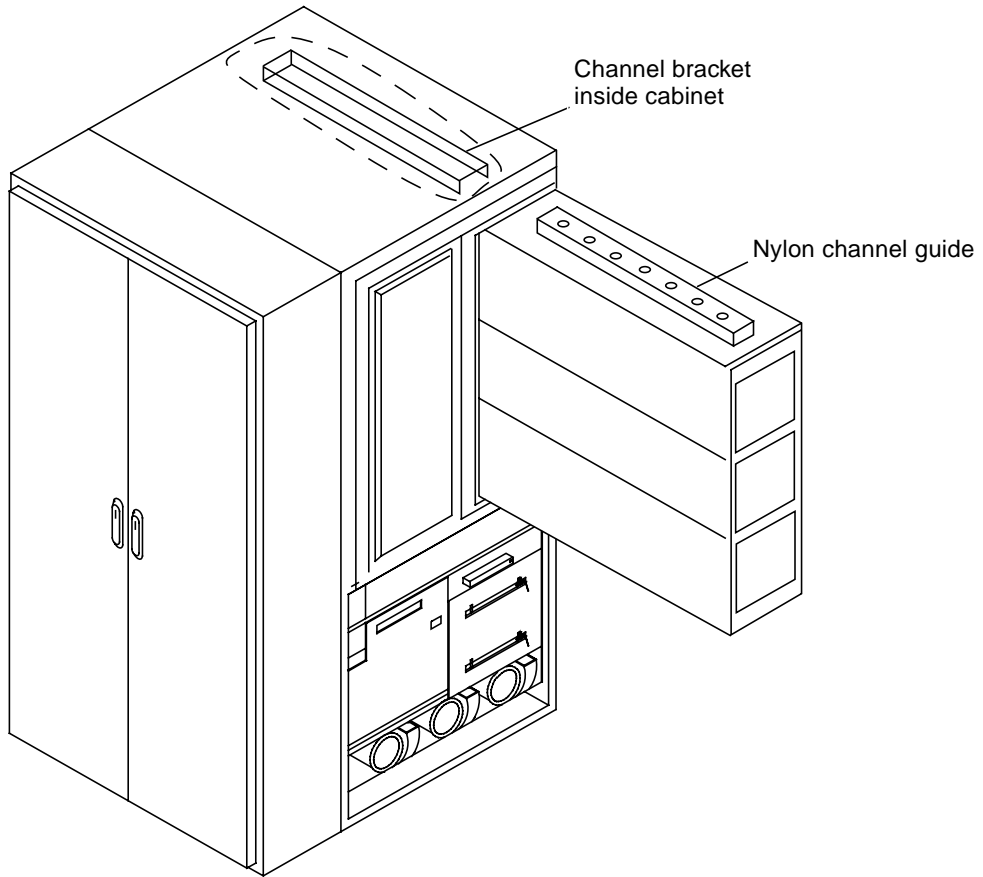
FIGURE 6-5   HDSA Drawer Channel Guide Adjustment Diagram

6.7 Leveling the Cabinet Before and After Disk Installation

Before and after you install the disk drives in the HDSA, you must level the cabinet. The leveling legs are located under each corner of the cabinet. See FIGURE 6-6.

1. **Use an open end 9/16-inch wrench to screw down the front cabinet leveling legs until contact with the floor is made.**

2. **Extend each front cabinet leveling leg one additional turn.**

3. **Unscrew the rear cabinet leveling legs until contact with the floor is made.**

4. **Extend each rear cabinet leveling leg one additional turn.**

5. **Adjust the appropriate leveling legs to set the cabinet's "front to back" at true level. Use a carpenter's level or an equivalent leveling tool.**

6. **Adjust the leveling legs to set the cabinet's "left side to right side" at true level.**

7. **Use an open end 9/16-inch wrench to screw down the two I/O Bay cabinet legs until contact with the floor is made. Do not use these legs to level the cabinet; they are for support only.**

Left side to right side level

Front to back level
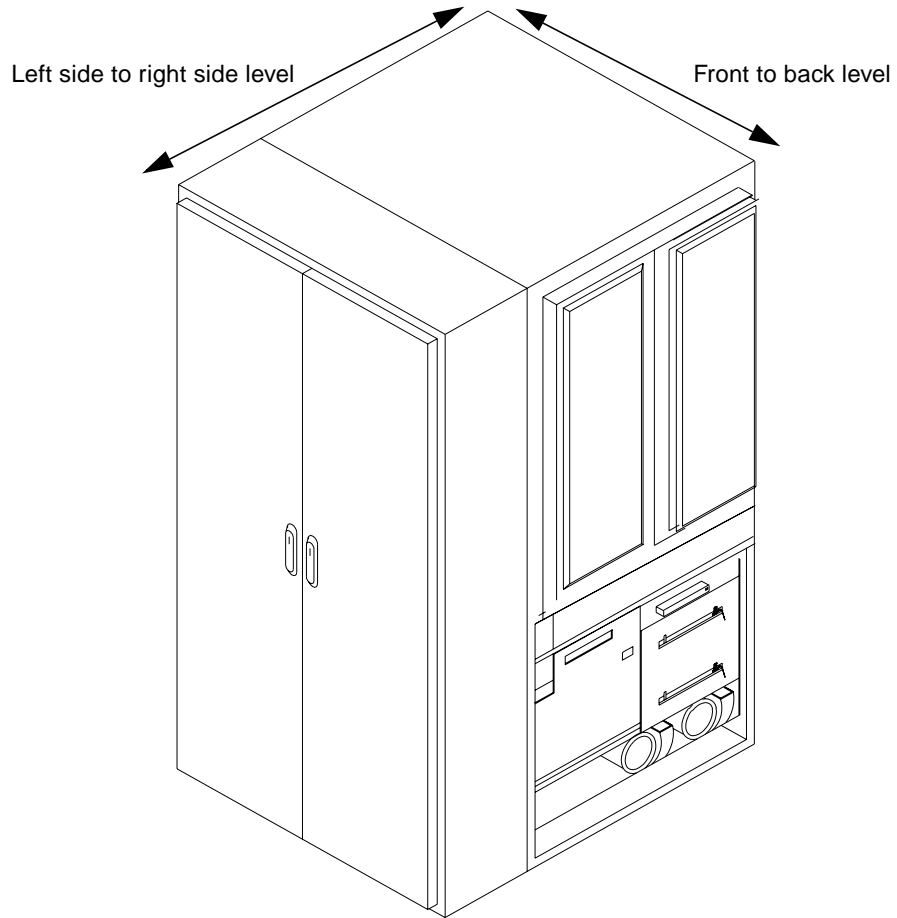
FIGURE 6-6   Cabinet Leveling

6.8 Disk Drive (Linear)

You can remove and replace linear disk drives as necessary without powering off the system. Note that some Sun StorEdge A7000 storage servers include a faceplate or frontpanel; the following paragraphs note the differences for removal and replacement.

To replace a failed RAID 5 disk drive, refer to Section 6.9 "Disk Drive (RAID 5)" on page 6-24.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

6.8.1 Removal, Faceplate Type

1. **Press the HDSA drawer open/close switch shown in** FIGURE 6-3. **The drawer assembly slowly slides forward.**

Note – The Sun StorEdge A7000 is configured to prevent both HDSA drawers from extending at the same time. Remove and replace disk drives in one drawer, press the switch to close it, and open the other if required.

---

2. **Locate the disk drive to be replaced.**

3. **Each drive faceplate has locking/unlocking thumbscrews (see** FIGURE 6-7**). Turn the thumbscrews counterclockwise until they release. The disk drive spins down slowly.**

4. **When the SAFE TO REMOVE LED lights, pull the drive toward you, using the handle.**

6.8.2　Replacement, Faceplate Type

1. **Remove the replacement disk drive from its packing material. Remove the foam connector protector at the rear of the drive.**

2. **Make sure the thumbscrews on the front of the disk drive are turned completely counterclockwise.**

3. **Slide the disk drive into its corresponding slot. Push it to engage the backplane connector. The green SAFE TO REMOVE LED will light.**

4. **Turn the drive's locking/unlocking thumbscrews clockwise to secure the drive in the slot. The SAFE TO REMOVE LED will turn off and the yellow POWER LED will light when the drive is ready.**

5. **When you finish replacing disk drives, close the HDSA drawer by pressing the HDSA open/close switch.**

6.8.3　Run Diagnostic Software

Run any diagnostic software as described in Chapter 4.
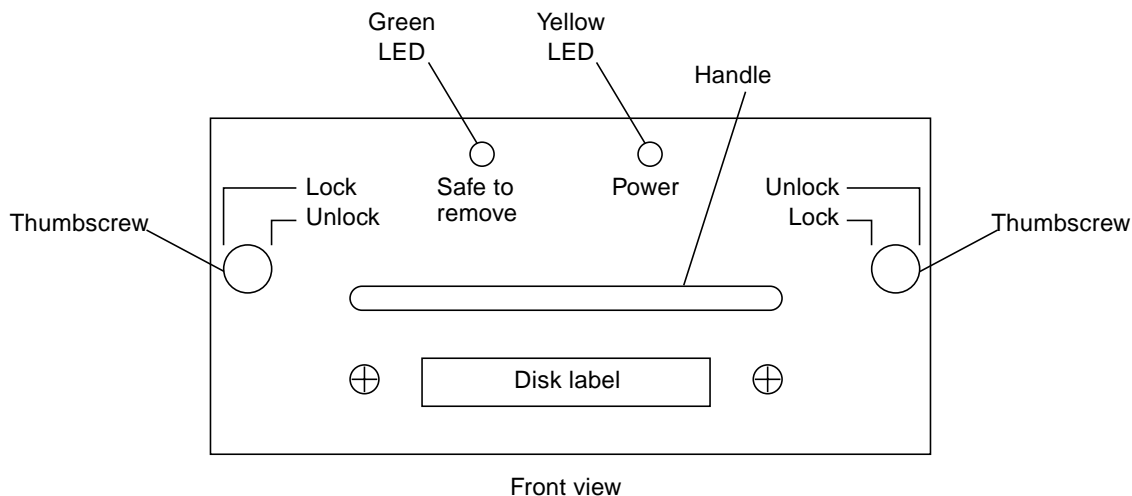
FIGURE 6-7　Disk Drive, Faceplate Type

6.8.4 Removal, Front Panel Type

1. **Press the HDSA drawer open/close switch shown in** FIGURE 6-3**. The drawer assembly slowly slides forward.**

Note – The Sun StorEdge A7000 is configured to prevent both HDSA drawers from extending at the same time. Remove and replace disk drives in one drawer, press the switch to close it and open the other if required.

---

2. **Locate the disk drive to be replaced. Place it offline by pulling the spring-loaded switch out and throwing it to the OFF position. See** FIGURE 6-8**.**

3. **Flip the drive window latch up, pull it, and open the drive window.**

4. **Push the drive eject latch to the right. See** FIGURE 6-9**.The disk drive handle opens and the drive releases from the backplane connector.**

5. **Pull the drive handle and remove the disk drive.**

6.8.5 Replacement, Front Panel Type

1. **Remove the replacement disk drive from its packing material. Remove the foam connector protector at the rear of the module.**

2. **Push the drive eject latch to the right to release the disk drive handle.**

3. **Slide the disk drive into its corresponding slot. Push it to engage the backplane connector and close the handle.**

4. **Close the drive window and push the window latch down to lock it.**

5. **When you finish replacing disk drives, close the HDSA drawer by pressing the HDSA open/close switch.**

The filled-in box corresponds to the disk drive location in the bundle

Spring-loaded online/offline switch (6x)

0 5
1 4
2 3

+5V DRIVE PWR OFF ON OFF ON OFF ON DRIVE PWR OFF ON OFF ON OFF ON -12V

ACTIVE ACTIVE ACTIVE ACTIVE ACTIVE ACTIVE

Drive access LED (6x)
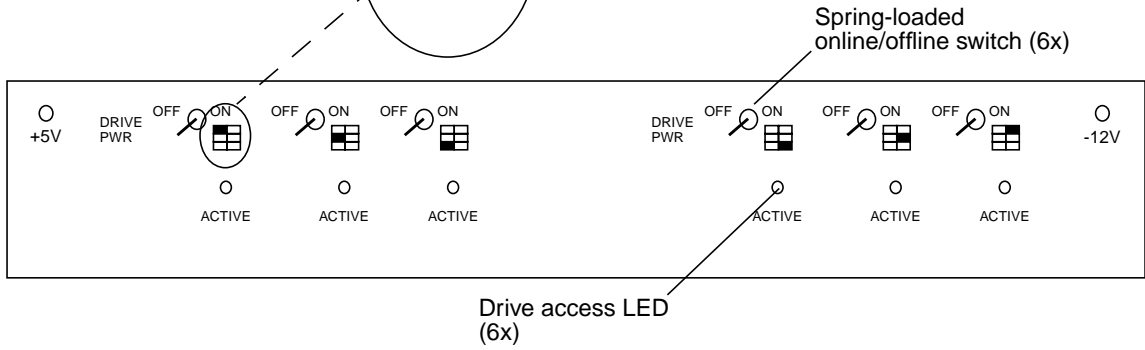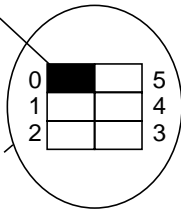
FIGURE 6-8   Disk Drive Front Panel Type

Disk drive chassis and faceplate
(drive window and latch not shown)

Push the drive eject latch
to the right
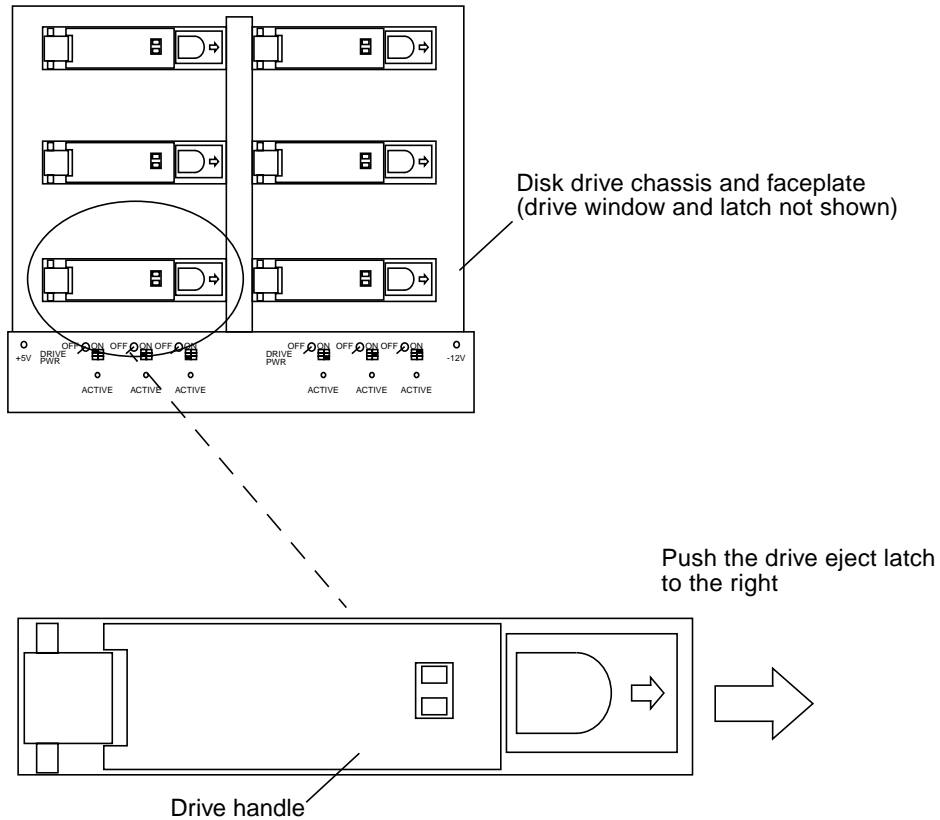
Drive handle

FIGURE 6-9   Disk Drive Eject Latch and Handle

6.8.6   How the Disk Drives Are Labeled

The six drives in each carton make a bundle and are dedicated to a specific, labeled six-drive chassis in the HDSA. Each label indicates the slot and chassis for correct placement. The label is located on the shelf under each six-drive chassis in the HDSA. See FIGURE 6-10 and TABLE 6-2.

Disk drive array chassis

Slot 0	Slot 5
Slot 1	Slot 4
Slot 2	Slot 3

DSP2/90/P1/0	DSP2/90/P1/5
DSP2/90/P1/1	DSP2/90/P1/4
DSP2/90/P1/2	DSP2/90/P1/3

DSP2/90/P1 (DSP1)   0   1   2   DSP2/90/P1 (DSP1)   3   4   5

Shelf label directly under disk drive bundle
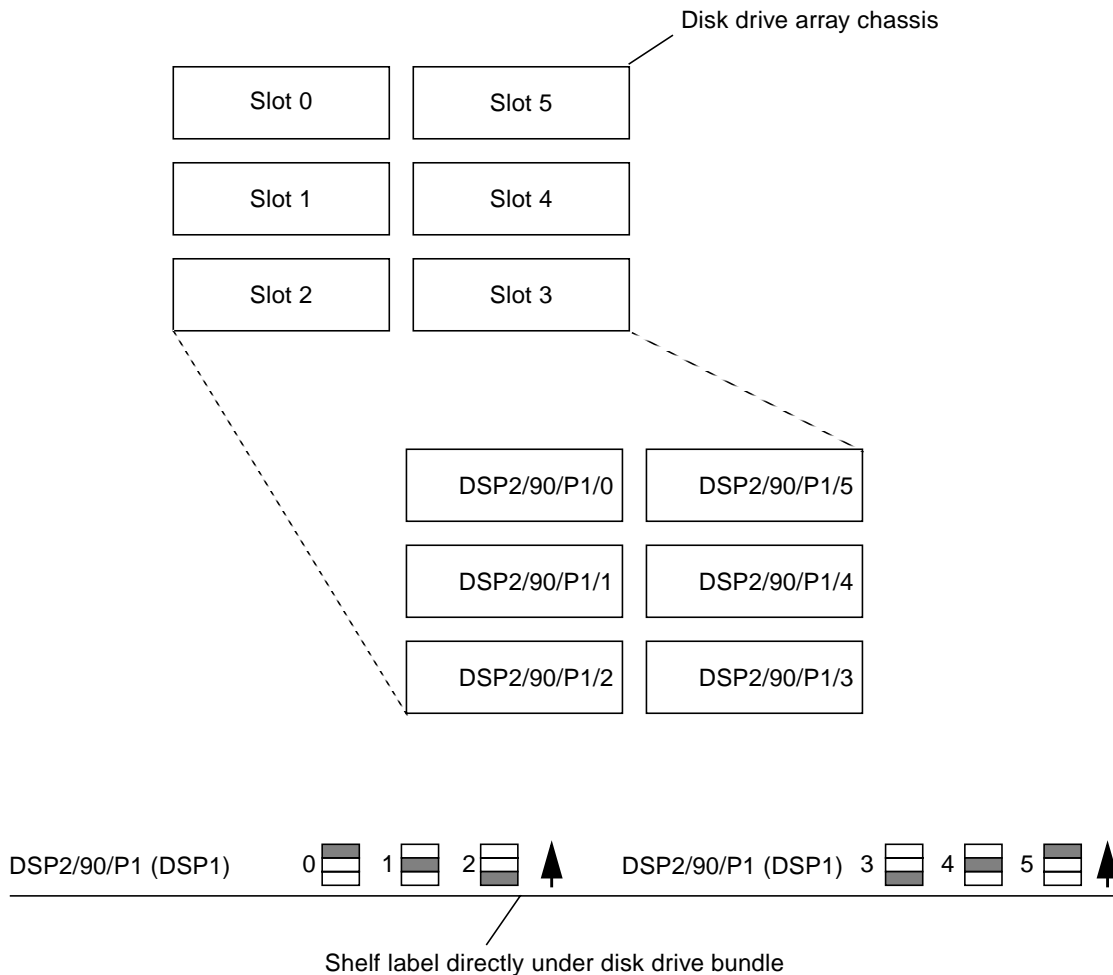
FIGURE 6-10 Disk Drive Slot Layout and Labeling

TABLE 6-2   System and HDSA Expansion Cabinet Disk Labeling

Cabinet	Drawer		
System Cabinet, Row	Labels, HDSA 1 (Left Drawer)		
Top	DSP2/68/P4	DSP1/68/P4	DSP2/70/P1
Middle	DSP1/68/P3	DSP2/68/P3	DSP1/68/P2
Bottom	DSP2/68/P1	DSP1/68/P1	DSP2/68/P2
	Labels, HDSA 2 (Right Drawer)		
Top	DSP1/78/P1	DSP2/78/P1	DSP1/70/P4
Middle	DSP2/70/P3	DSP1/70/P3	DSP2/70/P4
Bottom	DSP1/70/P2	DSP2/70/P2	DSP1/70/P1
Expansion Cabinet, Row	Labels, HDSA 3 (Bottom Left Drawer)		
Top	DSP2/80/P1	DSP1/80/P1	DSP2/80/P2
Middle	DSP1/78/P4	DSP2/78/P4	DSP1/78/P3
Bottom	DSP2/78/P2	DSP1/78/P2	DSP2/78/P3
	Labels, HDSA 4 (Bottom Right Drawer)		
Top	DSP1/88/P2	DSP2/88/P2	DSP1/88/P1
Middle	DSP2/80/P4	DSP1/80/P4	DSP2/88/P1
Bottom	DSP1/80/P3	DSP2/80/P3	DSP1/80/P2
	Labels, HDSA 5 (Top Left Drawer)		
Top	DSP2/90/P2	DSP1/90/P2	DSP2/90/P3
Middle	DSP1/90/P1	DSP2/90/P1	DSP1/88/P4
Bottom	DSP2/88/P3	DSP1/88/P3	DSP2/88/P4
	Labels, HDSA 6 (Top Right Drawer)		
Top	DSP1/98/P3	DSP2/98/P3	DSP1/98/P2
Middle	DSP2/98/P1	DSP1/98/P1	DSP2/98/P2
Bottom	DSP1/90/P4	DSP2/90/P4	DSP1/90/P3

6.9 Disk Drive (RAID 5)

The System Console or subsystem window displays a message similar to the following when a RAID 5 disk drive fails:

```
WARNING: Raid: Rewrite Failure, Device taken off-line on
MVME328 disk unit 62, partition 2
WARNING: Failover mode starting on RAID disk set 3, partition 4
```

In this example, disk unit 62 in RAID disk set 3 has failed and disk set 3 is in failover mode.

1. **Check the raid set status; the number 3 in the** `raidcfg` **and** `rctl` **statements below is the RAID disk set that is in failover mode. From a System Console window, type:**

```
# /etc/raidrcvr -sV -c /etc/raiddef/raidcfg3 /dev/rctl3
```

The following message confirms the error:

```
Raid control dev /dev/rctl3
Raid control flags    - 1005
  Raid iobuf flags    - 1
  Raid disk count     - 6
  Raid chunk size     - 48 blks
  Raid min device size- 8388288 blks
  Raid serial number  - 3238941f
  Raid cdev number    - 82, 194
  Raid bdev number    - 10, 194

/dev/rctl3 config'd bdev 9,3970 on line 7, stripe 5 is down
Sanity check on /dev/rctl3 found drives that are dead
```

2. **Determine the failed drive's location in the disk drawer. First, locate the drive in the** `/etc/system` **file; in this example, it is disk drive unit 62. Open the file using a text editor such as** `vi` **and search for** `m328d 62`**. The following entry (in bold) is found:**

```
# Path to Node2/6800/P2/0-5 (3cd*-41d*)#
#
   m328d 60 0x0 0x100    0x0      0x0
   m328d 61 0x0 0x110    0x0      0x0
   m328d 62 0x0 0x120    0x0      0x0
   m328d 63 0x0 0x130    0x0      0x0
   m328d 64 0x0 0x140    0x0      0x0
   m328d 65 0x0 0x150    0x0      0x0
#
```

From the entry information above, drive unit 62 is located in slot position DSP2/6800/P2/2. FIGURE 6-10 shows how the disk drives are labeled in the drawer.

3. **Remove the failed disk drive, according to the steps in Section 6.8 "Disk Drive (Linear)" on page 6-17.**

4. **Install the new drive in the drive slot.**

5. **Access the drive using the** `partdisk` **command from the DSP2 window:**

```
dsp2# partdisk -l /dev/rdsk/3ed3
```

The following information is displayed:

```
Current Partition Layout

Partition   Offset          Size                Type        Name
        2      0           08388314              All          all
        3      0               2268           Header       header
        4   2268           02556036           Standard     test
       15  8382528             4536        Diagnostic  diagnostic
```

6. **Update the Master Configuration Database (MCD) with the new drive serial number:**

```
dsp2# mcdudisks
```

The following information is displayed:

```
mcdudisks: Device [/dev/rdsk/3ed3] has the following MCD changes
mcdudisks:     serial_no        changed from 00335572 to :0114355
```

7. **Recover the raidset. The customer will still have complete access to the raidset while it is in recovery. In the following example** `raidcfg3` **and** `rctl3` **identify that raidset 3 is the raidset that is being recovered and** `3ed2` **is the disk within that raidset that has been replaced.**

```
dsp2# /etc/raidrcvr -frDV -c /etc/raiddef/raidcfg3 /dev/rctl3
/dev/dsk/3ed2 /dev/rdsk/3ed2
```

The following information is displayed:

```
Raid control dev /dev/rctl3
  New replace blk dev /dev/dsk/3ed2
  New replace char dev /dev/rdsk/3ed2

  Raid control flags   - 1005
  Raid iobuf flags     - 1
  Raid disk count      - 6
  Raid chunk size      - 48 blks
  Raid min device size - 8388288 blks
  Raid serial number   - 3238941f
  Raid cdev number     - 82, 194
  Raid bdev number     - 10, 194

/dev/rctl3 config'd bdev 9,3970 on line 7, stripe 5 is down
  Opening header partition on replacement drive
  Getting partition info on drive
  Setting partition info on drive

WARNING: Raid: Drive entering reconstruct phase on MVME328 disk
unit 62, partition 2
Starting rebuild/verify phase
  Beginning reconstruct phase

Percent completed 1, blkno 86736
    .
    .
    .
  Percent completed 99, blkno 8290512
  Rebuild/verify successful

WARNING: Raid: Drive is Online on MVME328 disk unit 62, partition 2
Bringing replacement drive on-line
  Resync checksum values for replacement drive
  Resync2 checksum values for replacement drive
  Updating configuration file /etc/raiddef/raidcfg3
  Creating new config file
  Set sync writes on new config file
  Copying and update info in new config file
  Updating Current Raid Configuration(internal)
  Rebuild completed for /dev/rctl3
  Replacing Config file with updated version
```

6.10 System Console

The Sun StorEdge A7000 contains a System Console in a carrier tray on the front cabinet door. You can replace the System Console with the Sun StorEdge A7000 powered on.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

⚠ **Caution –** The Processor card Ethernet port J2 is reserved for the System Console notebook computer only. Any use of this port by other devices is strictly prohibited.

6.10.1 Back Up Files to the Subsystem and Shut Down

Note – Chapter 7 also describes the `subsysbak` utility.

If possible, back up system files to the subsystems and shut down the System Console operating system in an orderly fashion:

1. **Open the System Console carrier tray.**

2. **The System Console display screen may be blank. Press any key to reactivate it.**

Note – On the System Console with trackpad mouse, move the pointer by putting your finger on the trackpad; the pointer moves as your finger moves over the trackpad.

---

3. **Put the mouse pointer in any open area on the root window display area.**

4. **Press and hold the left mouse button. A menu is displayed. Drag the mouse pointer to EXIT MWM. Release the left mouse button.**

5. **Drag the mouse to the OK pushbutton on the QUIT MWM dialog box; click Yes.**

   The display goes blank, then the `Console Login:` prompt reappears.

6. **Log in to the System Console:**

```
Console Login: root
```

7. **The system responds with a** `Password:` **prompt. Press the Enter key. The system prompt (#) is displayed.**

8. **Type the following:**

```
# subsysbak
```

9. **To shut down the System Console, type the following:**

```
# /etc/shutdown -y -g0 -i0
```

The System Console will display a series of shut down messages followed by a "Shutdown complete" message.

10. **Slide or press the System Console power switch.**

6.10.2   Removal

Note – The Sun StorEdge A7000 includes a modem card for domestic U.S. and international installations. For some international installations, the System Console uses its serial port.

1. **There is one PCMCIA dual-connector slot on the side of the System Console, holding an Ethernet card and modem card. Squeeze the sides of the cards, then unplug the modem and Ethernet PCMCIA cards from this slot. See** FIGURE 6-11**.**

2. **Disconnect the following:**

    a. **power cable at the rear of the System Console notebook**

    b. **cable connector labeled DSP1/DSP2 to the System Console parallel port connector**

    c. **RJ-11 telephone cable connector to the modem card; the cable is labeled MODEM**

    d. **DB9 connector to the serial port (some international installations)**

e. Ethernet connector to Ethernet card

FIGURE 6-11 shows connectors at the rear of the System Console.

3. **The System Console is held in place by snap-type Velcro strips. Remove the System Console. See** FIGURE 6-12**.**

4. **Keep the tray open for replacement procedures.**

Modem PCMCIA card
(domestic)   System Console model with trackball mouse

Ethernet
PCMCIA card

Parallel port
to dsp1/dsp2

Serial port COM1
(some international
installations)

Power connector

System Console model with trackpad mouse   Modem PCMCIA card (domestic)

Ethernet
PCMCIA card

Serial port COM1
(some international
installations)

Parallel port
to dsp1/dsp2

Power connector

Modem PCMCIA card
(domestic)   System Console model with pointing device

Ethernet
PCMCIA card

Parallel port
to dsp1/dsp2

Serial port COM1
(some international
installations)

Power connector

FIGURE 6-11 System Console Rear Connectors
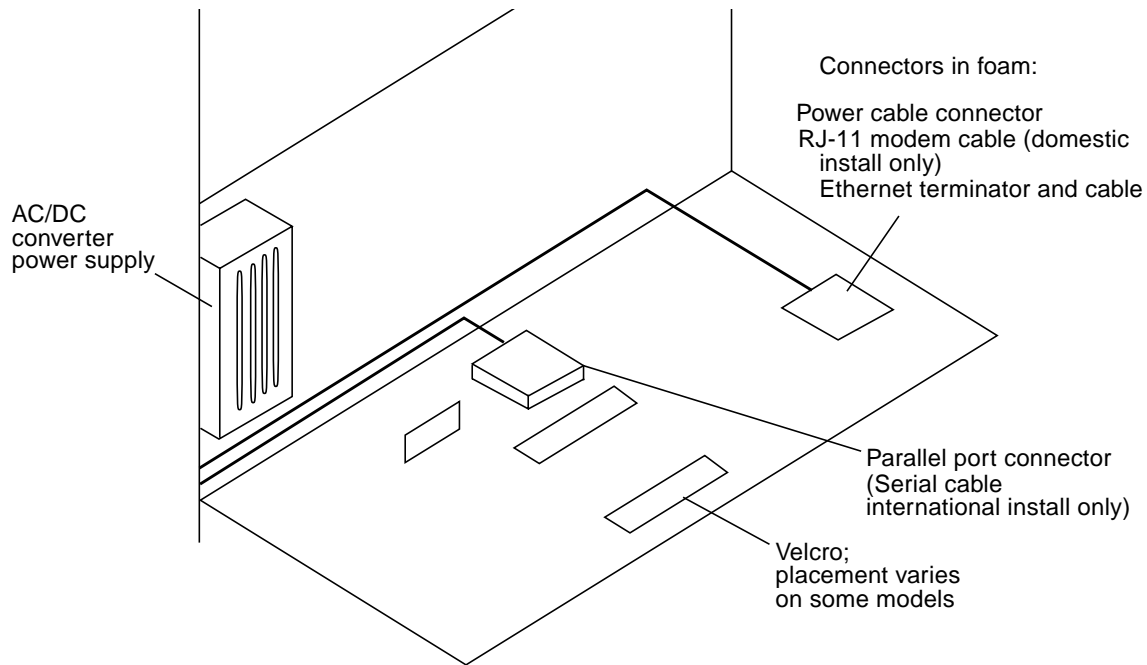
FIGURE 6-12 System Console Carrier Tray Connectors

6.10.3   Replacement

All cables and cards to connect to the System Console are already installed inside the carrier tray. To replace the System Console:

1. **Remove the System Console from its packaging.**

   The System Console is held in place by snap-type Velcro strips. Placement of the Velcro strips varies according to the System Console model being replaced.

2. **There is one PCMCIA dual-connector slot on the side of the System Console. This connector slot holds an Ethernet card and modem card. Plug the modem and Ethernet PCMCIA cards into this slot, as shown in** FIGURE 6-11**.**

3. **Connect the following (see** FIGURE 6-11**):**

    a. **Power cable at the rear of the System Console**

    b. **Cable connector labeled DSP1/DSP2 to the System Console parallel port connector**

    c. **RJ-11 telephone cable connector to the modem card; the cable is labeled MODEM**

    d. **DB9 connector to the serial port (some international installations)**

    e. **Ethernet connector to Ethernet card**

4. **Place the System Console snugly against the Velcro strips. Make sure the System Console is attached to the Velcro.** See FIGURE 6-12.

5. **The I/O bay cabinet contains a connector panel assembly with a DB9 connector. This connector is for the external modem used in some international installations. See** FIGURE 6-13**.**

6. **Cable the external modem to this DB9 connector.**

I/O bay cabinet

Power cords

Modem   Serial   ETHERNET

DSP1 maint

DB9 connector
for external modem

DSP2 maint
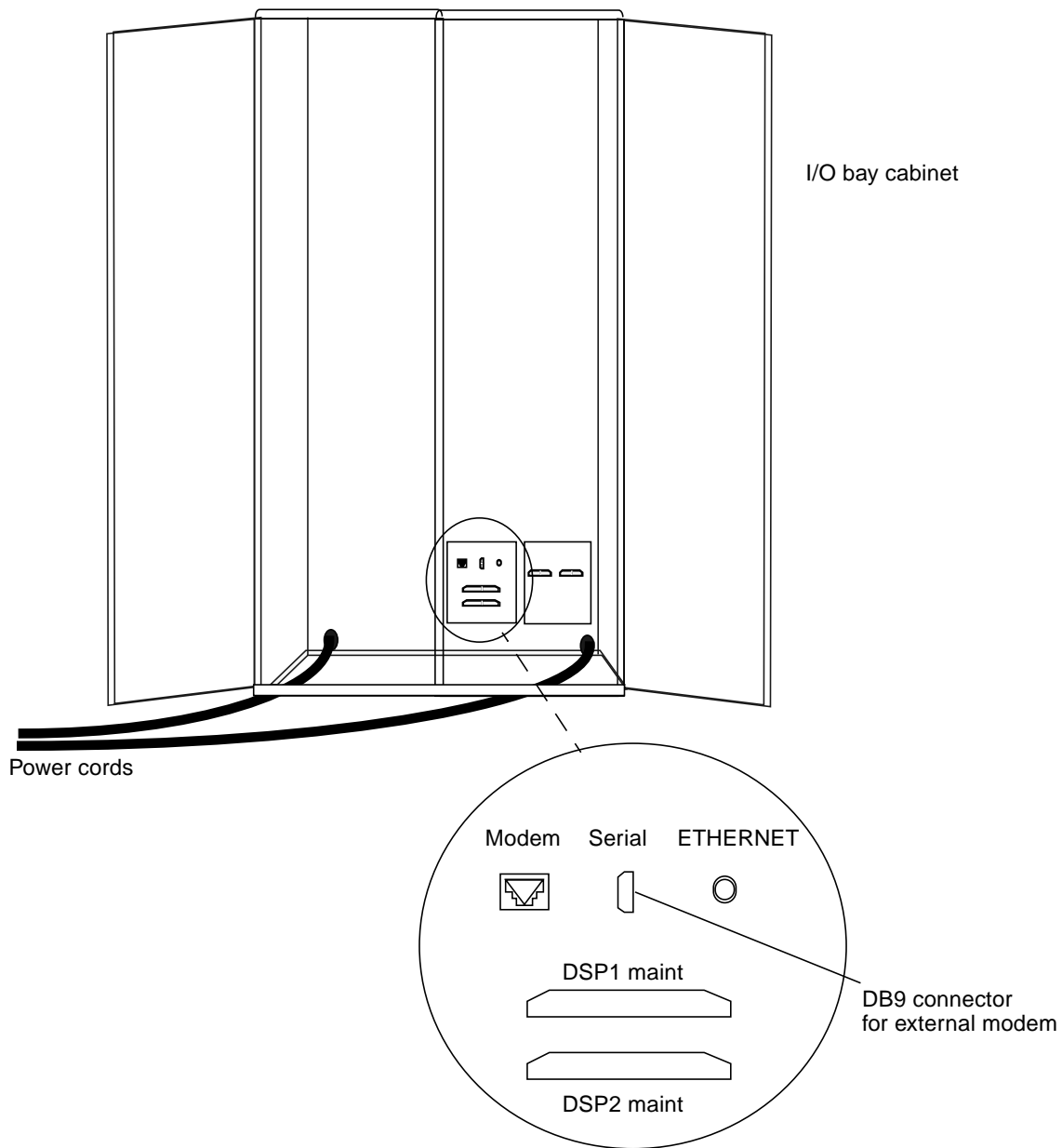
FIGURE 6-13 Modem Connector Assembly in I/O Bay Cabinet

6.10.4 Powering On the System Console and Restoring System Files

After replacement, you can now power on the System Console and restore the files you backed up on the subsystem in Section 6.4.1 "Back Up the Current MCD to a Subsystem" on page 6-5.

Note – On the System Console with trackpad mouse, move the pointer by putting your finger on the trackpad; the pointer moves as your finger moves over the trackpad.

---

1. **Slide the power switch to the left. The System Console starts the graphical user interface and the System Console application menu bar software (shown below):**
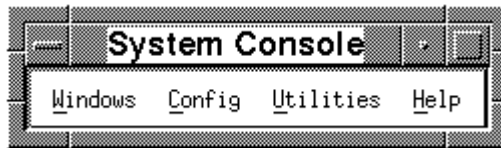
FIGURE 6-14 System Console Application Menu Bar

2. **Open a window for the System Console and each subsystem:**

— Open Subsystem Windows

a. **Move the mouse pointer to Windows at the Menu Bar.**

b. **Click and hold the left mouse button. A menu is displayed.**

c. **Drag the mouse pointer to dsp1. This is subsystem 1.**

d. **Release the mouse button. Window dsp1 is displayed and shows any communication occurring through the Processor card's serial port 0.**

Repeat these steps for the other subsystem, titled dsp2.

— Open a System Console xterm Window

a. **Put the mouse pointer in any open area on the root window display area.**

b. **Press and hold the left mouse button. A menu is displayed.**

Drag the mouse pointer to NEW WINDOW.

c. **Release the left mouse button. A System Console xterm window is displayed.**

3. **In the dsp1 window, get the Ethernet address of the Processor card:**

```
# prtconf
```

The following display is an example, with the Ethernet address bold for emphasis:

CODE EXAMPLE 6-1 `prtconf` Output

```
HARDWARE PARAMETER PROM INFO:
Slot 1
    Board Type: 0x0 (Processor)
    Assembly ID: 0x34 (4 CPU, 64 MB Memory, PCB Rev C)
    Assembly Revision: M00
    CPU Serial Number: 94710806
    On-Board Memory Size: 64 MB
    Memory Speed: 80 ns
    Clock Speed: 50 MHz
    Ethernet Address: 08:00:4c:01:03:7c
    Minimum Required ROM Software Version: V0_0
```

4. **Repeat Step 3 for subsystem dsp2.**

5. **Type the new Ethernet addresses in the System Console** `/etc/ethers` **file.**

   a. **Move the mouse pointer to the System Console xterm window. Using the** `vi` **editor, open the** `/etc/ethers` **file:**

```
# vi /etc/ethers
```

   b. **Search for the line containing the hostname** `dsp1`.

   c. **Type the dsp1 Ethernet address.**

   d. **Search for the line containing the hostname** `dsp2`.

   e. **Type the dsp2 Ethernet address.**

   f. **Save and exit the file.**

6. **In the System Console xterm window, type the following:**

```
# sh /etc/inet/rc.restart
```

7. **Restore the system files you backed up:**

```
# subsysbak -r dspcons
```

8. **In the System Console xterm window, type the following:**

```
# checkup
```

The checkup script returns zero (0) errors.

Now shut down and reboot the System Console, as follows.

9. **Put the mouse pointer in any open area on the root window display area.**

10. **Press and hold the left mouse button. A menu is displayed. Drag the mouse pointer to EXIT MWM. Release the left mouse button.**

11. **Drag the mouse to the OK pushbutton on the QUIT MWM dialog box; click Yes.**

   The display goes blank, then the `Console Login:` prompt reappears.

12. **Log in to the System Console:**

```
Console Login: root
```

13. **The system responds with a `Password:` prompt. Press the Enter key. The system prompt (#) is displayed.**

14. **Shut down the System Console:**

```
# /etc/shutdown -y -g0 -i0
```

   The System Console displays a series of shut down messages followed by a "Shutdown complete" message.

15. **Power the System Console off, wait a few moments, and power it on. This procedure starts the graphical user interface and the System Console application menu bar software.**

6.11 Subsystem Power Supply

The dsp1 and dsp2 subsystems have identical sets of power supplies, located in the front of the cabinet, just behind the System Console tray. Each subsystem has two separate supplies, power supply A and power supply B. See FIGURE 6-15 and FIGURE 6-16.

You need the following tool, plus those normally found in a Field Engineer's toolkit:

■ Nonconductive insulated adjustment screwdriver

6.11.1 Power Off the Subsystem and AC Box

Before replacing this component, arrange the following with the site administrator:

■ For Sun StorEdge A7000 servers connected to a mainframe computer: place the mainframe channels offline and shut down the subsystem where you are replacing a component. Refer to Section 7.6 "Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)" on page 7-33

■ For Sun StorEdge A7000 servers connected to an open system host computer: unmount the open system host's file systems, if the file systems reside on the failed component's subsystem

1. **Open the front cabinet door.**

2. **Power off the power supply for the subsystem needing power supply replacement. See** FIGURE 6-20 **for the subsystem DSPx power supply switch location, where x is the subsystem number.**

3. **At the AC box for the subsystem (located just below the subsystem), press the cabinet power switch to turn off power to the subsystem.**

4. **Throw the main circuit breaker switch CB1 switch to the left (OFF).**

6.11.2 Removal

1. **Turn the captive knurled knobs on the subsystem power supply tray to release the tray. Fold down the tray, pulling on the rubber grips. See** FIGURE 6-15**.**

2. **Remove the connector plugs from J1 and J2 on the power supply. See** FIGURE 6-16**. Note that the J1 connector plug has four pins and the J2 connector plug has three pins.**

3. **Remove the nuts from the red +5 VDC cable lugs and black GND cable lugs at the top of the supply. Move the cables out of the way.**

4. **Power Supply B Only: Using a Philips screwdriver, remove the screws from the terminal block at the right of the +5 VDC/GND cable lugs. Move the cables out of the way.**

5. **At the bottom of the power supply is the AC input terminal block. Use a Philips screwdriver to remove these three screws.**

6. **Remove the power supply assembly—use the grips and tilt the power supply tray. Remove the four power supply retaining screws, using a Philips screwdriver. See** FIGURE 6-15. **Remove the power supply assembly.**
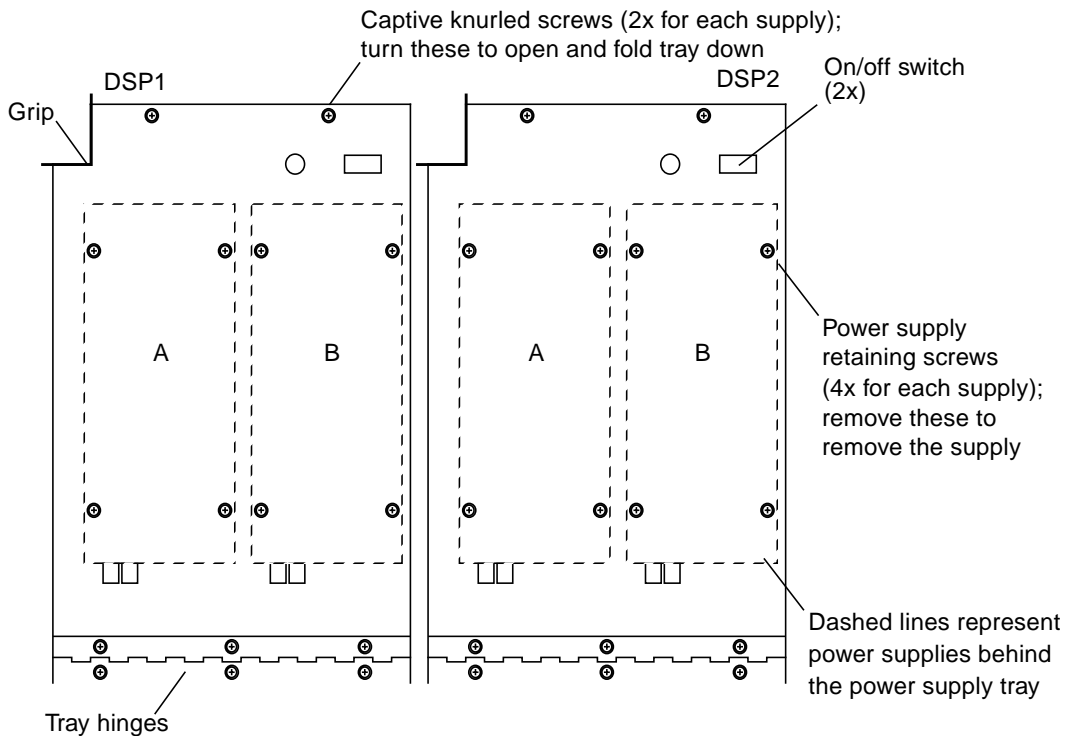
FIGURE 6-15 Subsystem Power Supplies

14-slot chassis backplane

+5 VDC bus bar

+12V

GND

GND (ground) bus bar

-12V

GND

Black ground cable (V1-)

Red power cable
(V1+)

1 2 3 4 5 6 7

Power for
chassis backplane

1 V2+ : +12 VDC
2 V2 - : GND for +12 VDC
3 V3+ : GND for - 12 VDC
4 V3 - : -12 VDC
5 to 7 : not used

J1   J2

Power supply A

Power supply B

1   2   3

AC input terminal blocks (2x)

1 — ACN (blue neutral; 120 VAC)
2 — ACL (brown; 120 VAC)
3 — GND (green with yellow stripe)
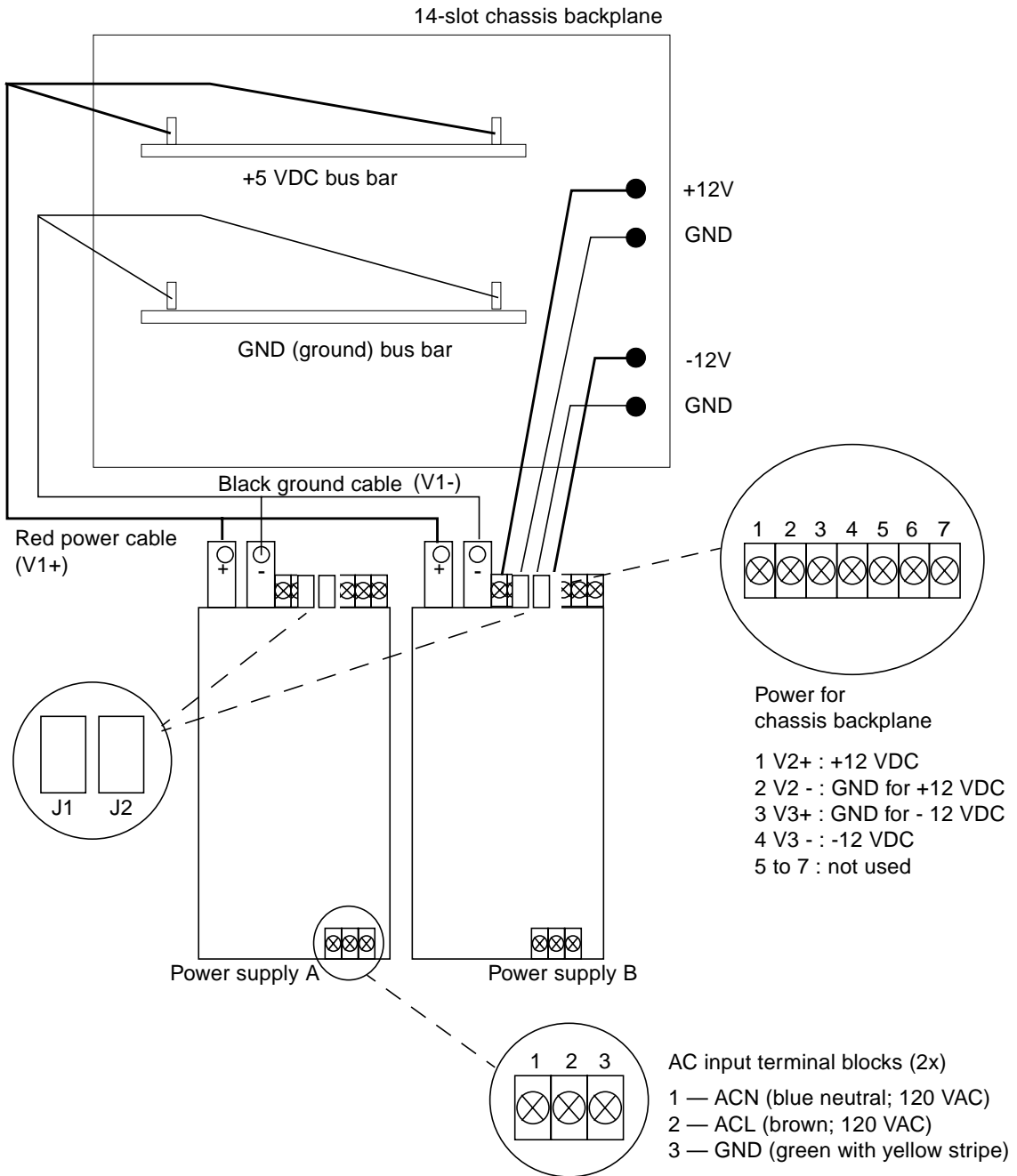
FIGURE 6-16 Subsystem Power Supply Connection

6.11.3   Replacement

1. **Fold down the power supply tray as described in Section 6.11.2 "Removal" on page 6**-38**.**

2. **Position the power supply assembly to align the four screw holes at the bottom of the power supply with the screw holes in the tray.**

   If power supply A or B has its +5 VDC voltage adjustment potentiometer on its side (labeled V1; see FIGURE 6-19**), skip this step and step 3 for now—if you screw the power supply in now, you will not be able to access V1. Return to steps 2 and 3 after you adjust and balance the power supplies.**

3. **Using a Philips screwdriver, screw in the four power supply retaining screws. See** FIGURE 6-15**.**

4. **Using a Philips screwdriver, replace the three terminals and screws in the AC input terminal block at the bottom of the power supply. See** FIGURE 6-16**.**

5. **Power Supply B Only: Using a Philips screwdriver, replace the screws and cables to the terminal block at the right of the +5 VDC/GND cable lugs.**

6. **Replace the red +5 VDC cable lugs and black GND cable lugs at the top of the supply.**

7. **Replace the lug nuts.**

8. **Replace connector plugs from J1 and J2 on the power supply. See** FIGURE 6-16**. Note that the J1 connector plug has four pins and the J2 connector plug has three pins.**

6.12 Balancing and Adjusting the Power Supplies A and B

Note – Perform these procedures after you have replaced a subsystem power supply as described in Section 6.11 "Subsystem Power Supply" on page 6-38. Perform them for the subsystem (dsp1 or dsp2) that needed its power supply replaced.

These procedures are typically not required as part of a Sun StorEdge A7000 installation.

The object of this procedure is to balance the DC output current and adjust the DC output voltages of the +5 VDC sections of subsystem power supplies A and B to present the correct combined voltage to the chassis backplane.

The recommended method for balancing and adjusting the +5 VDC power supplies includes measuring voltage and current. Measuring current requires that you use a clamp-on DC ammeter probe such as the Fluke i410 Current Clamp. Typically, most Enterprise Services field engineers do not have this tool as part of their regular toolkit.

Note – It is highly recommended that you acquire a clamp-on ammeter and use the current clamp method described below. Only use the method described in Section 6.12.2 "To Balance and Adjust the Power Supplies (No Current Clamp Method)" on page 6-48 in emergency cases.

To balance and adjust power supplies A and B after replacement, you need:
- Nonconductive insulated adjustment screwdriver
- Digital voltmeter (DVM) capable of reading up to hundredths of a volt. It should also be able to read 1 to 150 millivolts DC if used with a clamp-on ammeter
- Fluke i410 Current Clamp or equivalent clamp-on DC ammeter, 0 to 150A

Caution – High voltage is present during these procedures. Use a nonconductive insulated adjustment screwdriver to make the power supply adjustments. Remove all rings, watches, and conductive jewelry.

Caution – Do not allow backplane voltages higher than +5.35 VDC when making the adjustments below.

6.12.1 To Balance and Adjust the Power Supplies (Current Clamp Method)

If the difference in current between power supplies A and B is greater than 12 amps, you need to balance the power supplies.

6.12.1.1 Measure the Current Draw Difference Between Supplies A and B

1. **Power on the Sun StorEdge A7000 and bring the subsystem to the ROM Monitor prompt (`ROM >>`).**

   These procedures are described in Chapter 7.

2. **Open the front cabinet door.**

3. **Unscrew the power supply retaining screws from the left subsystem power supply tray. See** FIGURE 6-15**.**

4. **Fold down the tray, pulling on the rubber grips.**

   This tray contains the power supplies A and B for subsystem with the power supply being replaced or adjusted.

5. **Set your DVM to DC voltage mode.**

6. **Measure the DC voltage across the +5 VDC and GND backplane bus bars shown in** FIGURE 6-17 **and record this voltage.**

7. **Connect the Fluke i410 current clamp (or equivalent) to the DVM's V and COM inputs.**

8. **Set your DVM to mV (millivolts) and power on the current clamp.**

9. **Zero the DVM.**

   The scale on the DVM is 1 amp per mV.

10. **Put the current clamp on power supply A, V1+.**

    Place the clamp as close as possible to the red cable on V1+.

11. **Record the measurement.**

12. **Repeat Step 10 and Step 11 for power supply B, V1+.**

    If the difference in current between power supplies A and B is greater than 12 amps, balance and adjust them according to Section 6.12.1.2 "Balance and Adjust the Power Supplies" on page 6-45.

13. Remove the clamp and replace the tray.

14-slot chassis backplane

X

+5 VDC bus bar

X

GND (ground) bus bar

Black ground cable (V1-)

Red power cable
(V1+)

V1+
(2x);
for current
draw
measurements

X = midpoint between
power connect studs;
for voltage measurement

Power supply A   Power supply B
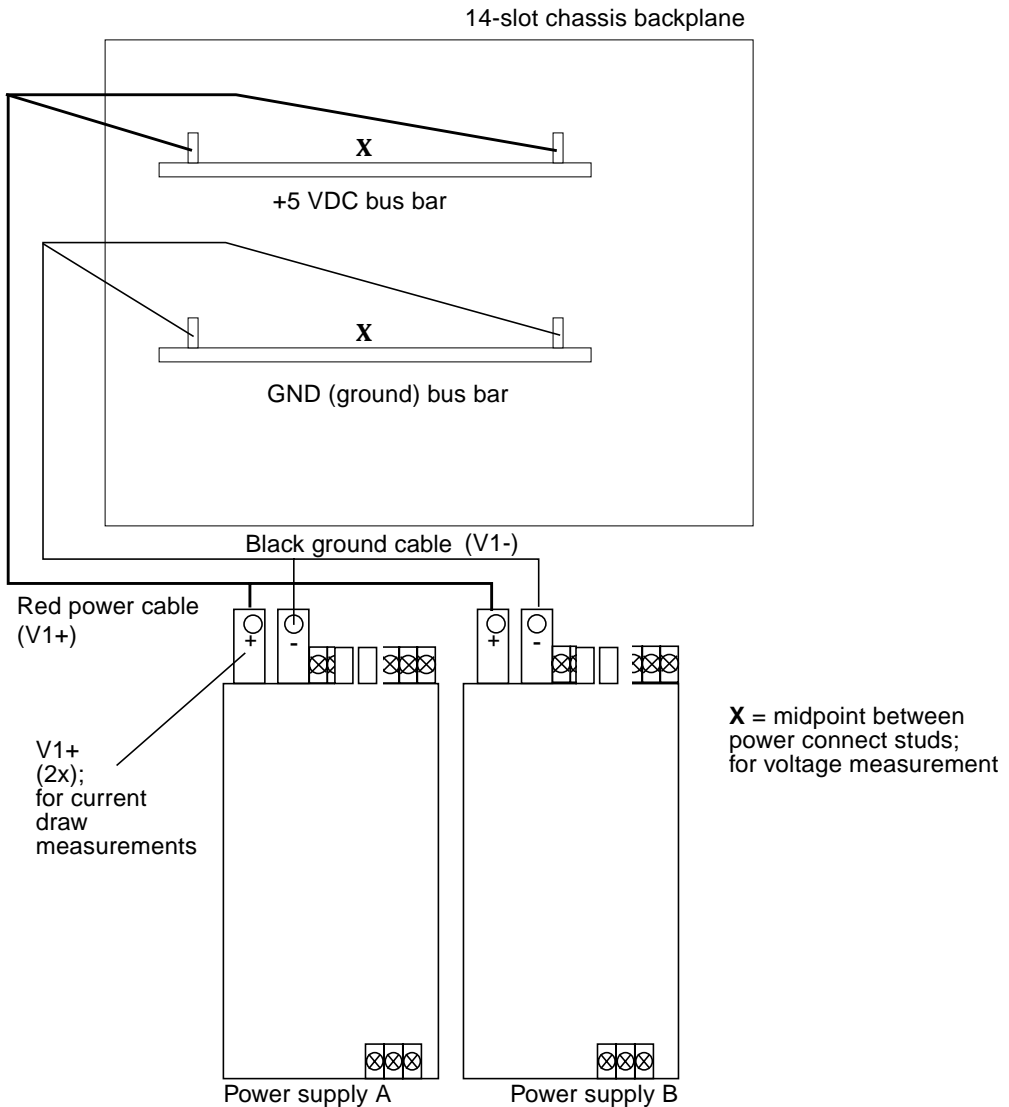
FIGURE 6-17 Subsystem Power Supply Measurement Points

6.12.1.2 Balance and Adjust the Power Supplies

Note – Ensure that the total current load on a single subsystem does not exceed 120 amps. If it exceeds 120 amps, unseat cards from the subsystem chassis, starting at slot 14, until the total measured load is reduced. Reseat the cards after you complete the procedures below.

In this procedure, you reconfigure the power supply on/off switch so that the switch inhibits one of the power supplies. That is:

- You can power off one supply.
- Measure the supply that remains on and make necessary adjustments.
- Power off this supply.
- Measure the supply that is now on and make necessary adjustments.

1. **Unscrew the power supply retaining screws from the left subsystem power supply tray. See** FIGURE 6-15**.**

2. **Fold down the tray, pulling on the rubber grips.**

   This tray contains power supplies A and B for subsystem DSP1.

3. **At the on/off switch assembly inside the tray, remove the connector from pin 4 and place it on pin 6. See** FIGURE 6-18**.**

   The switch is now a power supply select switch. Leave the switch in its current position (ON) and note which supply is off; the supply's built-in fan should be off.
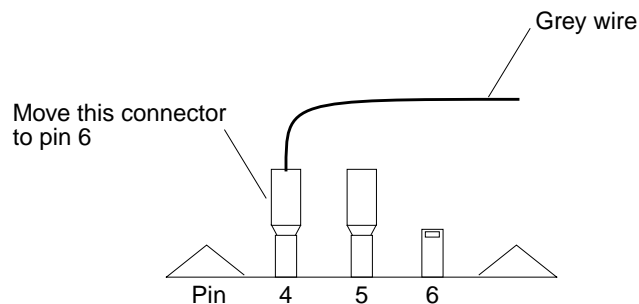
FIGURE 6-18 Subsystem Power Supply On/off Switch, Front View

4. **Connect the DVM leads at the midpoint between power connect studs for the +5 VDC and GND (ground) buses on the backplane. See** FIGURE 6-17**.**

5. **Using a nonconductive insulated adjustment Philips screwdriver, adjust the V1 adjustment pot on the power supply so that the DVM reading is +5.01 VDC. See** FIGURE 6-19**.**

6. **Place the on/off switch in the OFF position.**

7. **Repeat Step 5 for the other power supply.**

8. **Place the on/off switch in the ON position.**

9. **At the on/off switch assembly, remove the connector from pin 6 and replace it on pin 4.**

   Both supplies are now powered on. The DVM reading should now be between +5.04 and +5.06 VDC.

10. **Disconnect the DVM leads from the power bus bars.**

11. **Measure the current draw for subsystem DSP1 as described in Section 6.12.1.1 "Measure the Current Draw Difference Between Supplies A and B" on page 6-43.**

    If the difference is greater than 12 amps, repeat the steps in this section.

12. **Reseat any cards in the subsystem chassis.**

13. **Repeat Step 11.**

14. **Repeat the steps in this section for the DSP2 power supplies in the right tray.**

+5VDC   GND
V1+   V1-

-12 VDC

V3

V1*

+12 VDC

V2

V1
+5 VDC

Power supply A

+5VDC   GND
V1+   V1-

-12 VDC

V3

V1*

+12 VDC

V2

V1
+5 VDC
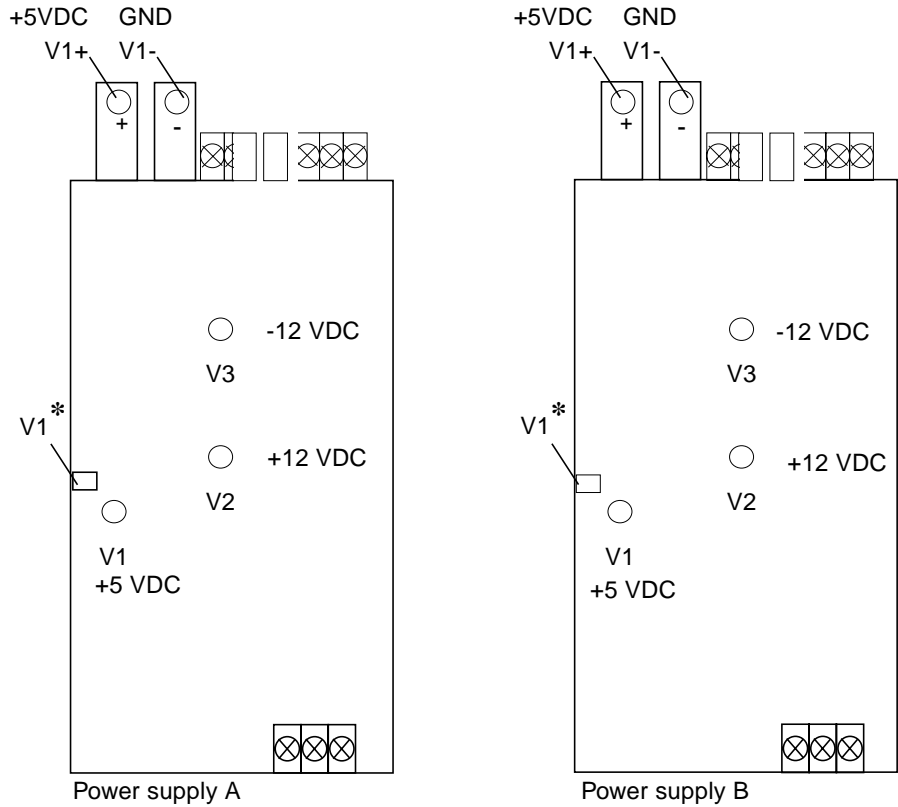
Power supply B

*Some power supply models have the +5 VDC adjustment on the left side (with tray folded down).

Power supplies are shown with power supply tray folded down

FIGURE 6-19 Subsystem Power Supply Adjustment Locations

6.12.2 To Balance and Adjust the Power Supplies (No Current Clamp Method)

> **Note –** **It is highly recommended that you acquire a current clamp** and use the current clamp method described below. Only use this method in emergency cases.

⚠

> **Caution –** There is a risk of equipment damage if you operate a subsystem chassis on a single power supply and the current draw exceeds 120 amps. This damage is more likely on heavily configured systems (systems with a majority of the 14 slots occupied).

In this procedure, you reconfigure the power supply on/off switch so that the switch inhibits one of the power supplies. That is:

- You can power off one supply.
- Measure the supply that remains on and make necessary adjustments.
- Power off this supply.
- Measure the supply that is now on and make necessary adjustments.

1. **Unscrew the power supply retaining screws from the left subsystem power supply tray.**

2. **Fold down the tray, pulling on the rubber grips.**

    This tray contains power supplies A and B for subsystem DSP1.

3. **At the on/off switch assembly inside the tray, remove the connector from pin 4 and place it on pin 6. See** FIGURE 6-18.

    The switch is now a power supply select switch. Leave the switch in its current position (ON) and note which supply is off; the supply's built-in fan should be off.

4. **Connect the DVM leads at the midpoint between power connect studs for the +5 VDC and GND (ground) buses on the backplane.**

5. **Using a nonconductive insulated adjustment Philips screwdriver, adjust the V1 adjustment pot on the power supply so that the DVM reading is 5.01 VDC. See** FIGURE 6-19.

6. **Place the on/off switch in the OFF position.**

7. **Repeat Step 5 for the other power supply.**

8. **Place the on/off switch in the ON position.**

9. **At the on/off switch assembly, remove the connector from pin 6 and replace it on pin 4.**

   Both supplies are now powered on. The DVM reading should now be between 5.04 and 5.06 VDC.

10. **Disconnect the DVM leads from the power bus bars.**

11. **Repeat the steps in this section for the DSP2 power supplies in the right tray.**

6.12.3 Adjusting Power Supply B (+12 VDC/-12 VDC)

Caution – High voltage is present during these procedures—use a nonconductive insulated adjustment Phillips screwdriver to make the power supply adjustments.

1. **Power on the cabinet supplies by pressing the cabinet power switch, shown in** FIGURE 6-20**.**

2. **Power on the subsystem power supplies by sliding the power supply switch to the right (you may have to tilt the tray up to access the switch).**

3. **Connect the DVM leads to the +12 VDC and GND lugs on the power supply B's chassis backplane. See** FIGURE 6-19**.**

4. **Using a nonconductive insulated adjustment Philips screwdriver, turn pot V2 on the power supply until the DVM displays +12.0 VDC.**

5. **Connect the DVM leads to the -12 VDC and GND lugs on the chassis backplane. See** FIGURE 6-19**.**

6. **Using a nonconductive insulated adjustment Philips screwdriver, turn pot V3 on the power supply until the DVM displays -12.0 VDC.**

7. **Remove the DVM leads.**

HDSA drawer
open/close switches

HDSA power supply
on/off switch

HDSA power supply
on/off switch

DSP1 power supply
on/off switch

DSP2 power supply
on/off switch

Blower assembly

Cabinet power
on/off switch

Main circuit breaker
(CB1)

Power reset
circuit breaker (CB2)

Sun StorEdge A7000 power:
main cabinet power
and AC distribution boxes (2)
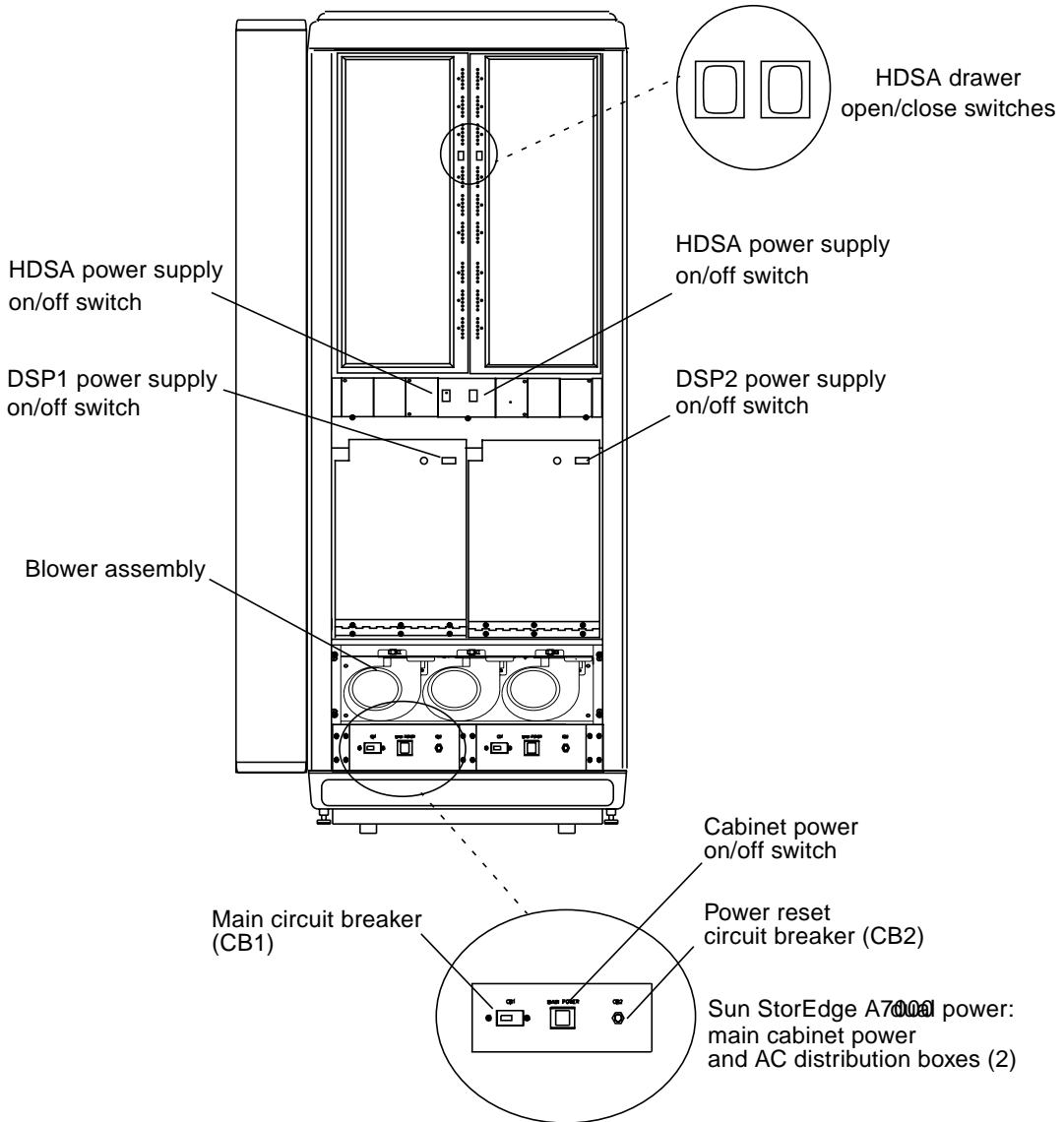
FIGURE 6-20 Cabinet Power Supply Switches

6.13   HDSA Power Supply Module

Just below the High Density Storage Array (HDSA) drawers are the HDSA power supply modules in the power supply module chassis. See FIGURE 6-21. Before you begin, open the front door.

6.13.1   Removal

1. **Using 1/8-inch flat blade screwdriver, loosen the two retaining screws on the left side of the module. The screws are not removable. See** FIGURE 6-21**.**

2. **Push in the bottom half of the retractable handle. A pull-ring folds down.**

3. **Grab the pull-ring and pull the module assembly out of its slot.**
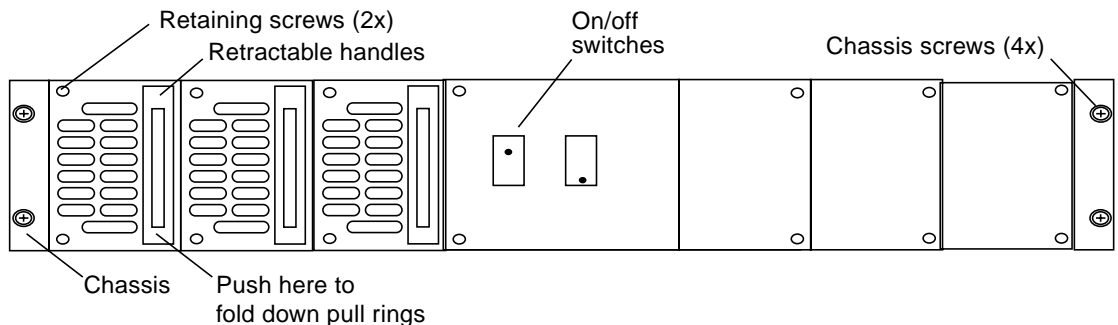
FIGURE 6-21 HDSA Power Supply Module

6.13.2   Replacement

1. **Push in the bottom of the module's retractable handle. A pull-ring folds down.**

2. **Align the module in the slot and slide the module into its slot. Push the module until it fully connects and the front panel is flush.**

3. **Using 1/8-inch flat blade screwdriver, tighten the two retaining screws on the left side of the module.**

6.14 HDSA Power Supply Module Chassis

The HDSA power supply module chassis holds the six power supply modules. Before you begin:

1. **Power off the Sun StorEdge A7000 according to procedures in Chapter 7.**

2. **Open the front door.**

6.14.1 Removal

1. **At the front cabinet door, remove the four power supply module chassis screws shown in** FIGURE 6-21**.**

2. **Go to the right side of the cabinet and remove the side panel door. Use a large flat blade screw driver to turn each release latch clockwise one quarter turn. See** FIGURE 6-22**.**

3. **Go to the rear of the cabinet. The rear of the power supply chassis is just above the 14-slot chassis. Disconnect all cables at the rear of the chassis.**

4. **Remove the screws shown in** FIGURE 6-22**. To remove the screw on the right side, cut the cable ties holding cables to the rail and move the cables out of the way. You will need to use a short "stubby" Philips screwdriver to remove the righthand screw.**

5. **Pull the power supply module chassis through the front of the cabinet.**

6.14.2   Replacement

1. **Push the power supply module chassis in through the front of the cabinet.**

2. **Replace the screws.**

3. **Reposition the cables and secure them to the side rail with cable ties.**

4. **Replace the side panel. With a large flat blade screw driver, turn each release latch counterclockwise one quarter turn. See 8-11.**

5. **Replace all cables at the rear of the power supply module chassis.**

6. **Go to the front of the cabinet and replace the front chassis screws.**

Cabinet

Retainer bracket
12 places

Side skin panel

Quarter-turn latch
12 places
see Detail A

Detail A

Side skin

Cabinet
frame

Quarter-turn
latch

Retainer
bracket

Frame

Frame

Rear view of chassis

Remove these screws (2 places)

Panel off
this side

Cut cable ties
and move cables
at this side
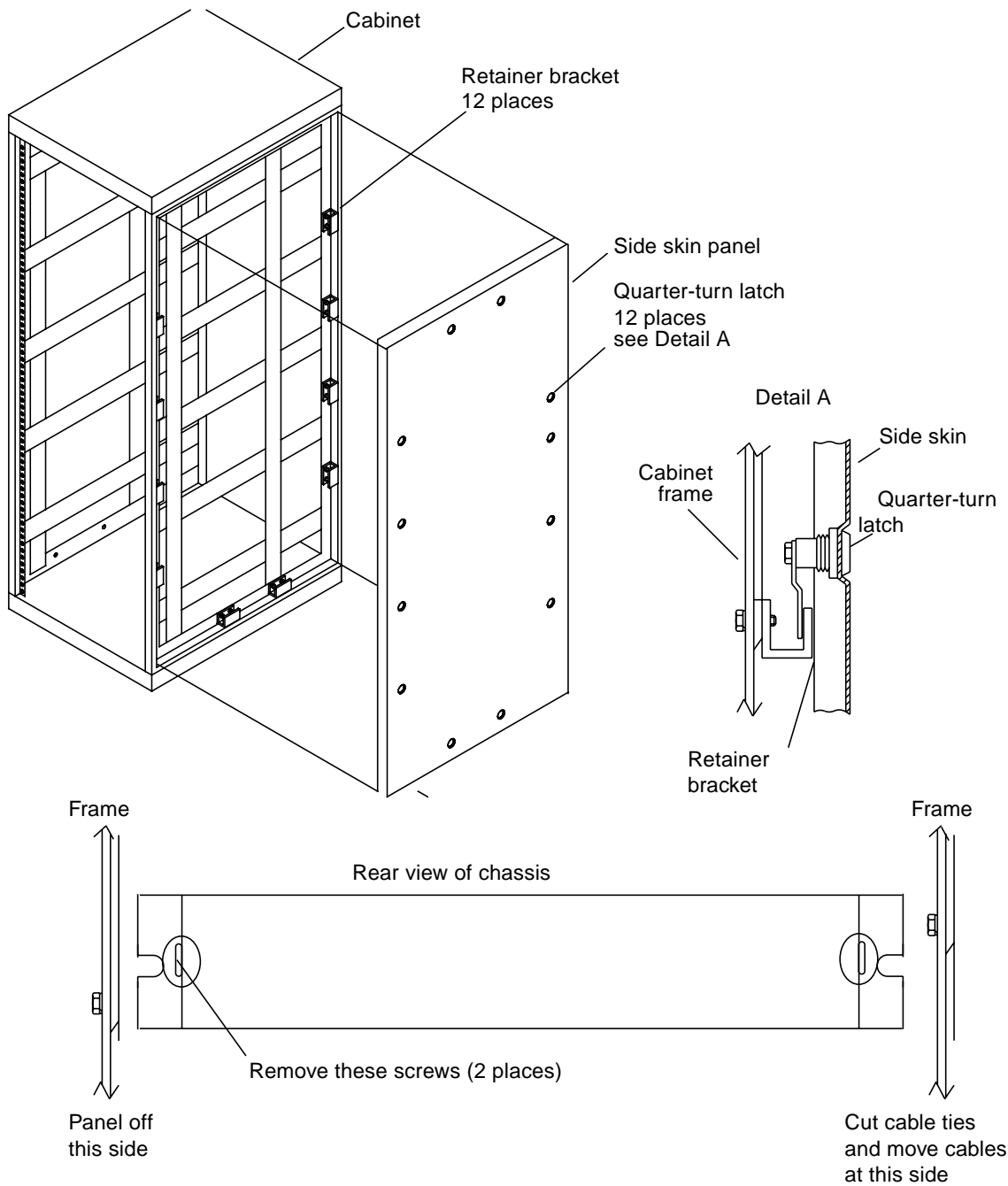
FIGURE 6-22 HDSA Power Supply Module Chassis Removal

6.15 Linear Actuator Device

The linear actuator device (LAD) is the device that moves the HDSA drawer in and out of the cabinet. Before you begin:

1. **Power off the Sun StorEdge A7000 according to procedures in Chapter 7.**

2. **Open the front and rear doors.**

3. **Remove the HDSA power supply module chassis according to the procedures in Section 6.14 "HDSA Power Supply Module Chassis" on page 6-52.**

6.15.1 Removal

1. **Remove connector plugs P3 and P4 from the front plate, as shown in** FIGURE 6-23.

2. **Remove the red and black cables on the terminal screws on the DC motor behind the front plate.**

3. **Remove the shaft support screws shown in** FIGURE 6-24. **Access these screws from underneath the center of the shaft at the rear and front of the cabinet.**

4. **Remove the release pin.**

5. **Pull the LAD through the rear of the cabinet.**

6.15.2 Replacement

1. **Push the LAD through the rear of the cabinet into place (see** FIGURE 6-23**).**

2. **Replace the shaft support screws shown in** FIGURE 6-24. **Access these screws from underneath the center of the shaft at the rear and front of the cabinet.**

3. **Replace the release pin. Make sure to pull the HDSA drawer all the way into the cabinet to engage the release pin hitch assembly on the back of the HDSA drawer.**

4. **Replace the red and black cables on the terminal screws on the DC motor behind the front plate.**

5. **Replace connector plugs P3 and P4 from the front plate, as shown in** FIGURE 6-23.

6. **Replace the HDSA power supply module chassis according to the procedures in Section 6.14 "HDSA Power Supply Module Chassis" on page 6-52.**

Release pin hitch assembly

Release pin

P3

P4

Terminal screws (2x)

DC motor
behind plate
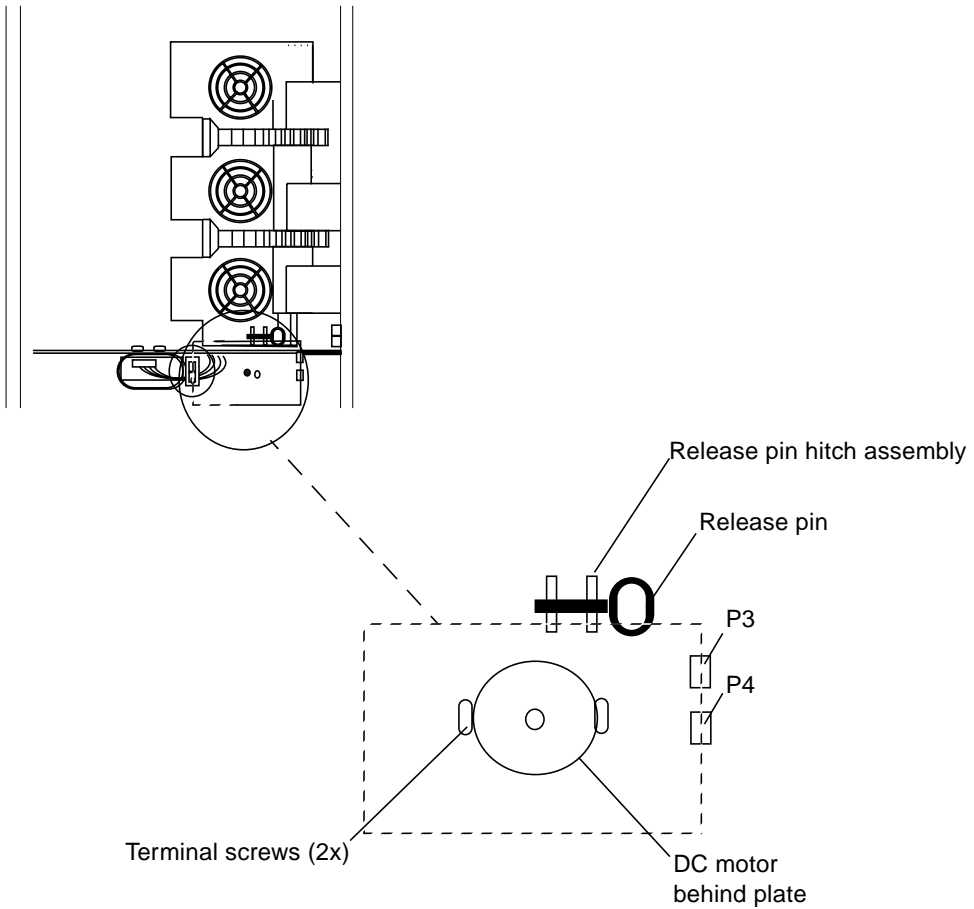
FIGURE 6-23 Linear Actuator Device

Cabinet support frame

Shaft support screws (4x)

Shaft support assembly

Front of cabinet,
side view
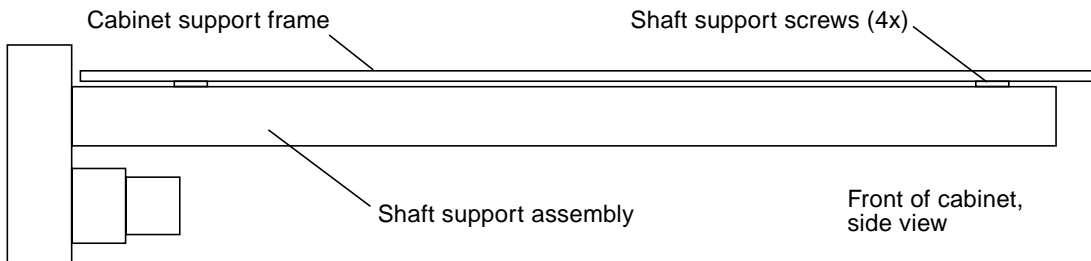
FIGURE 6-24 Linear Actuator Device Shaft Support Screws

6.16 LAD/SCSI Expander Power Supply

The power supply located in the rear of the Sun StorEdge A7000 cabinet between the HDSA drawers provides power to the Linear Actuator Device (LAD) and SCSI Expander chassis. Before you begin:

1. **Power off the Sun StorEdge A7000 according to procedures in Chapter 7.**

2. **Open the rear doors.**

6.16.1 Removal

1. **Unscrew the terminals from the power supply, located as shown in** FIGURE 6-25.

2. **Remove the two screws per side holding the power supply to the cabinet frame.**

6.16.2 Replacement

1. **Position the power supply and replace the two power supply screws holding the power supply to the cabinet frame.**

2. **Replace the terminals from the LAD power supply as shown in** FIGURE 6-23.

Rear of cabinet

3
GND   1
       ACL

2
ACN

1 — ACL (Line)
2 — ACN (Neutral)
3 — GND (Ground)

6 5 4 3 2 1

1 V2+ : +12 VDC
2 V2 - : GND FOR +12 VDC
3 V3+ : + 12 VDC
4 V3 - : GND FOR +12 VDC
5 V4+ : +12 VDC
6 V4 - : GND FOR +12 VDC

V1

J2/P2

J1/P1   GND   +5VDC
        (black)   (red)

Front/top of power supply
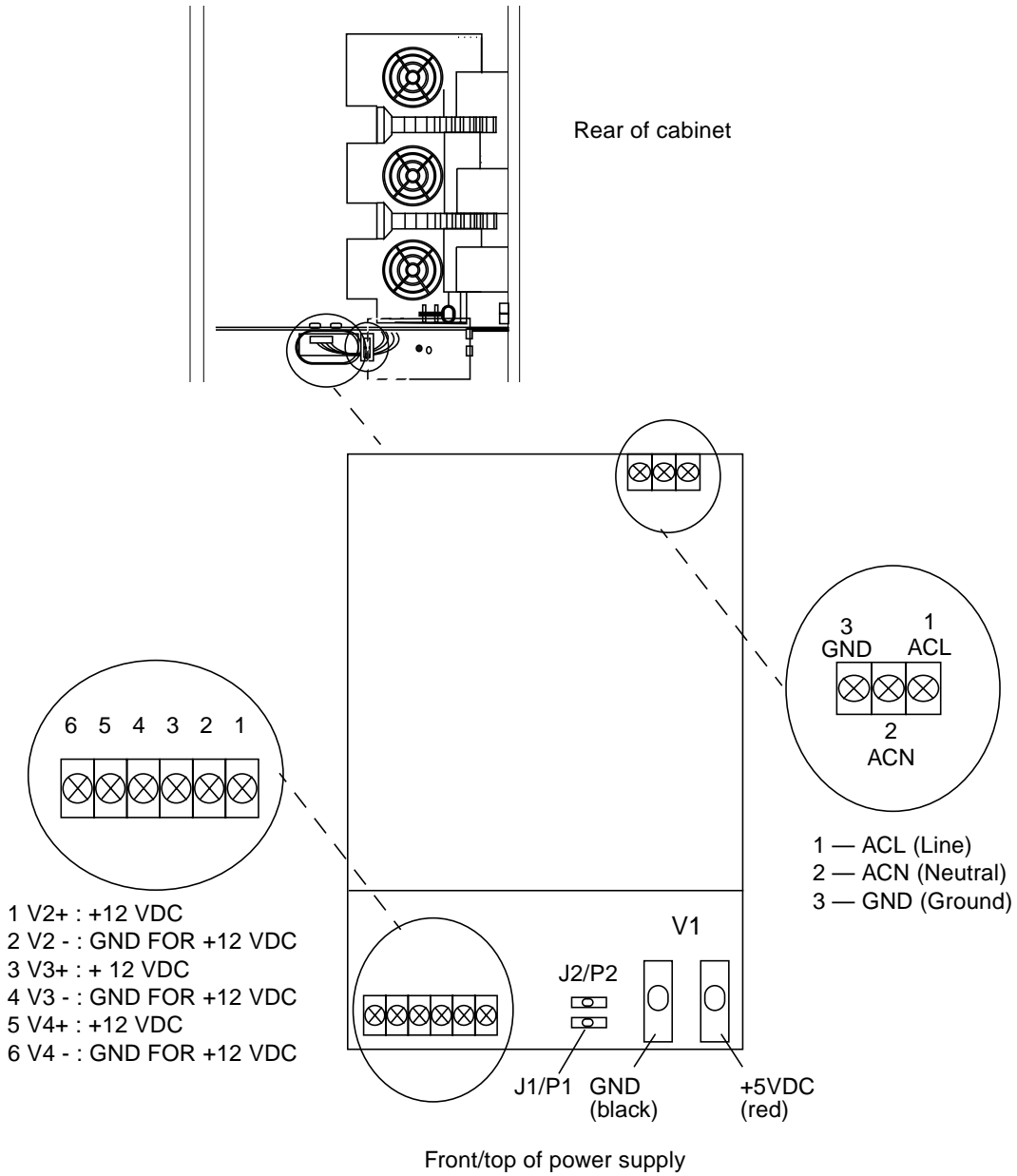
FIGURE 6-25 Linear Actuator Device ⁄ SCSI Expander Power Supply

6.17 AC Power Distribution Unit

The AC power distribution unit (PDU) consists of the AC power distribution box with a terminal block (near the rear of the cabinet), and AC box (near the front of the cabinet). The terminal block connects the power cord to the AC distribution box. The AC power distribution box provides power to other Sun StorEdge A7000 components. The AC box contains the line filter, cabinet power switch, and circuit breaker switch.

Note – The Sun StorEdge A7000 has dual AC PDUs; the following instructions are valid for each AC PDU assembly.

Before you begin:

1. **Power off the Sun StorEdge A7000 according to procedures in Chapter 7.**

2. **Disconnect the AC power cord from its plug receptacle.**

6.17.1 Removal

1. **Open the rear cabinet door and move the SCSI expander chassis out of the way.**

   Pull up the spring-loaded retainer on the right top and bottom side of the chassis and swing the chassis out.

2. **Remove the three screws from the power cord conduit where the conduit meets the terminal block box.**

3. **Unscrew the top cover of the terminal block box cover, exposing the AC wires connected to a quick-connect terminal block. See** FIGURE 6-26.

   The two screws are on the front of the box.

4. **Using a flat blade screwdriver, release the terminals and disconnect the ground, neutral, and line wires coming from the power cord.**

5. **Unplug any connectors plugged into the AC distribution box.**

6. **Open the front cabinet door. Remove the screws holding the AC box. See** FIGURE 6-27.

7. **Slide the AC box forward; the entire assembly with AC power distribution box will come out.**

6.17.2   Replacement

1. **Open the rear cabinet door and move the SCSI expander chassis out of the way.**

   Pull up the spring-loaded retainer on the right top and bottom side of the chassis and swing the chassis out.

2. **Open the front cabinet door. Slide the AC box and AC power distribution box assembly into the cabinet.**

3. **Replace the screws securing the AC box. See** FIGURE 6-27**.**

4. **At the rear of the cabinet, plug any connectors you removed back into the AC distribution box.**

5. **Pull the wires coming from the AC power cord through the terminal block box.**

6. **Connect the power cord wires to the terminal block as shown in** FIGURE 6-26**.**

7. **Replace the terminal block box cover.**

8. **Swing the SCSI expander chassis back into place.**

   Pull the retainers on the right side, align the alignment pegs, and snap the chassis back into place.

Top view

J7B J6B J5B J4B J3B J2B   J7A J6A J5A J4A J3A J2A

J1B   J1A

AC power
distribution box (2x)

Terminal block box   Terminal block box

Power cord
inside conduit

Power cord
inside conduit

Quick connect
terminal block

Terminal block box
with top cover removed

Ground
(green with
yellow stripe)

Quick disconnect terminals (5x)

Line 2*
(blue)

Line 1 (brown)

From power cord

* International neutral
  when applicable

FIGURE 6-26 AC Power Distribution Unit

Bottom front of cabinet

Retaining screws (12x)
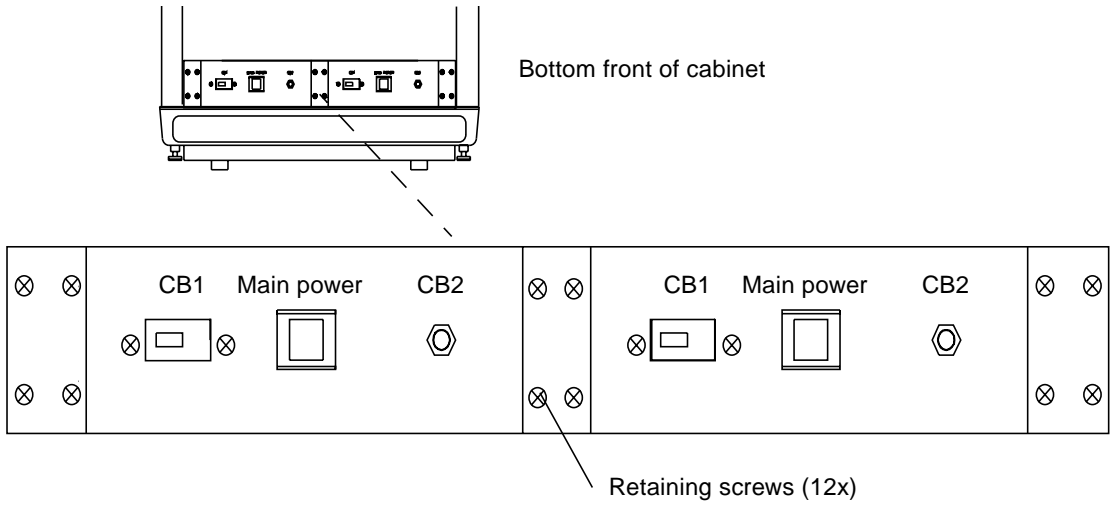
FIGURE 6-27 AC Box

6.18   Cabinet Blower Fan

The cabinet blower fan housing is located at the front of cabinet, just above the AC box, as shown in FIGURE 6-20. It contains three blower fans.

You can replace each fan with the Sun StorEdge A7000 powered on. Before you begin:

1. **Open the front door.**

2. **Unpack the new fan.**

6.18.1   Removal

1. **Slide the retaining latch on the front of the failed blower fan to the left.**

2. **Using the handle, pull the blower fan out.**

6.18.2   Replacement

1. **Align the blower fan and slide it into its slot in the blower fan housing.**

2. **Slide the retaining latch on the front of the blower fan to the right.**

3. **Verify that all fans are powered and spinning.**

Slide latch to open

Blower housing   Latch (3x)   Handle (3x)
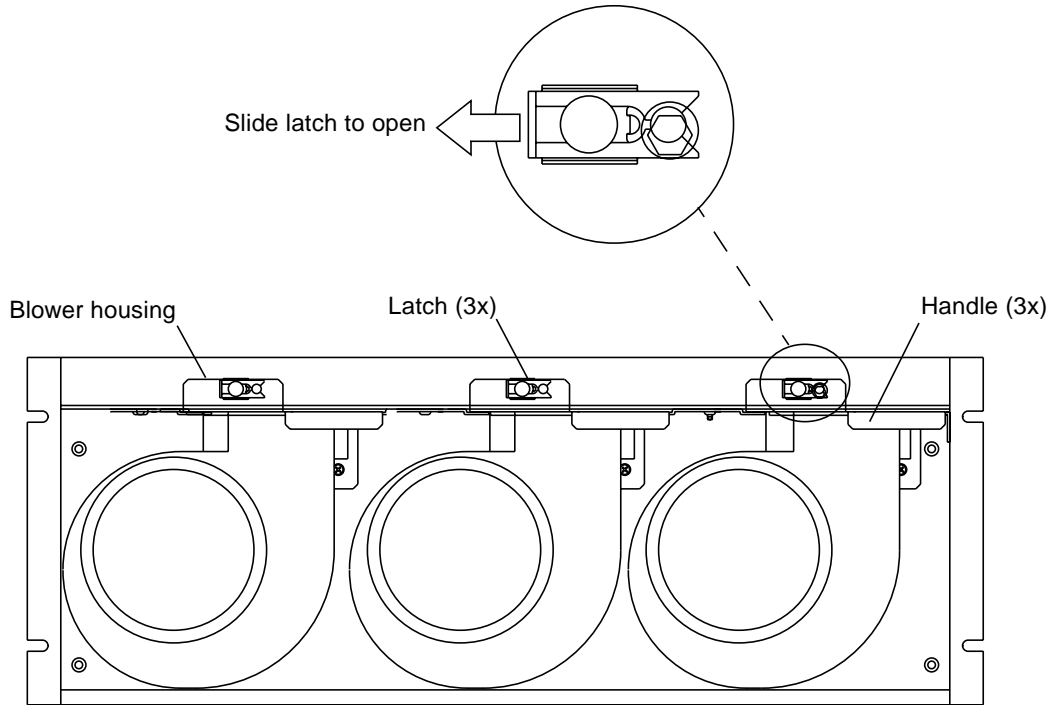
FIGURE 6-28 Blower Assembly

6.19 SCSI Expander Cards and Dual Chassis

The SCSI expander cards (also known as **SCSI splitter cards**) are located in a chassis in the bottom rear of the Sun StorEdge A7000 cabinet. Before you begin, open the rear door.

6.19.1 SCSI Expander Card

This section describes the removal and replacement procedures for the SCSI expander card.

6.19.1.1 Removal

1. **Power off the Sun StorEdge A7000, as described in Chapter 7.**

2. **Remove the card retaining bracket screws and bracket. See** FIGURE 6-29**.**

3. **The front of each SCSI expander card has a terminator attached to a SCSI cable connector. Remove the terminator and connector from the card being replaced.**

4. **The rear of each SCSI expander card has a power connector and SCSI cable connector with terminator attached. Remove the connector and terminator from the card being replaced.**

5. **Remove the SCSI expander card from its slot.**

   Note – Each cable connected to the SCSI expander card is labeled.

6.19.1.2 Replacement

1. **See** FIGURE 6-29**. Place the SCSI expander card in the SCSI expander chassis slot.**

2. **Connect the SCSI, terminator, and power cable connectors to the rear of the card.**

3. **Connect the SCSI connector and terminator to the front of the card.**

4. **Replace the retaining bracket and screws.**

6.19.2   SCSI Expander Chassis

This section describes the removal and replacement procedures for the SCSI expander chassis.

6.19.2.1   Removal

1. **Remove any SCSI expander cards from the chassis according to procedures in Section 6.19.1.1 "Removal" on page 6-65.**

2. **Cut and remove the cable ties holding the power supply harnesses to the chassis.**

    There are two power supply harnesses that are cable tied to the chassis: one harness for the bottom row of cards and one for the top row of cards.

3. **Pull up the spring-loaded retainer on the left, and lift the chassis up to release it from the peg on the bottom.**

4. **Pull up the spring-loaded retainer on the right, and lift the chassis up to release it from the peg on the bottom.**

5. **Pull the chassis out.**

6.19.2.2   Replacement

1. **Position the SCSI expander chassis in the rear of the Sun StorEdge A7000 cabinet.**

2. **Pull up the spring-loaded retainer on the left, and align the hole in left side with it. Align the chassis with the peg on the bottom.**

3. **Pull up the spring-loaded retainer on the right, and align the hole in right side with it. Align the chassis with the peg on the bottom.**

4. **Dress and cable tie the power supply harnesses to the chassis.**

    There are two power supply harnesses: one harness for the bottom row of cards and one for the top row of cards.

5. **Replace any SCSI expander cards according to procedures in Section 6.19.1.2 "Replacement" on page 6-65.**

Spring-loaded retainers (2x)

Power harnesses cable-tied to the top of the chassis

SCSI expander card slots (14 slots each chassis)

Card retaining bracket screws (6x)

Chassis retainer bracket (2x)

Peg (2x)
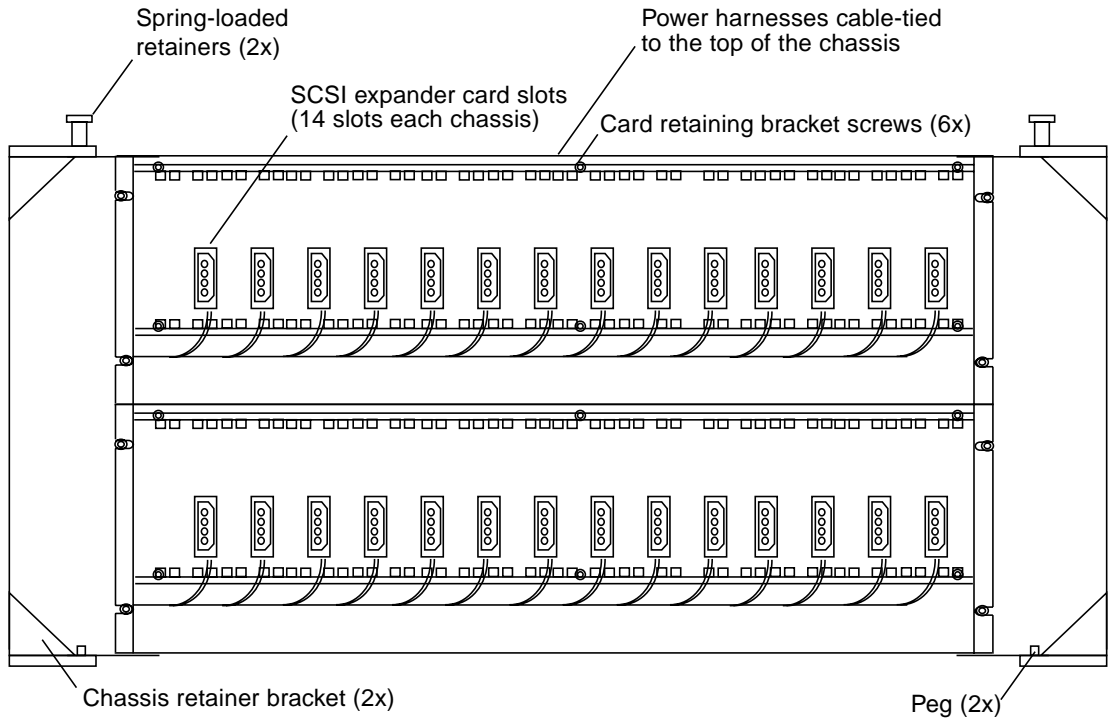
FIGURE 6-29 Dual SCSI Expander Chassis
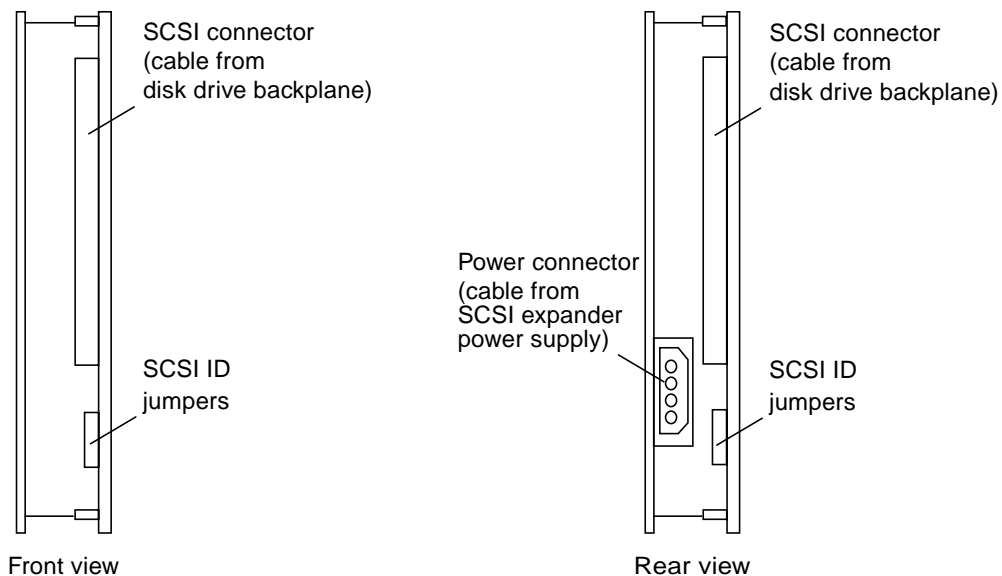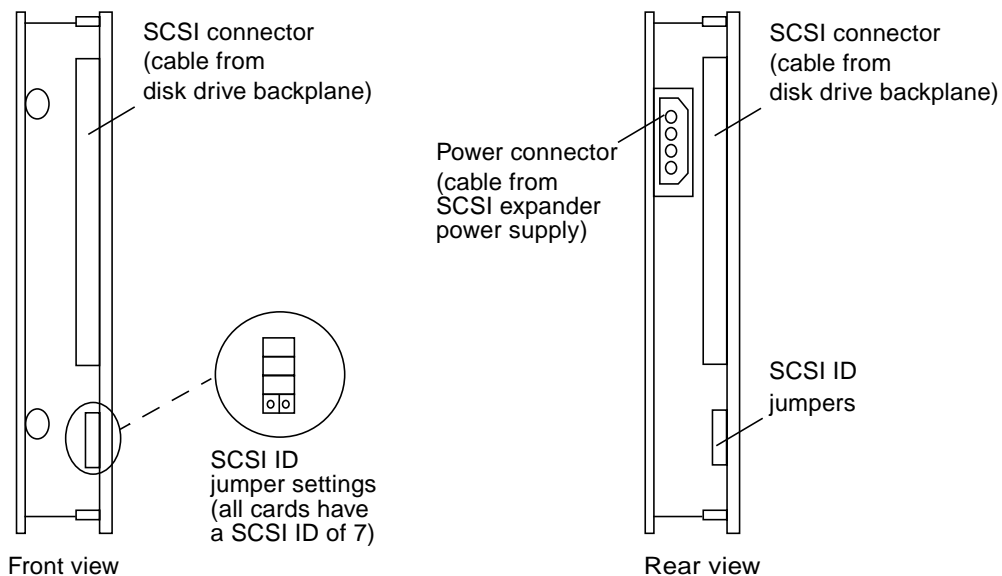
FIGURE 6-30 SCSI Expander Card Connectors and Jumpers, Both Card Types

6.20 Processor Card Set: Adapter Board

The Processor card set consists of an adapter board and processor board. The adapter board resides in chassis slot 1 of each subsystem chassis.

The procedures you need to perform are as follows:

- Save the NVRAM settings on both subsystems
- Power off the subsystem where you are going to replace the board
- Remove and replace the board
- Power on the subsystem and test the board
- Update the MCD database with the new serial number and revision level

Caution – The Ethernet port J2 is reserved for the System Console notebook computer only. Any use of this port by other devices is strictly prohibited.

6.20.1 Save the NVRAM Settings

If possible, perform the NVRAM Save procedure on both subsystems:

1. **Open an xterm window at the System Console:**

   a. **Put the mouse pointer in any open area on the root window display area.**

   b. **Press the left mouse button. A menu appears. Drag the mouse pointer to NEW WINDOW. Release the mouse button.**

   c. **An xterm window is displayed. Move the mouse pointer to the xterm window.**

2. **Save the NVRAM data on dsp1:**

   ```
   # /usr/local/bin/save_nvram dsp1
   ```

3. **Save the NVRAM data on dsp2:**

   ```
   # /usr/local/bin/save_nvram dsp2
   ```

6.20.2   Power Off the Subsystem

Before replacing the adapter board, arrange the following with the site administrator:

■ For Sun StorEdge A7000 servers connected to a mainframe computer: place the mainframe channels offline and shut down the subsystem where you are replacing a card. Refer to Section 7.6 "Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)" on page 7-33

■ For Sun StorEdge A7000 servers connected to an open system host computer: unmount the open system host's file systems, if the file systems reside on the failed adapter board's subsystem

1. **Open the front cabinet door.**

2. **Power off the power supply for the subsystem needing adapter board replacement. See** FIGURE 6-20 **for the subsystem DSPx power supply switch location, where x is the subsystem number. Leave the HDSA and other power supplies on.**

6.20.3   Removal

1. **Remove the System Console cable at serial port 0. See** FIGURE 6-31 **for the port location.**

2. **Disconnect the PCU data cable(s) connected at the other serial port(s).**

3. **Remove the cable connectors from SCSI Ports 0 and 1.**

4. **Remove the cable from the Ethernet transceiver on connector J2.**

5. **Remove the cable connecting the processor board and adapter board.**

6. **Unscrew the two front panel captive screws.**

7. **Unseat the board by pressing the top edge of the card ejectors located on the front edge of each board.**

8. **Slide the board out of the slot.**

9. **Using a small flat blade screwdriver, push the retaining clip holding the Ethernet transceiver up and remove the transceiver from connector J2.**

6.20.4 Replacement

1. **Write down the new adapter board serial number and revision level. Look for a sticker near the board backplane connector; it has this information printed on it. You will need this number, as described in Section 6.20.5 "Power On the Subsystem and Execute Tests" on page 6-73.**

2. **Install the Ethernet transceiver on connector J2.**

   Using a small flat blade screwdriver, push the retaining clip at holding the Ethernet transceiver down to lock it onto connector J2.

3. **Slide the card into slot 1; press to make sure the backplane connectors engage.**

4. **Using a small flat blade screwdriver, screw down the front panel captive screws to secure the card to the chassis card cage.**

5. **Replace the cable connectors to SCSI Ports 0 and 1.**

6. **Replace the cable connecting to the Ethernet transceiver on connector J2.**

7. **Replace the cable connecting the processor board and adapter board.**

8. **Install the PCU data cable at serial port 1, or the loopback cable at serial ports 1, 2, and 3. If you plan to execute loopback diagnostics, connect the loopback cable (both cables are cable tie-wrapped together). After executing loopback diagnostics, remove the loopback cable and install the PCU data cable(s).**

9. **Connect the System Console cable at serial port 0.**

Adapter board

Processor board

SLOT 2 ONLY

Status
LED indicators

Error
LED indicator

Abort/reset
toggle switch

Serial port 0
(System Console)

Serial port 1 to 3 connection
for loopback cable and
PCU cable

External interrupts (P5)

J2 (Ethernet)
Transceiver connector

SCSI 0
(Single ended;
to system boot disk)

SCSI 1
(differential)

0
1
2
3
4
5
6
7
ERR

ABORT
RESET

SER 0 SER 1 SER 2 SER 3

LAN

CCI

410P
LBP
ECCE
LBTO

ND0
ND1
ND2
ND3
410B
PLL

Status LED indicators

Slot 1/slot 2 connection (J1)

External interrupts (J2)

Caution – The
Ethernet port J2 is
reserved for the System
Console notebook
computer only. Any use
of this port by other
devices is strictly
prohibited.

FIGURE 6-31 Processor Card Set Front Panels

6.20.5　Power On the Subsystem and Execute Tests

After replacing the adapter board, begin to power on the Sun StorEdge A7000 (specific procedures are described in Chapter 7).

1. **Power on the DSPx subsystem power supply.**

2. **In the subsystem window on the System Console display, the subsystem requests the serial number and revision level for the new adapter board. Type the numbers, which you wrote down before you installed the new board; refer to Section 6.20.4 "Replacement" on page 6-71. The following is an example of the request:**

```
 >> ADAPTER BOARD INFORMATION *MUST* BE ENTERED NOW TO CONTINUE <<
Enter serial number (example: 92a12345):98110249
Enter functional revision (example: A):H
Starting cpu 1\
Starting cpu 2
Starting cpu 3
Clearing Processor Brd memory...
Clearing expansion memory...
Searching for Scsi Devices on Channel A:
...............................
Adding disk drive on 0 0 6 0 to configuration
```

3. **Interrupt the operating system software powerup sequence. The** ROM>> **prompt is displayed.**

4. **Run two passes of the core and qmem tests:**

```
ROM>> test core qmem
```

After the tests complete, type the above again to run the second pass.

5. **Restore the NVRAM settings you saved in Section 6.20.1 "Save the NVRAM Settings" on page 6-69. To restore settings, repeat the steps in that section, but type** restore_nvram **instead of** save_nvram**.**

6. **Reset the subsystem and boot the operating system software:**

```
ROM>> reset node
ROM>> boot
```

6.20.6   Add the Ethernet Address to /etc/ethers

1. **In the window of the subsystem with the new adapter board, get the Ethernet address of the Processor card by typing the following:**

```
# prtconf
```

The following display is an example, with the Ethernet address in boldfaced text:

```
HARDWARE PARAMETER PROM INFO:
Slot 1
    Board Type: 0x0 (Processor)
    Assembly ID: 0x34 (4 CPU, 64 MB Memory, PCB Rev C)
    Assembly Revision: M00
    CPU Serial Number: 94710806
    On-Board Memory Size: 64 MB
    Memory Speed: 80 ns
    Clock Speed: 50 MHz
    Ethernet Address: 08:00:4c:01:03:7c
    Minimum Required ROM Software Version: V0_0
```

2. **Open an xterm window and type the new Ethernet address in the System Console** /etc/ethers **file.**

   a. **Put the mouse pointer in any open area on the root window display area.**

   b. **Press and hold the left mouse button. A menu is displayed. Drag the mouse pointer to NEW WINDOW.**

   c. **Release the left mouse button. A System Console xterm window is displayed.**

   d. **Move the mouse pointer to the System Console xterm window. Using the** vi **editor, open the** /etc/ethers **file:**

```
# vi /etc/ethers
```

   e. **Search for the line containing the hostname of the subsystem with the new Processor card (**dsp1 **or** dsp2**).**

   f. **Type the Ethernet address.**

   g. **Save and exit the file.**

3. **Add the new Ethernet address to the subsystem arp table (in the following example, use the appropriate subsystem name, dsp1 or dsp2). Type the following in the window of the subsystem with the new adapter board:**

```
# arp -s dsp1 08:00:4c:01:03:7c
```

4. **For mainframe-connected A7000s only: Start the simulation on dsp1 through a dsp1 window (optional; only if it does not automatically start):**

```
# ckdadmin start
```

Repeat for subsystem dsp2.

6.20.7   Update the Master Configuration Database (MCD)

5. **Update the Master Configuration Database with the new adapter board serial number and revision. First, find the replaced card's subsystem database record. Type:**

```
# mcdesn |grep adapter -0
```

Output similar to the following displays:

```
|11 |1 |CONTROLLER |dsp1 |2 |adapter |adapter-0 |160-xxxxxx-001 |H
| 2,0 |98110252 |

|18 |1 |CONTROLLER |dsp2 |3 |adapter |adapter-0  |160-xxxxxx-001
|H   | 2,0 |9819049 |
```

Note the record number of the subsystem you will update (in this example, 11 for dsp1, 18 for dsp2).

6. Type the following on dsp1 through a dsp1 window:

```
# mcdesn -e
```

This command lets you step through all records and update the adapter board record. When you reach the adapter board record, change the revision level and serial number you wrote down in Section 6.20.4 "Replacement" on page 6-71.

6.21 Processor Card Set: Processor Board

The Processor card consists of an adapter board and processor board. The processor board resides in slot 2 of each subsystem chassis.

The procedures you need to perform are as follows:

- Save the NVRAM settings on both subsystems
- Power off the subsystem where you are going to replace the board
- Remove and replace the board
- Power on the subsystem and test the board
- Update the MCD database with the new serial number and revision level

6.21.1 Save the NVRAM Settings

If possible, perform the NVRAM Save procedure on both subsystems:

1. **Open an xterm window at the System Console:**

   a. **Put the mouse pointer in any open area on the root window display area.**

   b. **Press the left mouse button. A menu appears. Drag the mouse pointer to NEW WINDOW. Release the mouse button.**

   c. **An xterm window is displayed. Move the mouse pointer to the xterm window.**

2. **Save the NVRAM data on dsp1:**

   ```
   # /usr/local/bin/save_nvram dsp1
   ```

3. **Save the NVRAM data on dsp2:**

   ```
   # /usr/local/bin/save_nvram dsp2
   ```

6.21.2 Power Off the Subsystem

Before replacing the processor board, arrange the following with the site administrator:

■ For Sun StorEdge A7000 servers connected to a mainframe computer: place the mainframe channels offline and shut down the subsystem where you are replacing a card. Refer to Section 7.6 "Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)" on page 7-33

■ For Sun StorEdge A7000 servers connected to an open system host computer: unmount the open system host's file systems, if the file systems reside on the failed adapter board's subsystem

1. **Open the front cabinet door.**

2. **Power off the power supply for the subsystem needing processor board replacement. See** FIGURE 6-20 **for the subsystem DSPx power supply switch location, where x is the subsystem number. Leave the HDSA and other power supplies on.**

6.21.3 Removal

1. **Before removing the processor board, you must first remove the adapter board. Perform the procedures in Section 6.20.3 "Removal" on page 6-70.**

2. **Remove the cable connecting the processor board and adapter board.See** FIGURE 6-31 **for the location.**

3. **Unscrew the two front panel captive screws.**

4. **Unseat the board by pressing the top edge of the card ejectors located on the front edge of each board.**

5. **Slide the board out of the slot.**

6.21.4 Replacement

1. **Write down the new processor board serial number and revision level number. Look for a sticker near the board backplane connector; it has this information printed on it. You will need this number, as described in Section 6.21.5 "Power On the Subsystem and Execute Tests" on page 6-79.**

2. **Slide the card into slot 2; press to make sure the backplane connectors engage.**

3. **Using a small flat blade screwdriver, screw down the front panel captive screws to secure the card to the chassis card cage.**

4. **Replace the adapter board according to Section 6.20.4 "Replacement" on page 6-71.**

5. **Replace the cable connecting the processor board and adapter board.**

6.21.5   Power On the Subsystem and Execute Tests

After replacing the processor board, begin to power on the Sun StorEdge A7000 (specific procedures are described in Chapter 7).

1. **Power on the DSPx subsystem power supply.**

2. **In the subsystem window on the System Console display, the subsystem requests the serial number and revision level for the new processor board. Type the numbers, which you wrote down before you installed the new board; refer to Section 6.21.4 "Replacement" on page 6-78. The following is an example of the request:**

```
 >> PROCESSOR BOARD INFORMATION *MUST* BE ENTERED NOW TO CONTINUE
<<
Enter serial number (example: 92a12345):98110249
Enter functional revision (example: A):H
Starting cpu 1
Starting cpu 2
Starting cpu 3
Clearing Processor Brd memory...
Clearing expansion memory...
Searching for Scsi Devices on Channel A:
..............................
Adding disk drive on 0 0 6 0 to configuration
```

3. **Interrupt the operating system software powerup sequence. The** ROM>> **prompt is displayed.**

4. **Run two passes of these tests:**

```
ROM>> test core qmem cache ecc
```

After the tests complete, type the above again to run the second pass.

5. **Restore the NVRAM settings you saved in Section 6.21.1 "Save the NVRAM Settings" on page 6-77. To restore settings, repeat the steps in that section, but type** restore_nvram **instead of** save_nvram**.**

6. **Reset the subsystem and boot the operating system software:**

```
ROM>> reset node
ROM>> boot
```

6.21.6   Update the Master Configuration Database (MCD)

7. **Update the Master Configuration Database with the new processor board serial number and revision. First, find the replaced card's subsystem database record. Type:**

```
# mcdesn |grep vipcpu
```

Output similar to the following displays:

```
|11 |1 |CONTROLLER |dsp1 |2 |vipcpu |vipcpu-0 |160-113373-001 |H
| 2,0 |98110252 |

|18 |1 |CONTROLLER |dsp2 |3 |vipcpu |vipcpu-0 |160-113373-001 |H
| 2,0 |9819049 |
```

Note the record number of the subsystem you will update (in this example, 11 for dsp1, 18 for dsp2).

8. **Type the following on dsp1 through a dsp1 window:**

```
# mcdesn -e
```

This command lets you step through all records and update the Processor board record. When you reach the Processor board record, change the revision level and serial number you wrote down in Section 6.21.4 "Replacement" on page 6-78.

6.22 Cache Memory Card

The cache memory card is a multilayered PCB set (with motherboard and daughtercard) occupying one slot in each chassis card cage. To remove and replace the cache memory module, you must open the rear cabinet door.

Note – Chapter 3 contains jumper and switch setting information for Sun StorEdge A7000 cards.

Caution – Use caution during this concurrent maintenance procedure and remove the card cables in the order described in the Removal and Replacement paragraphs.

6.22.1 Power Off the Subsystem

Before replacing the cache memory card, arrange the following with the site administrator:

■ For Sun StorEdge A7000 servers connected to a mainframe computer: place the mainframe channels offline and shut down the subsystem where you are replacing a card. Refer to Section 7.6 "Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)" on page 7-33

■ For Sun StorEdge A7000 servers connected to an open system host computer: unmount the open system host's file systems, if the file systems reside on the failed card's subsystem

1. **Open the front cabinet door.**

2. **Power off the power supply for the subsystem needing card replacement. See** FIGURE 6-20 **for the subsystem DSPx power supply switch location, where x is the subsystem number. Leave the HDSA and other power supplies on.**

6.22.2 Removal

1. **At the front of the cache memory card in the** *powered-on subsystem*, **remove all cables from the front connectors in this order: J3, J1, J2 and J4.**

Leave this card in the subsystem chassis.

2. **At the front of the cache memory card in the powered-off subsystem, remove all cables from the front connectors in this order: J3, J1, J2, and J4.**

3. **Unscrew the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

4. **Unseat the card by pressing the top edge of the card ejectors located on the front edge of the card.**

5. **Slide the card out of the slot.**

6.22.3   Replacement

1. **Slide the card into the slot and press it to make sure the backplane connectors engage.**

2. **Using a small flat blade screwdriver, screw the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

3. **At the front of the cache memory card in the powered-off subsystem, replace all cables at the front connectors in this order: J1, J2, J4, and J3.**

4. **At the front of the cache memory card in the powered-on subsystem, replace all cables at the front connectors in this order: J1, J2, J4, and J3.**

5. **Power on the DSPx subsystem power supply.**

6.22.4   Run Diagnostic Software

Run the Diagnose diagnostic software as described in Chapter 4.

6.23 Quad-Channel BMC Card

The quad-channel BMC card is a multilayered PCB occupying one slot of each chassis card cage. To remove and replace the BMC card, you must open the rear cabinet door.

Note – Chapter 3 contains jumper and switch setting information for Sun StorEdge A7000 cards.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

6.23.1 Removal

1. **Power off the Sun StorEdge A7000, as described in Chapter 7.**

2. **Remove all cables from the front panel connectors on the card being replaced.**

3. **Unscrew the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

4. **Unseat the card by pressing the top edge of the card ejectors located on the front edge of the card.**

5. **Slide the card out of the slot.**

6.23.2 Replacement

1. **Slide the card into the slot and press it to make sure the backplane connectors engage.**

2. **Using a small flat blade screwdriver, screw the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

3. **Replace all cables from the front panel connectors.**

4. **Power on the Sun StorEdge A7000, as described in Chapter 7.**

6.23.3 Run Diagnostic Software

Run the Diagnose diagnostic software as described in Chapter 4.

6.24 Quad-Channel SCSI Controller

The quad-channel SCSI controller card is a multilayered PCB occupying one slot of each chassis card cage. To remove and replace the card, you must open the rear cabinet door.

Note – Chapter 3 contains jumper and switch setting information for Sun StorEdge A7000 cards.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

6.24.1 Removal

1. **Power off the Sun StorEdge A7000, as described in Chapter 7.**

2. **Remove all cables from the front panel connectors on the card being replaced.**

3. **Unscrew the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

4. **Unseat the card by pressing the top edge of the card ejectors located on the front edge of the card.**

5. **Slide the card out of the slot.**

6.24.2 Replacement

1. **Slide the card into the slot and press it to make sure the backplane connectors engage.**

2. **Using a small flat blade screwdriver, screw the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

3. **Replace all cables on the front panel connectors.**

4. **Power on the Sun StorEdge A7000, as described in Chapter 7.**

6.24.3 Run Diagnostic Software

Run the Diagnose diagnostic software as described in Chapter 4.

6.25 Quad-Channel SCSI Target Mode Controller

The quad-channel SCSI Target Mode Controller is multilayered PCB occupying one slot of each chassis card cage. To remove and replace the card, you must open the rear cabinet door.

Note – Chapter 3 contains jumper and switch setting information for Sun StorEdge A7000 cards.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

6.25.1 Power Off the Subsystem

Before replacing the card, arrange the following with the site administrator:

1. **Unmount the open system host's file systems, if the file systems reside on the failed card's subsystem.**

2. **Open the front cabinet door.**

3. **Power off the power supply for the subsystem needing card replacement. See** FIGURE 6-20 **for the subsystem DSPx power supply switch location, where x is the subsystem number. Leave the HDSA and other power supplies on.**

6.25.2   Removal

1. **Remove all cables from the front panel connectors on the card being replaced.**

2. **Unscrew the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

3. **Unseat the card by pressing the top edge of the card ejectors located on the front edge of the card.**

4. **Slide the card out of the slot.**

6.25.3   Replacement

1. **Slide the card into the slot and press it to make sure the backplane connectors engage.**

2. **Using a small flat blade screwdriver, screw the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

3. **Replace all cables from the front panel connectors.**

4. **Power on the DSPx subsystem power supply.**

6.25.4   Run Diagnostic Software

Run the Diagnose diagnostic software as described in Chapter 4.

6.26 Dual-Channel ESCON to VME Card

The dual-channel ESCON to VME Interface card is a multilayered PCB. To remove and replace the card, you must open the rear cabinet door.

Note – Chapter 3 contains jumper and switch setting information for Sun StorEdge A7000 cards.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

6.26.1 Removal

1. **Power off the Sun StorEdge A7000, as described in Chapter 7.**

2. **Remove the channel and control/status cables from the front panel connectors on the card being replaced.**

3. **Unscrew the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

4. **Unseat the card by pressing the top edge of the card ejectors located on the front edge of the card.**

5. **Slide the card out of the slot.**

6.26.2 Replacement

1. **Slide the card into the slot and press it to make sure the backplane connectors engage.**

2. **Using a small flat blade screwdriver, screw the front panel metal edge plate securing the card to the chassis card cage with the two captive screws.**

3. **Replace all cables at the front panel connectors.**

4. **Power on the Sun StorEdge A7000, as described in Chapter 7.**

6.26.3 Run Diagnostic Software

Run any diagnostic software as described in Chapter 4.

6.27 Chassis Card Cage with Backplane

Each Sun StorEdge A7000 model contains two 14-slot chassis card cages with backplanes. Each can be replaced separately. Before you begin:

1. **Power off the Sun StorEdge A7000, as described in Chapter 7.**

2. **Label cables as necessary.**

3. **Retain all screws and washers.**

4. **Keep the front and rear cabinet doors open.**

5. **Remove and replace all printed circuit cards in the chassis according to the procedures in this chapter.**

6.27.1 Removal

1. **Go to the front of the cabinet and turn the power supply knurled knobs at the subsystem power supply tray. Fold down the tray, pulling on the rubber grips.**

2. **Remove the nuts from the red +5 VDC cable lugs and black GND cable lugs at the +5 VDC and GND bus bar terminals shown in** FIGURE 6-32 **and** FIGURE 6-33. **Move the cables out of the way.**

3. **Remove the nuts from the +12 VDC, -12 VDC, and two GND terminals shown in** FIGURE 6-32 **and** FIGURE 6-33. **Move the cables out of the way.**

4. **At the bottom and top of the chassis, using a Philips screwdriver, remove the screws holding the chassis to the frame, as shown in** FIGURE 6-34.

5. **Go to the rear of the cabinet. Note that there is a small rubber spacer between the two 14-slot chassis at the top, as shown in** FIGURE 6-35. **Grip this spacer with needlenose pliers and keep for chassis replacement.**

6. **At the bottom of the chassis, using a Philips screwdriver, remove the screws holding the chassis to the frame, as shown in** FIGURE 6-34.

7. **Pull the chassis through the rear of the cabinet.**

6.27.2   Replacement

1. **Go to the rear of the cabinet. Position the chassis and push it into place.**

2. **At the bottom of the chassis, using a Philips screwdriver, replace the screws holding the chassis to the frame, as shown in** FIGURE 6-34.

3. **Using needlenose pliers, replace the rubber spacer shown in** FIGURE 6-35.

4. **Go to the front of the cabinet. At the bottom and top of the chassis, using a Philips screwdriver, insert each screw holding the chassis to the frame, as shown in** FIGURE 6-34, **and hand tighten the screw.**

   Note – Do not completely tighten the screws yet.

   ---

5. **With all screws hand threaded and tightened, tighten them now with a screwdriver.**

6. **Replace the +12 VDC, -12 VDC, and two GND cables on the terminals shown in** FIGURE 6-32 **and** FIGURE 6-33. **Replace the nuts on the terminals.**

7. **Replace the +5 VDC and GND cables on the terminals shown in** FIGURE 6-32 **and** FIGURE 6-33. **Replace the nuts on the terminals.**

8. **Fold the subsystem power supply tray up and secure it with the captive knurled knobs.**
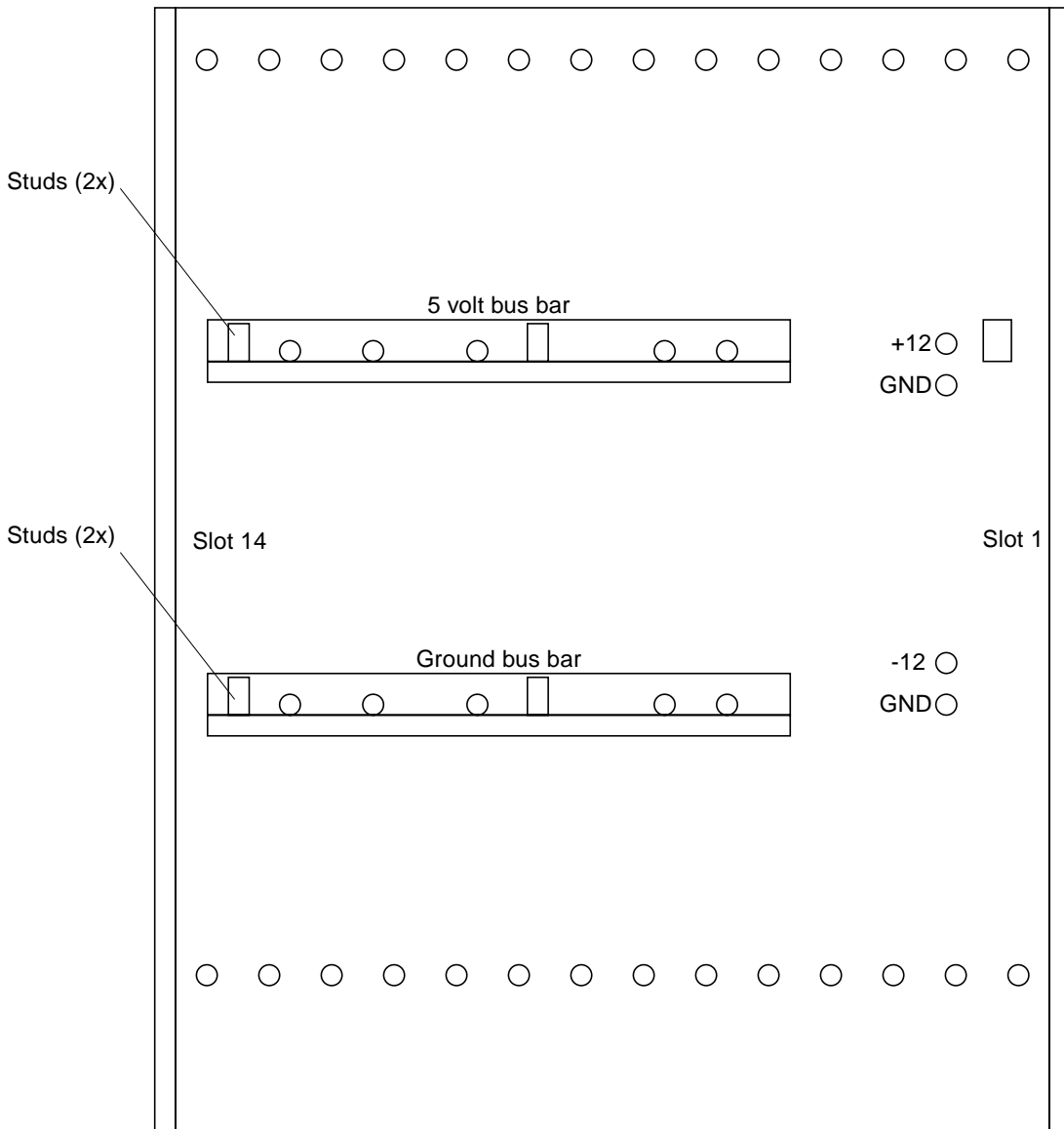
FIGURE 6-32 Chassis Backplane Power Connections

14-slot chassis backplane

+5 VDC bus bar

+12V

GND

GND (ground) bus bar

-12V

GND

Black ground cable (V1-)

Red power cable
(V1+)

1 2 3 4 5 6 7

+ -

+ -

Power supply A

Power supply B

Power for
chassis backplane

1 V2+ : +12 VDC
2 V2 - : GND for +12 VDC
3 V3+ : GND for - 12 VDC
4 V3 - : -12 VDC
5 to 7 : not used
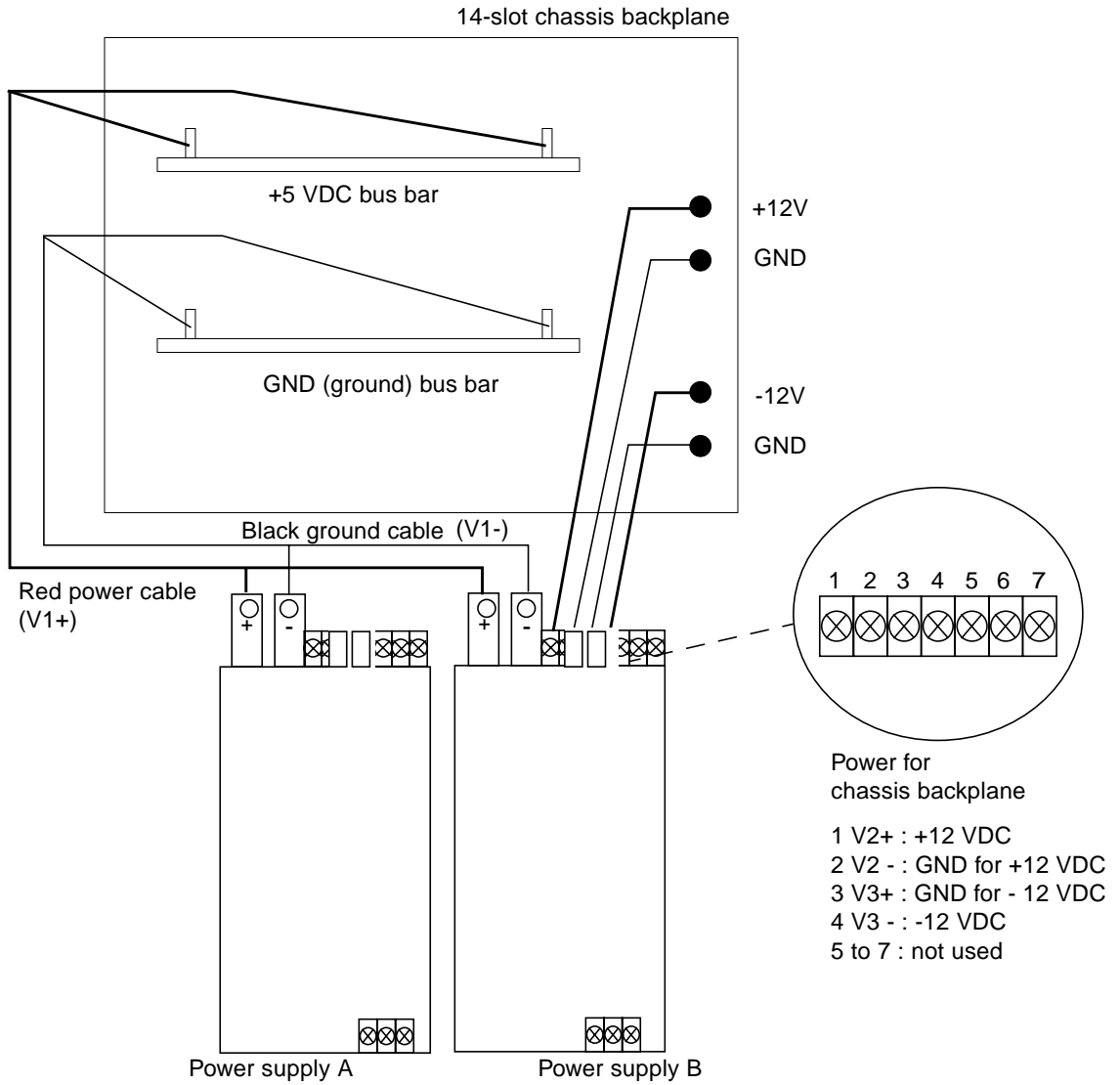
FIGURE 6-33 Chassis Backplane Power Connection Diagram

Hardware provided
with cabinet (4x)

14-slot chassis

Part of
cabinet

Rear of cabinet

Hardware provided
with cabinet (4x)
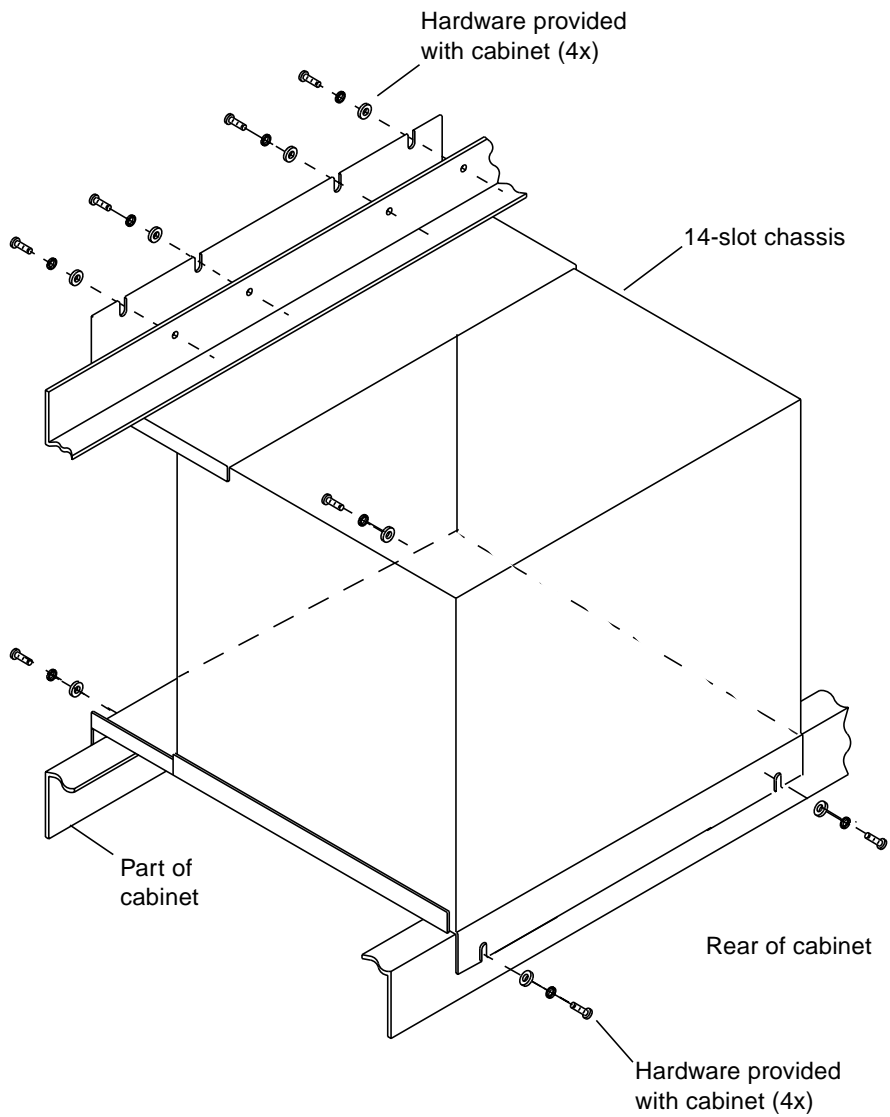
FIGURE 6-34 Chassis Removal/Replacement Screw Locations
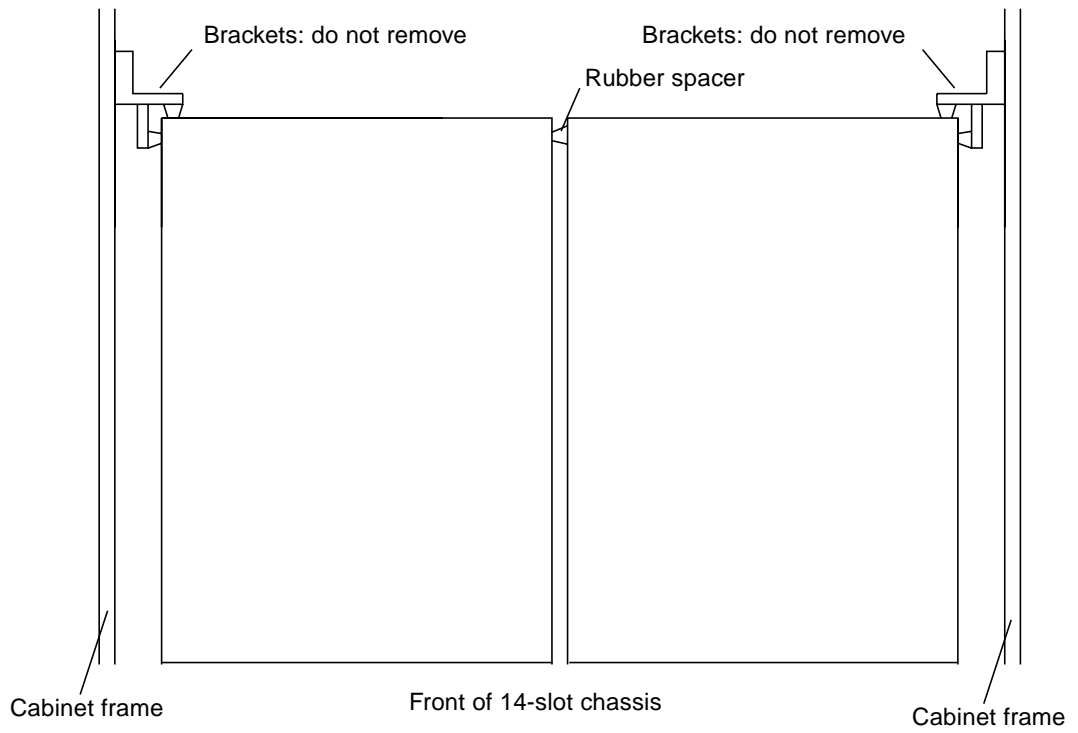
FIGURE 6-35 Chassis Brackets and Rubber Spacer

6.28 Disk Drive Array Chassis

The disk drive array chassis contains six drives to make a six-drive bundle. The HDSA drawer contains nine disk drive array chassis. Before you begin, open the front and rear doors.

Consult with the site administrator, as the customer loses all access to data stored on the drives in the chassis being replaced.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

6.28.1 Removal

1. **Remove the six disk drives from the array chassis to be replaced, according to procedures in Section 6.8 "Disk Drive (Linear)" on page 6-17. Leave the HDSA drawer open.**

2. **At the inside (facing the cabinet interior) of the HDSA are two retaining plates per row of three disk drive array chassis. Remove the screws holding the plates and then remove the plates. See** FIGURE 6-36**.**

3. **With the retaining plates removed, note the cables at the top and bottom of the backplane. See** FIGURE 6-37**. Remove, in order:**

   a. **SCSI controller cables**

   b. **backplane interconnection cables**

   c. **HDSA LED cables**

   d. **HDSA tray fan cables (only the front and rear chassis of each row have these cables attached; the middle chassis of each row does not connect to the fans)**

4. **Go to the outside (disk drive faceplate side, facing the cabinet sides) of the HDSA. Remove the two screws on each retaining bar above and below the six-drive bundles, then remove the retaining bars.**

5. **Remove the alignment screws. See** FIGURE 6-37**.**

6. **Remove the array chassis assembly.**

Retaining plates removed from row 1

Retaining plates   Screw (4x)

Row 1

Row 2

Row 3

Front of HDSA   Screw (6x)   Retaining plates

Backplane (inside view)
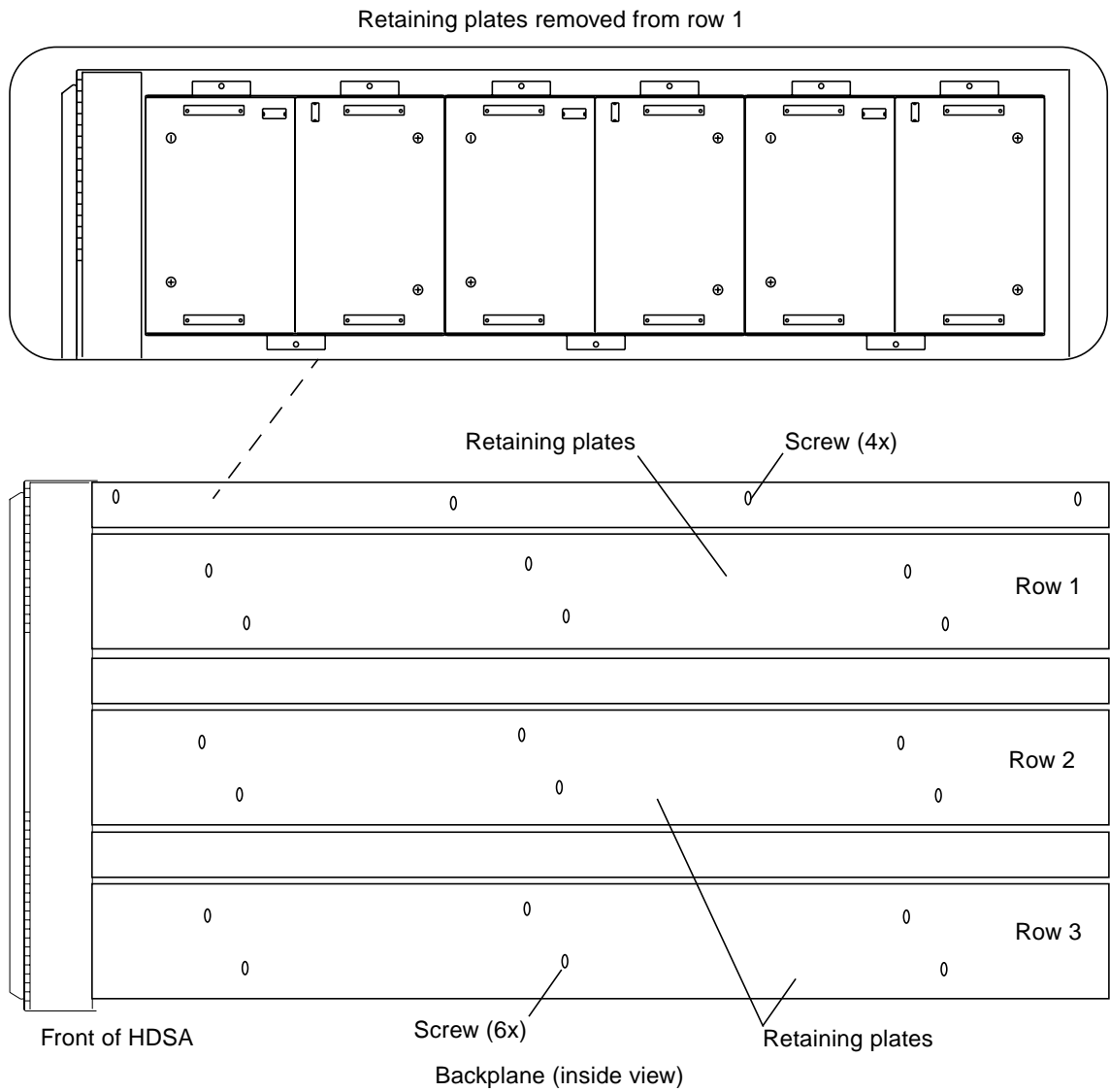
FIGURE 6-36 HDSA, Inside View

6.28.2   Replacement

1. **At the outside of the HDSA, insert the array chassis.**

2. **Replace the alignment screws, but do not tighten them. See** FIGURE 6-37.

3. **At the inside of the HDSA, replace the following cables, in order:**

   a. **HDSA tray fan cables (only the front and rear chassis of each row have these cables attached; the middle chassis of each row does not connect to the fans)**

   b. **backplane interconnection cables**

   c. **HDSA LED cables**

   d. **SCSI controller cables**

4. **Replace the two retaining plates.**

5. **Replace the six disk drives according to procedures in Section 6.8 "Disk Drive (Linear)" on page 6-17.**

6. **Go to the outside (disk drive faceplate side, facing the cabinet sides) of the HDSA. Replace the retaining bars and the two screws on each retaining bar above and below the six-drive bundles.**

7. **Tighten the screws you replaced on Step 2.**

8. **To check that the drives are in the correct drive slot, type the following in a subsystem window:**

```
# mcdudisks
```

If this command reports any drive changes, then the drives are in the wrong slots.

Alignment screws (3x)

Front view

SCSI controller cable
connectors (2x)

Ribbon cable
to HDSA LEDs

Rear
(component) view

J6   J5

Tray fan
cable
connector

Backplane
interconnection
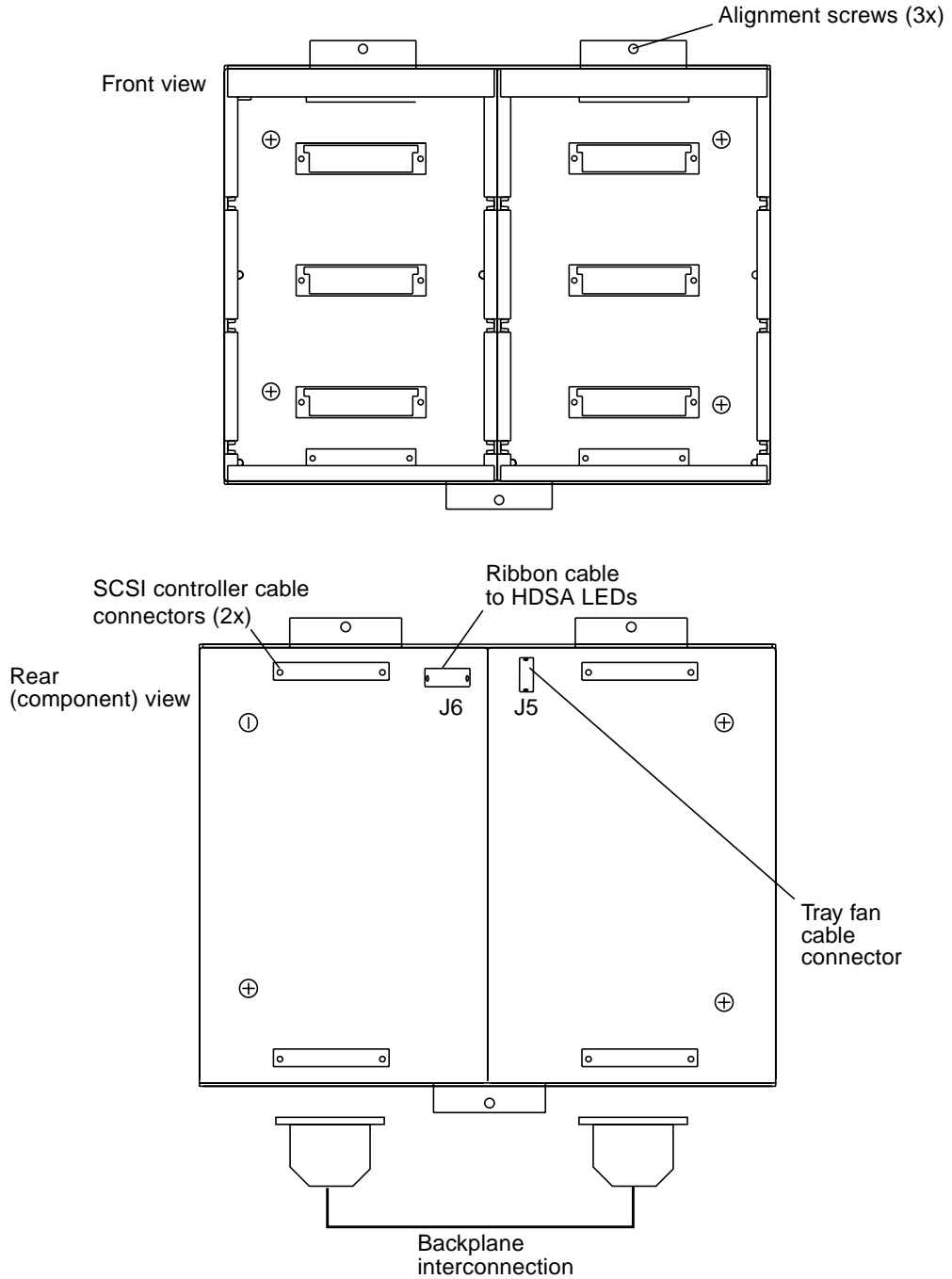
FIGURE 6-37 Disk Drive Array Chassis Front and Component Views

6.29 CPU Transceiver and Loopback Cable

The CPU transceiver is located on the LAN Ethernet port J2 of the Processor card.

> **Caution –** Ethernet port J2 is reserved for the System Console notebook computer only. Any use of this port by other devices is strictly prohibited.

6.29.1 CPU Transceiver

6.29.1.1 Removal

1. **At the front of the transceiver is a T-shaped BNC connector with cable attached. Turn the connector counterclockwise and pull to remove it.**

2. **Using a small flat blade screwdriver, push the retaining clip holding the Ethernet transceiver up to release it.**

3. **Remove the transceiver.**

6.29.2 Replacement

1. **Replace the transceiver on the LAN Ethernet port on the Processor card.**

2. **Using a small flat blade screwdriver, push the retaining clip holding the Ethernet transceiver down to lock it.**

3. **At the front of the transceiver is a terminal for the T-shaped BNC connector with cable attached. Align the connector on the terminal, push it in, and turn it clockwise to connect it.**

6.29.3　Loopback Cable

6.29.3.1　Removal, Loopback Cable

The loopback cable occupies serial ports 1, 2, and 3 on the Processor card. Pull the loopback cable to remove it.

6.29.3.2　Replacement

1. **Install the loopback connector at serial ports 1, 2, and 3.**

2. **Push the cable to replace it.**

6.29.4　Run Diagnostic Software

Run any diagnostic software as described in Chapter 4.

6.30   HDSA Drawer Fan

Three HDSA drawer fans are located at the rear of the HDSA and three fans are located at the front behind the grill. Before you begin:

1. **Open the rear door (if you replacing a fan in the rear).**

2. **Extend the HDSA drawer containing the fan being replaced.**

6.30.1   Removal

1. **Identify the fan to be replaced.**

2. **If the fan to be replaced is in the front of the drawer, remove the fan grill cover. See** FIGURE 6-38**. Otherwise, go to Step 3.**

   a. **Using a flat-blade screwdriver, slip the blade under the edge of the cover. Gently turn the screwdriver to partially pop off the cover. It is retained by beveled posts.**

   b. **Pull the grill off.**

3. **Remove the retaining plates on the interior of the HDSA drawer for that fan's row.**

4. **Remove the cable on connector J5 at the front or rear disk drive array backplane, depending on which fan is being replaced. Front fan cables are connected to the front backplane and rear fan cables are connected to the rear backplane. See** FIGURE 6-37**.**

5. **Remove the two retaining screws on the fan. See** FIGURE 6-39**.**

6. **Remove the fan.**

6.30.2   Replacement

1. **Position the tray fan and replace the two retaining screws.**

2. **Replace the cable on connector J5 at the front or rear disk drive array backplane. Cable tie as needed. See** FIGURE 6-37**.**

3. **Replace the retaining plates on the interior of the HDSA drawer for that fan's row.**

4. **If the replaced fan is at the front of the drawer, replace the grill cover:**

a. **Line up the cover posts with the holes on the HDSA.**

b. **Push the cover in.**

Place screwdriver tip at any of these points and turn to remove the grill
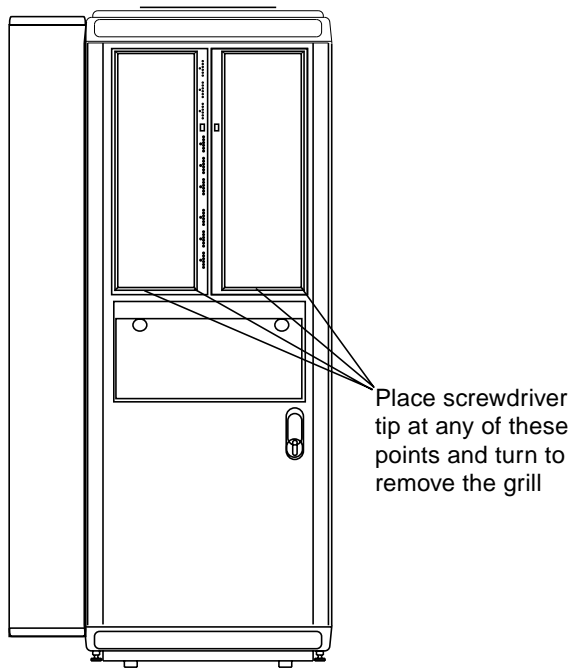
FIGURE 6-38 HDSA Front Fan and Grill Cover Location

Retaining screws;
2x per fan)
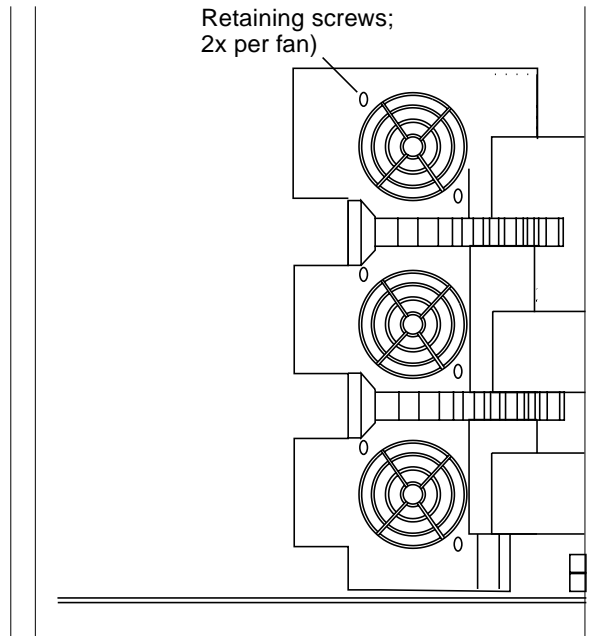
FIGURE 6-39 HDSA Rear Tray Fans

6.31 BMC Bus and Tag Driver/Receiver Card

Note – Chapter 3 contains jumper and switch setting information for Sun StorEdge A7000 cards.

You must place offline those channels (not the paths) the BMC card connects from the mainframe to the Sun StorEdge A7000. Chapter 7 generally describes the mainframe side of this procedure; consult the site administrator.

The BMC Bus and Tag driver/receiver card is located inside the I/O bay cabinet in the left side of the main cabinet. See FIGURE 6-40. Before you begin:

1. **Power off the Sun StorEdge A7000, as described in Chapter 7.**

2. **Remove the channel cables by loosening the securing screw on the connector with a flat-blade screwdriver and pulling the cable connector off the connector.**

6.31.1   Removal

1. **Remove the two mounting plate retaining screws and washers shown in** FIGURE 6-41**.**

2. **Pull the plate down; it swings down to show the rear (component side) of the driver/receiver card. The rear of the card has J1 and J2 connectors for the cables from the quad-channel BMC card. See** FIGURE 6-42**.**

3. **Remove the cables from the J1 and J2 card connectors.**

4. **Swing the mounting plate back up and secure it to the cabinet with one screw and washer each at the top and bottom. This will let you remove the retaining screws holding the driver/receiver card more easily.**

5. **Remove seven retaining screws above and seven retaining screws below the driver/receiver card.**

6. **Remove the screws from the mounting plate and swing it down again.**

7. **Remove the remaining retaining screws from the driver/receiver card.**

8. **Remove the driver/receiver card from the cutout in the mounting plate.**

I/O bay cabinet

Two driver/receiver cards
per mounting plate
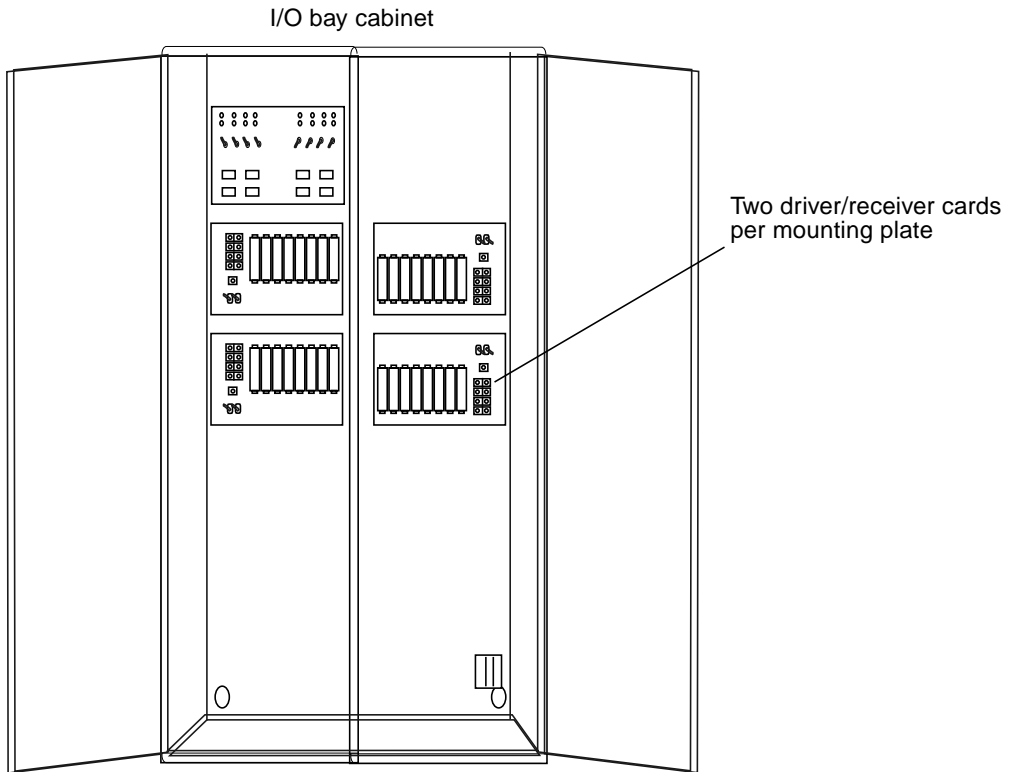
FIGURE 6-40 BMC Bus and Tag Driver ⁄ Receiver Card Location

6.31.2   Replacement

1. **Place the driver/receiver card in the cutout in the mounting plate.**

2. **Replace one retaining screw each at the top and the bottom of the card, from the front of the mounting plate.**

3. **Swing the mounting plate up and secure it to the cabinet with one screw and washer each at the top and bottom. This will let you place the remaining retaining screws holding the driver/receiver card more easily.**

4. **Replace seven retaining screws above and seven retaining screws below the driver/receiver card.**

5. **Remove the screws from the mounting plate and swing it down again.**

6. Connect the cables from the quad-channel BMC controller card to the J1 and J2 connectors.

7. Swing the mounting plate up and secure it to the cabinet with two screws and washers.

8. Reinstall the Bus and Tag cables from the mainframe to the appropriate connector slot. Be careful when seating cables. Improper seating can cause bent or broken connector pins.

9. To secure the connectors to the slots, locate the securing screw in the center of each connector and screw down each connector with a flat-blade screwdriver. Do not overtighten. If the screw is hard to turn, reinstall the connector and try again.

10. Put each interface channel online by placing each driver/receiver toggle switch in the online (1) position.

Mounting plate retaining screws and washers (2x);
remove these to swing the mounting plate down

Cable
connector
securing screw
(one per
connector)

Driver/receiver
retaining screws
(16x per adapter)
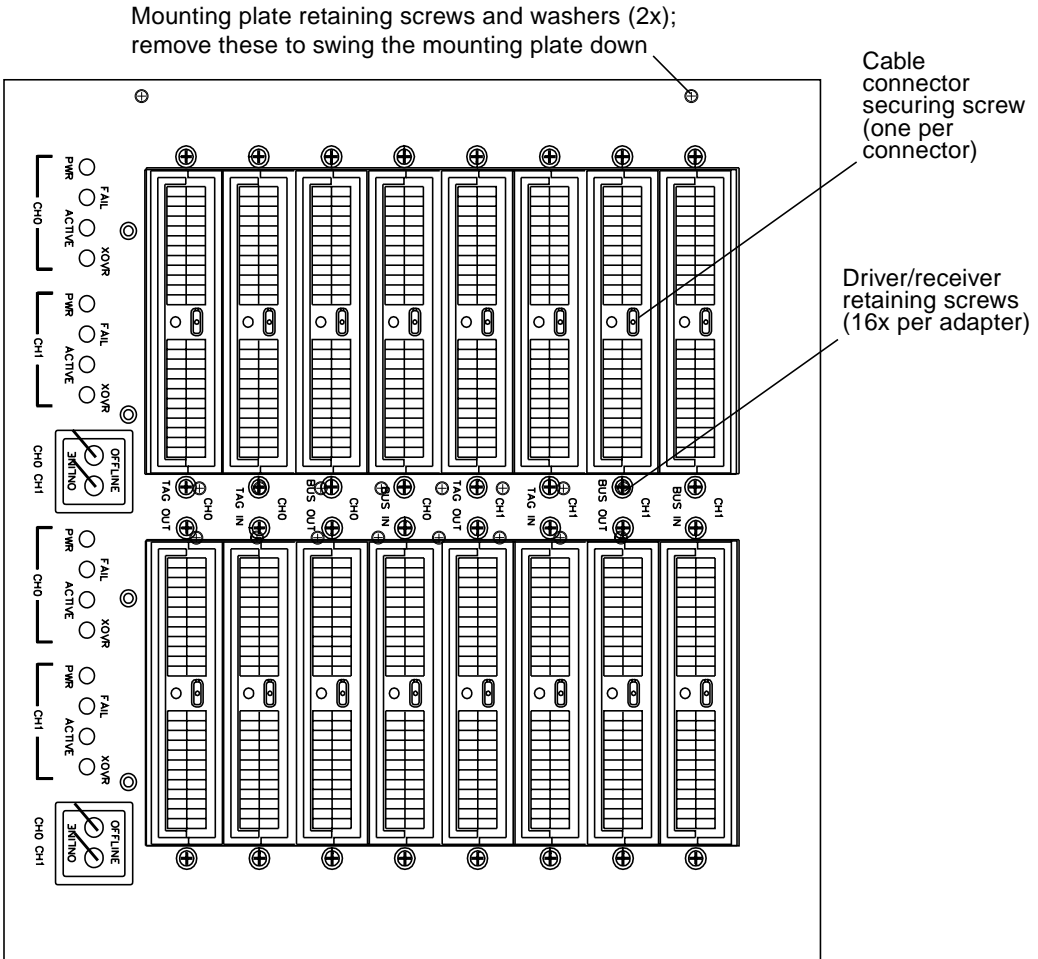
FIGURE 6-41 Mounting Plate and Driver/Receiver Screw Locations

Channel 1   Channel 0

J1   J2

Jumper I2A2B   Jumper C0A2B
(channel 1)   (channel 0)
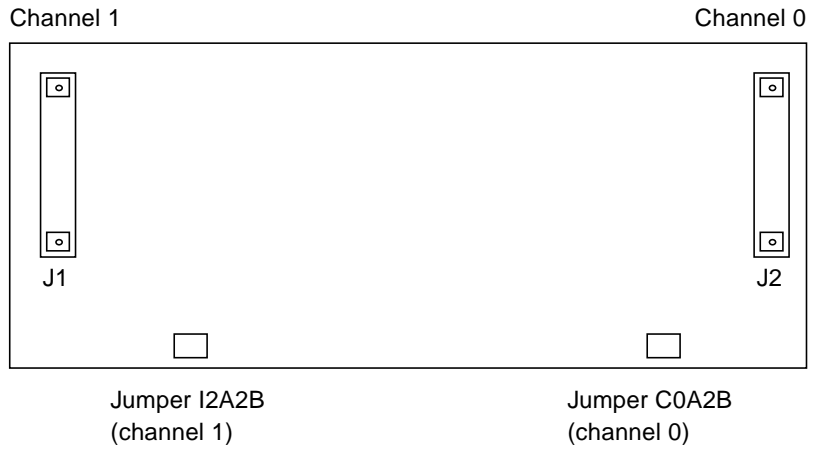
FIGURE 6-42 Driver/Receiver Card, Component Side

6.32 System Disk Drive

The Sun StorEdge A7000 has two system disk drives at the front of the cabinet, located between the HDSA power supply module chassis and 14-slot chassis. Before you begin:

- If possible, back up system and other files onto diskette or to the console. Section 6.10.1 "Back Up Files to the Subsystem and Shut Down" on page 6-28 and Chapter 7 describe the subsysbak program.

Note – After replacement, update this unit's serial number, as described in Section 6.4 "Entering Serial Numbers in the Master Configuration Database (MCD)" on page 6-5.

Note – Always check the jumper settings of the new drive, making sure they match the jumper settings of the old drive.

6.32.1 Power Off the Subsystem

- For Sun StorEdge A7000 servers connected to a mainframe computer: place the mainframe channels offline and shut down the subsystem where you are replacing a drive. Refer to Section 7.6 "Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)" on page 7-33

- For Sun StorEdge A7000 servers connected to an open system host computer: unmount the open system host's file systems, if the file systems reside on the failed drive's subsystem

Before replacing the drive, arrange the following with the site administrator:

1. **Open the front cabinet door.**

2. **Power off the power supply for the subsystem needing drive replacement. See** FIGURE 6-20 **for the subsystem DSPx power supply switch location, where x is the subsystem number. Leave the HDSA and other power supplies on.**

6.32.2   Removal

1. **Open the front cabinet doors to reveal the power supply trays.**

2. **Turn the captive knurled knobs on the subsystem power supply tray to release the tray. Fold down the tray, pulling on the rubber grips. See** FIGURE 6-15 **for the location of these screws.**

3. **Loosen the four disk drive captive retaining screws. Pull the drive forward. See** FIGURE 6-43**.**

4. **Remove the power and data cables from the rear of the disk drive.**

5. **Remove the four small screws (two per side) securing the drive to its mounting bracket.**

6.32.3   Replacement

1. **Check the new drive's jumper settings, making sure they match the old drive's settings.**

2. **Place the disk drive in the mounting bracket.**

   a. **Line up the screw holes on the side of the bracket and disk drive.**

   b. **Replace the four small screws to secure the disk drive to the mounting bracket.**

3. **Connect the power and data cables to the rear of the disk drive.**

4. **Put the disk drive/bracket assembly in the space below the HDSA power supply chassis module and tighten the captive retaining screws. See** FIGURE 6-43**.**

5. **Fold the power supply tray to its upright position.**

6. **Turn the captive knurled knobs on the subsystem power supply tray to seat the tray, if needed.**
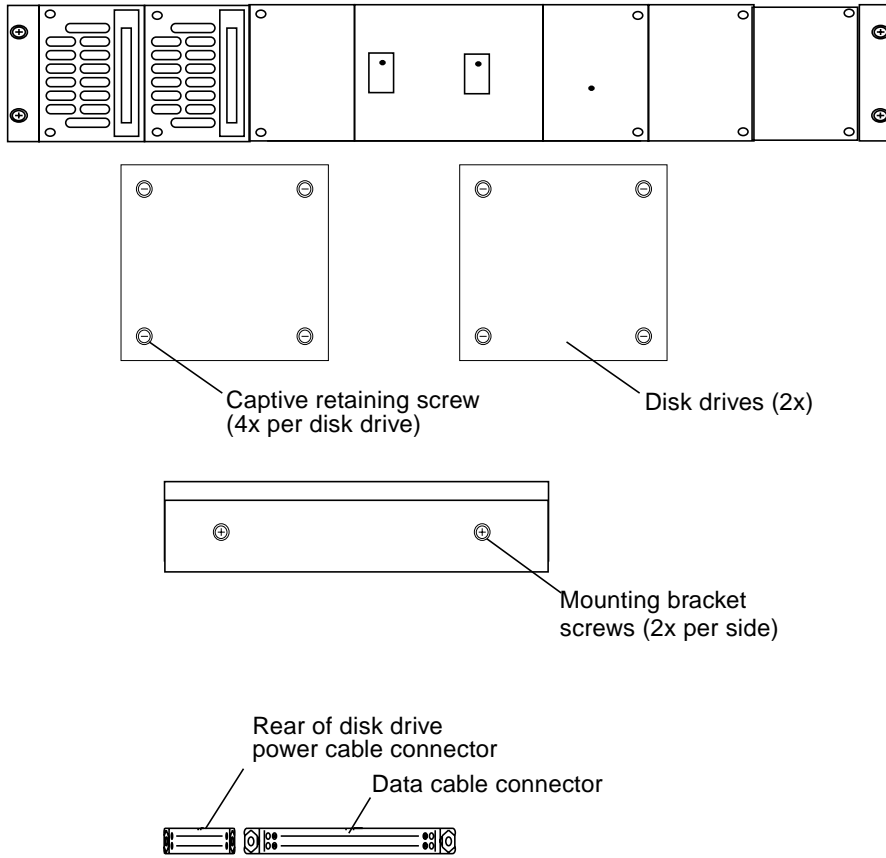
Captive retaining screw
(4x per disk drive)

Disk drives (2x)

Mounting bracket
screws (2x per side)

Rear of disk drive
power cable connector

Data cable connector

FIGURE 6-43 System Disk Drive

6.32.4 Run the System Disk Partition Recovery Software

The System Disk Partition (SPS) Recovery software uses the binary and data files on the remote subsystem to recover a failed Sun StorEdge A7000 system boot. The primary file system is the file system associated with the following disk partitions:

- `/dev/dsk/0s0`
- `/dev/dsk/0s5`
- `/dev/dsk/0s6`
- `/dev/dsk/0s7`

The alternate file system is the file system associated with the following disk partitions:

- `/dev/dsk/0se`
- `/dev/dsk/0s8`
- `/dev/dsk/0s9`
- `/dev/dsk/0sa`

The following files are on the SPS Recovery software distribution media:

- A bootable UMAX V operating system installed into the alternate file system
- `/etc/README.recover`
- `/etc/sps_recover.cf`
- `/etc/sps_edram`
- `/etc/init.d/sps_recover`

The `/etc/README.recover` also describes the SPS Recovery software operation in more detail.

The master recovery boot disk is already partitioned with a primary and an alternate file system set that is large enough to contain the original boot disk file systems. Partitioning includes the header partition used for maintaining the appropriate sysboot image and the diagnostics. A base release of the UMAX V operating system and the SPS Recovery software is preinstalled to the alternate file system. The local `nodename` and ethernet IP address is preconfigured as `nodename=recover` and `IP=63.1`.

When a subsystem system boot disk fails, a failover occurs and the other subsystem assumes the disk load for the failed subsystem. Because the SPS Recovery process must access the working subsystem to recover the software for the failed subsystem, recovery times vary depending on the system configuration. The best case time for this recovery to complete is 50 minutes. On a heavily loaded system, the recovery can take 12 hours or more.

6.32.4.1 Prerequisites

The SPS Recovery software depends on proper A7000 system software installation and configuration file management. Most of the recovered software is obtained from the remote subsystem alternate file system set to assure idle file systems during the copy.

- All software products and their patches must be symmetrically installed on each subsystem in the Sun StorEdge A7000 system

- After each software installation, you must use the `altpartmgr` utility to back up the primary file system set to the alternate file system set. The subsystem-specific configuration files are recovered from the remote primary file system `/usr/install/backup` directory. Each time the system configuration changes, use the `subsysbak` utility to back up the boot disk configuration files

---

Note – Chapter 7 describes the `subsysbak` utility. See also Section 6.10.1 "Back Up Files to the Subsystem and Shut Down" on page 6-28.

6.32.4.2 Recovering the Failed System Disk

The initial steps to recover a failed boot disk include:

- Replacing the failed boot disk with a recovery master boot disk
- Booting the failed subsystem from the alternate file system
- Running the `sps_recover` script to begin the recovery

1. **Replace the failed boot disk as described in this section.**

2. **Rawboot from the alternate root file system of the recovery disk to single user mode:**

```
ROM>> rawboot 0 0 6 0
```

The following message is displayed:

```
Manual boot (sysboot) from 0 0 6 0
Header Partition Image Rev 1.x.0 for OS: Umax V
UMAX V Boot Loader 4.15:  Fri Jun 27 01:52:18 EDT 1999
 .
 .
 .
```

3. **Enter the single user mode when prompted:**

```
ENTER RUN LEVEL (0-6,s or S): s

INIT: SINGLE USER MODE
#
```

4. **Run the SPS recovery script to recover the boot disk from the binary files and data backed up to the remote subsystem by typing:**

```
# /etc/init.d/sps_recover
```

All default parameters used for the recovery are presented for user confirmation. As recovery proceeds, messages are displayed about the progress of the recovery.

If sps_recover completes without errors and autoboot is enabled, a reboot from the GEMROM default boot device occurs automatically.

If sps_recover encounters errors during processing, it disables autoboot and shuts down the local subsystem. Check the /etc/sps_recover.log log file for more information. Once the problem is corrected, run sps_recover again.

Note – The subsysbak script used to back up subsystem-specific configuration files does not remove stale files. As a result, startup warning messages might appear for files under the /etc/raiddef directory that are no longer valid. These warnings do not indicate error conditions and the stale files should be removed.

---

5. **If sps_recover completes normally and autoboot is disabled, sps_recover starts the subsystem to the ROM prompt (ROM>>). Manually reboot from the recovered primary file system set by typing:**

```
ROM>> boot
```

After the recovered subsystem boots, you may check the log file by mounting the alternate file system and accessing it as /altroot/etc/sps_recover.log.

6. **Run on the recovered file systems and verify that no problems exist. When you are satisfied the recovery has been accomplished, back up the recovered primary file system set over the original SPS Recovery software in the alternate file system by typing:**

```
# /etc/init.d/altpartmgr -b
```

Operation

This chapter describes the System Console, power on and power off procedures, and Sun StorEdge A7000 operating procedures. Section 7.6 "Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)" on page 7-33 generally describes placing mainframe channels offline.

7.1　Accessing the System Console

The System Console is a microprocessor-based notebook computer that is located in a carrier tray. When the System Console is not in use, keep the tray closed. FIGURE 7-1 shows where the tray and System Console are located.

7.1.1　To Open the System Console Tray and Cover

1. **Turn the spring-loaded knob on the tray clockwise to release the tray.**

2. **Fold down the front door tray.**

3. **There is one screen latch on each side of the System Console, as shown in** FIGURE 7-2**. Slide the latches and lift the cover.**

Note – Some System Console models have screen latches on the front left and front right sides. Slide the left latch to the left, and the right latch to the right; lift the cover. Other models have one screen latch in the front; push the latch in and lift the cover.

7.1.2　To Close the System Console Tray and Cover

1. **Close the System Console cover by pushing it down until the latches engage.**

2. **Fold up the tray. When it is nearly closed, turn the tray latches clockwise, push the tray all the way up, and release the latches to secure the tray.**

Spring-loaded
tray latches

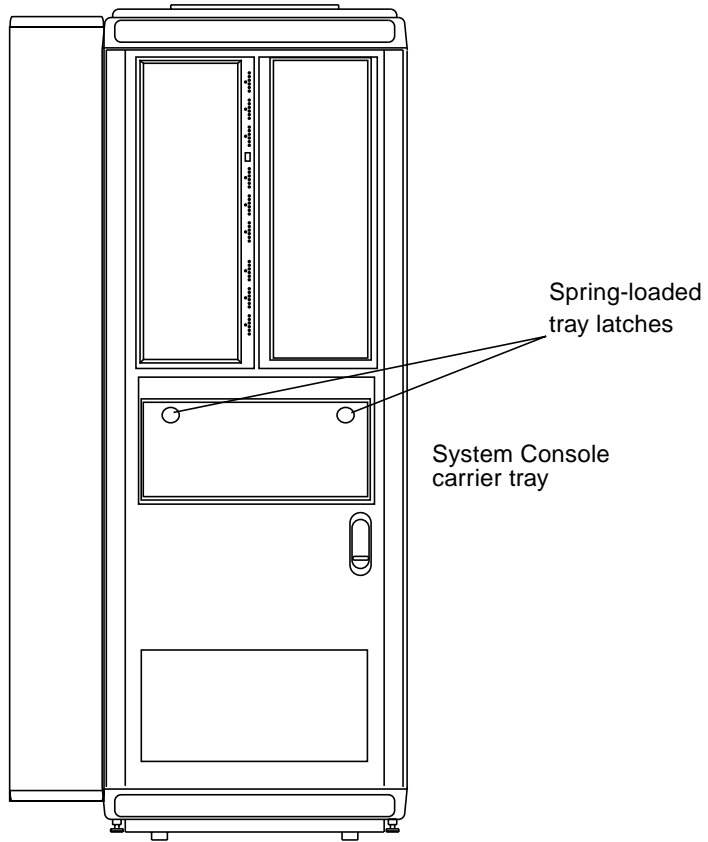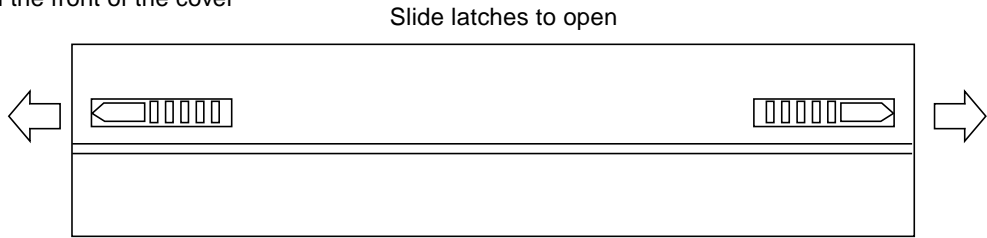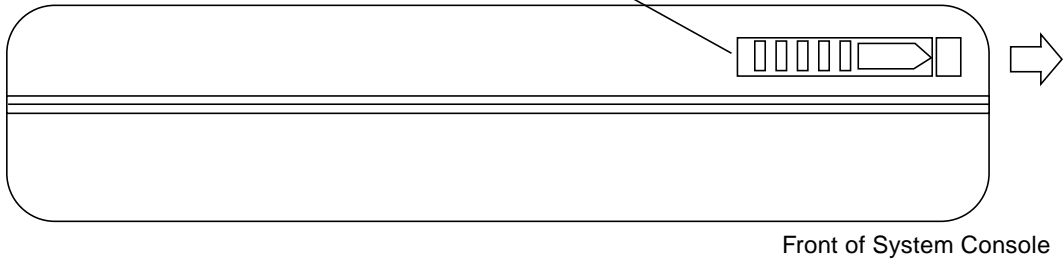System Console
carrier tray

FIGURE 7-1 System Console Tray Location

Some models have latches
on the front of the cover

Slide latches to open

Latch, left side
(matching latch on right side)

Slide latch to open

Front of System Console

Some models have one pushbutton latch
on the front of the cover

Push latch to open

Front of System Console
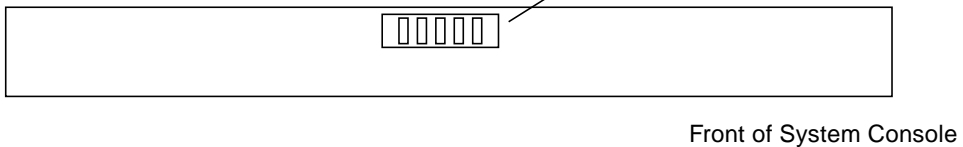
FIGURE 7-2   System Console Cover Latches

7.2 Navigating the System Console

Because the System Console uses a graphical user interface (GUI), you use the pointing device and two mouse buttons to navigate. See FIGURE 7-3. Refer to TABLE 7-1 for GUI terminology used in this Guide.

Note – Some System Console models have primary and secondary mouse buttons. This guide refers to the primary button as "left" and the secondary button as "right".

7.2.1 To Move the Mouse Pointer and Select Features

1. **Move the mouse pointer by placing your finger on the pointing device; the pointer moves as your finger moves.**

2. **Click the left or right buttons to select features, as directed in the text.**

TABLE 7-1   Graphical User Interface Terms

Verb	Action	Example
Choose	To open a menu or initiate a command.	Choose New from the File menu.
Click	To press and release a mouse button without moving the pointer.	Click the left mouse button on the OK button.
Double-click	To click a mouse button twice quickly without moving the pointer.	Double-click on the File Manager icon to re-open the program.
Drag	To move the pointer or an object by sliding the mouse with one button pressed.	Drag the Applications Menu Bar to the left corner of the screen.
Point	To move the mouse pointer to a specific location on the screen with no mouse buttons pressed.	Point to the Trash icon and click to select it.

TABLE 7-1 Graphical User Interface Terms *(Continued)*

Verb	Action	Example
Press	To push a mouse button down and continue to hold it.	Press the left mouse button on NVRAM.
Release	To let up on a mouse button to initiate an action.	Release the left mouse button when the Print button is highlighted.
Select	To highlight an entire window or data in a window.	Select the Applications Menu bar. Select the dsp1 window.

7.2.2 To Adjust Display Brightness and Contrast

Adjust the contrast/brightness using the control near the front edge of the case.

7.3 System Console Power-Saving Mode

When the System Console is on but idle for one minute, the display goes blank. A blank display indicates that the System Console is in the power-saving mode. To reactivate the System Console and display, press any key.
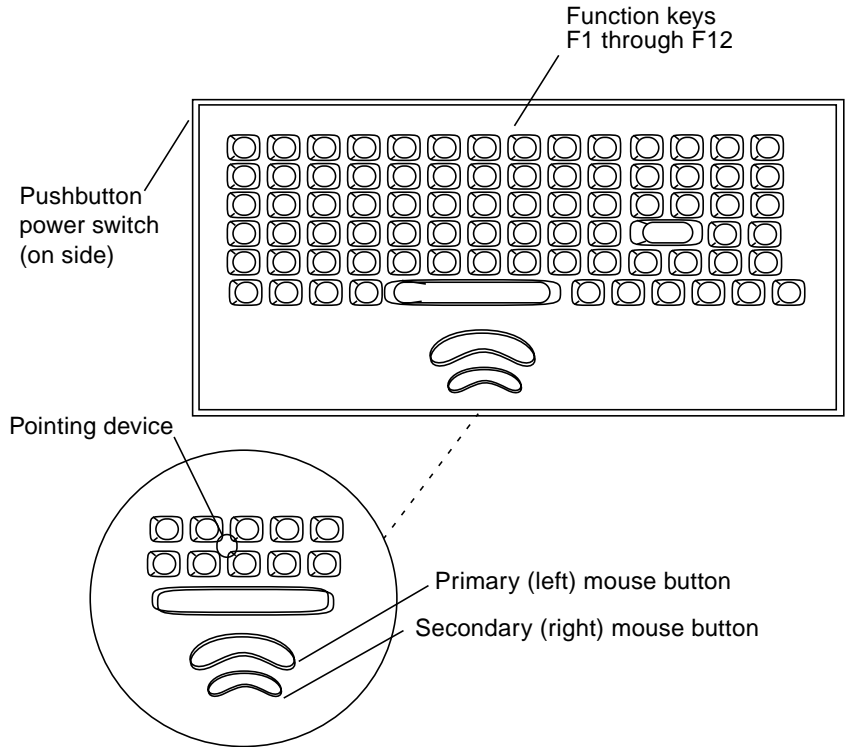
FIGURE 7-3   System Console Keyboard with Pointing Device

7.4   Powering On the Sun StorEdge A7000

The power on procedure includes the following steps:

1. **Powering on the power conditioning unit (PCU).**

2. **Opening the front cabinet door.**

3. **Powering on the cabinet power supply.**

4. **Powering on the System Console.**

5. **Opening windows into each Sun StorEdge A7000 subsystem.**

6. **Powering on the subsystems.**

7. **Powering on the HDSA power supplies.**

8. **Starting the subsystem operating system**

9. **Starting optional software.**

7.4.1   To Power on the Power Conditioning Unit (PCU)

1. **Turn the customer-supplied AC power ON at the source main breaker.**

2. **At the front of the PCU, turn the key switch inside the front panel to AUTO. To open the panel, pull it down at the notches. See** FIGURE 7-4.

3. **At the rear of the PCU, put the circuit breaker in the ON position.**

7.4.2   To Open the Front Cabinet Door

The front cabinet door is located at the lower half of the cabinet (the upper half holds the HDSA drawers). The front door also contains the System Console in its tray carrier. See FIGURE 7-5. To open the front cabinet door:

1. **Insert a flat-blade screwdriver in the door lock and turn it clockwise.**

2. **Pull the bottom of the latch out (toward you) and turn the latch assembly counterclockwise.**

3. **Pull the latch to open the door. The door must be open to perform the power on procedures.**

Front panel door notches

OFF

BYPASS   AUTO

Keyswitch

On

Off

Older PCU models
have the two-pole
circuit breaker

On

Off
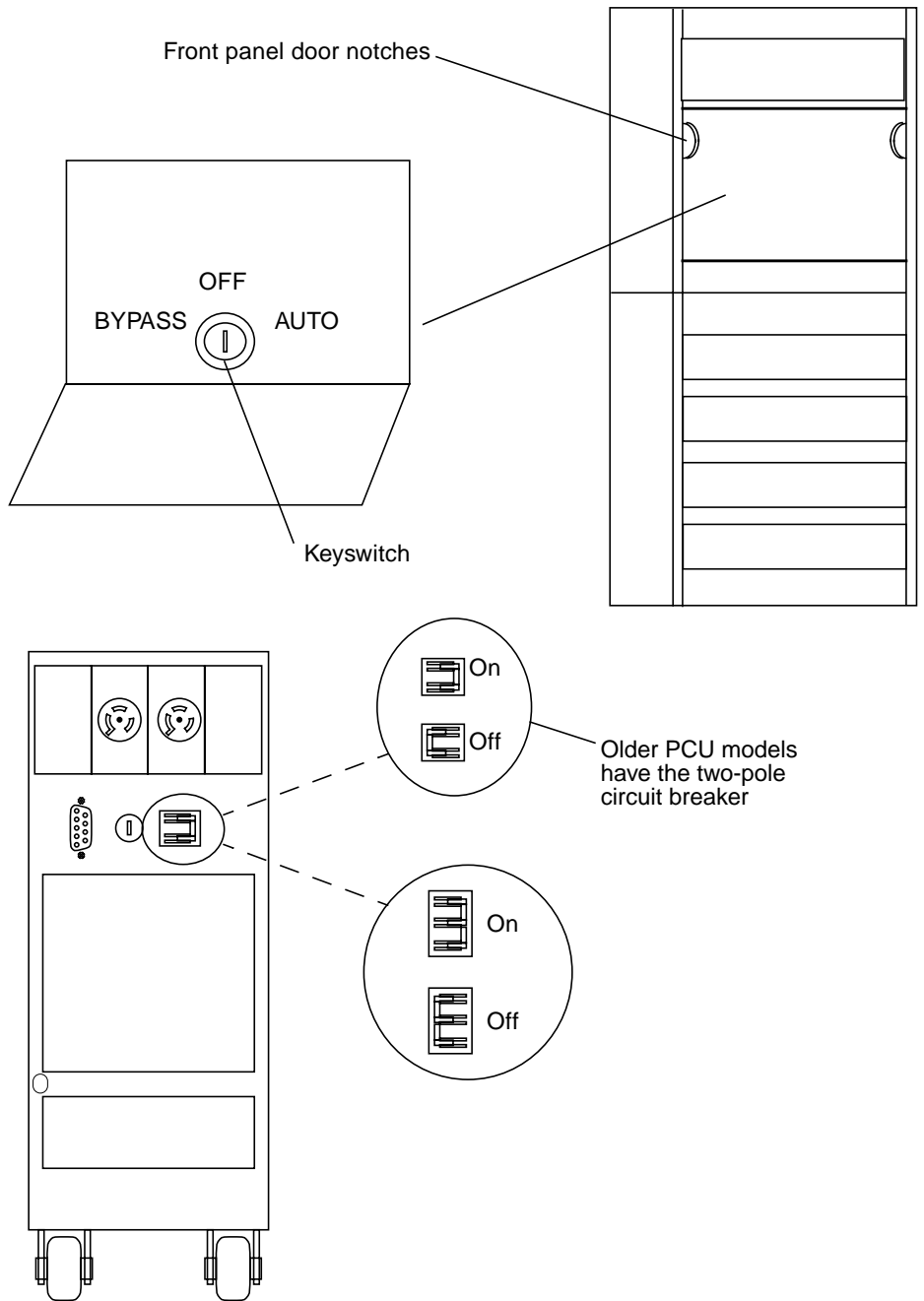
FIGURE 7-4 PCU Keyswitch and Circuit Breaker

Spring-loaded
tray latches

System Console
carrier tray

Locked   Unlocked

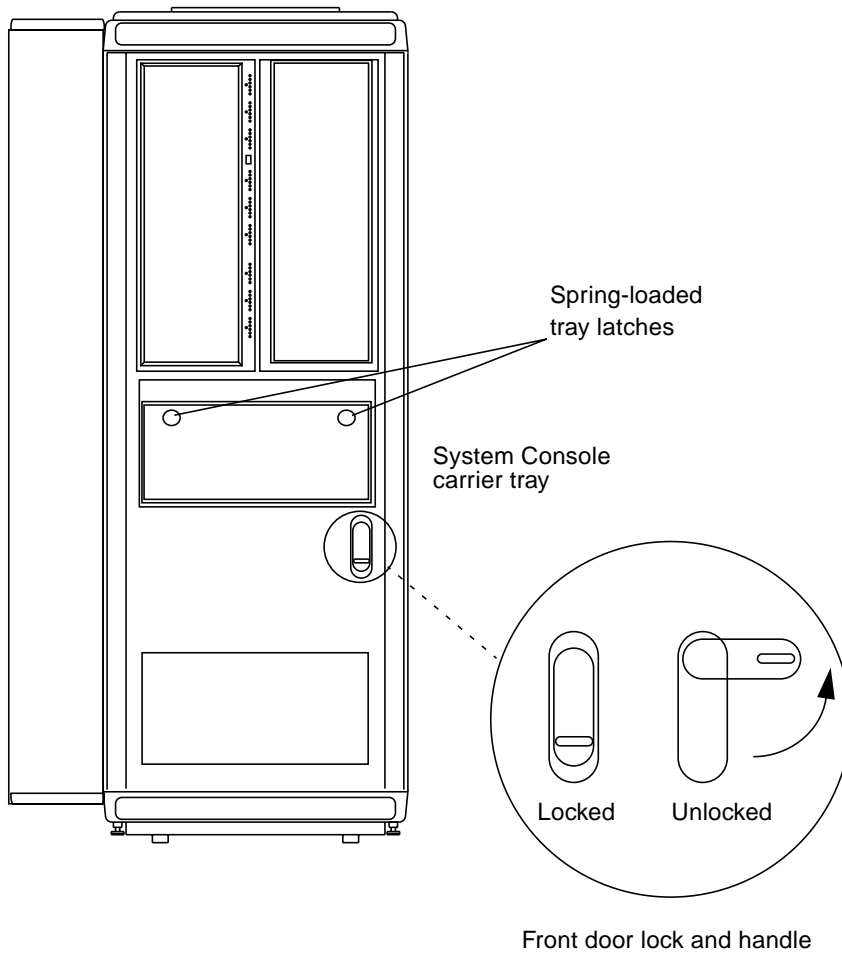Front door lock and handle

FIGURE 7-5   Cabinet Front Door Lock and Tray Latches

7.4.3 To Power On the Cabinet Power Supply

Power on both cabinet power supplies; these supplies provide power to the blowers at the bottom of the cabinet and the System Console transformer (located in the carrier tray). To power on the cabinet power supplies:

1. **At the left AC distribution box, throw the main circuit breaker switch CB1 to the right (**ON**). See** FIGURE 7-6.

2. **Press the cabinet power switch to turn on power to the cabinet.**

3. **Repeat the above steps for the right AC distribution box.**

4. **Listen for the blower fans; this indicates power has been applied to the cabinet.**

7.4.3.1 To Check the AC Relay Switch

These steps verify that the AC relay switch is operating.

5. **Perform steps 2 and 3 for both AC boxes.**

6. **At the AC box you first powered on (for dsp1), throw the main circuit breaker switch CB1 to the left (**OFF**) and verify that all three blower fans continue to operate.**

7. **Throw switch CB1 to the right (**ON**). Verify that power is restored by seeing that the switch lights.**

8. **At the AC box for dsp2, throw switch CB1 to the left (**OFF**) and verify that all three blower fans continue to operate.**

9. **Throw switch CB1 to the right (**ON**). Verify that power is restored by seeing that the switch lights.**

7.4.3.2 To Check Any Other Switches

10. **Power on the LAD/SCSI Expander. See** FIGURE 7-7 **for switch location.**

11. **Open the I/O Bay cabinet doors. Just above the right power cord are two switches labeled DSP1 and DSP2. Press the top of the switch to throw these to** ON**. See** FIGURE 7-8**. These supply power to the dual DC supplies for each subsystem. The LED in each switch will light.**

HDSA drawer
open/close switches

HDSA power supply
on/off switch

DSP1 power supply
on/off switch

HDSA power supply
on/off switch

DSP2 power supply
on/off switch

Sun StorEdge A7000 dual power
main cabinet power
and AC distribution boxes (2);
see detail below

Main circuit breaker
(CB1)

Power reset
circuit breaker (CB2)

Cabinet power
on/off switch
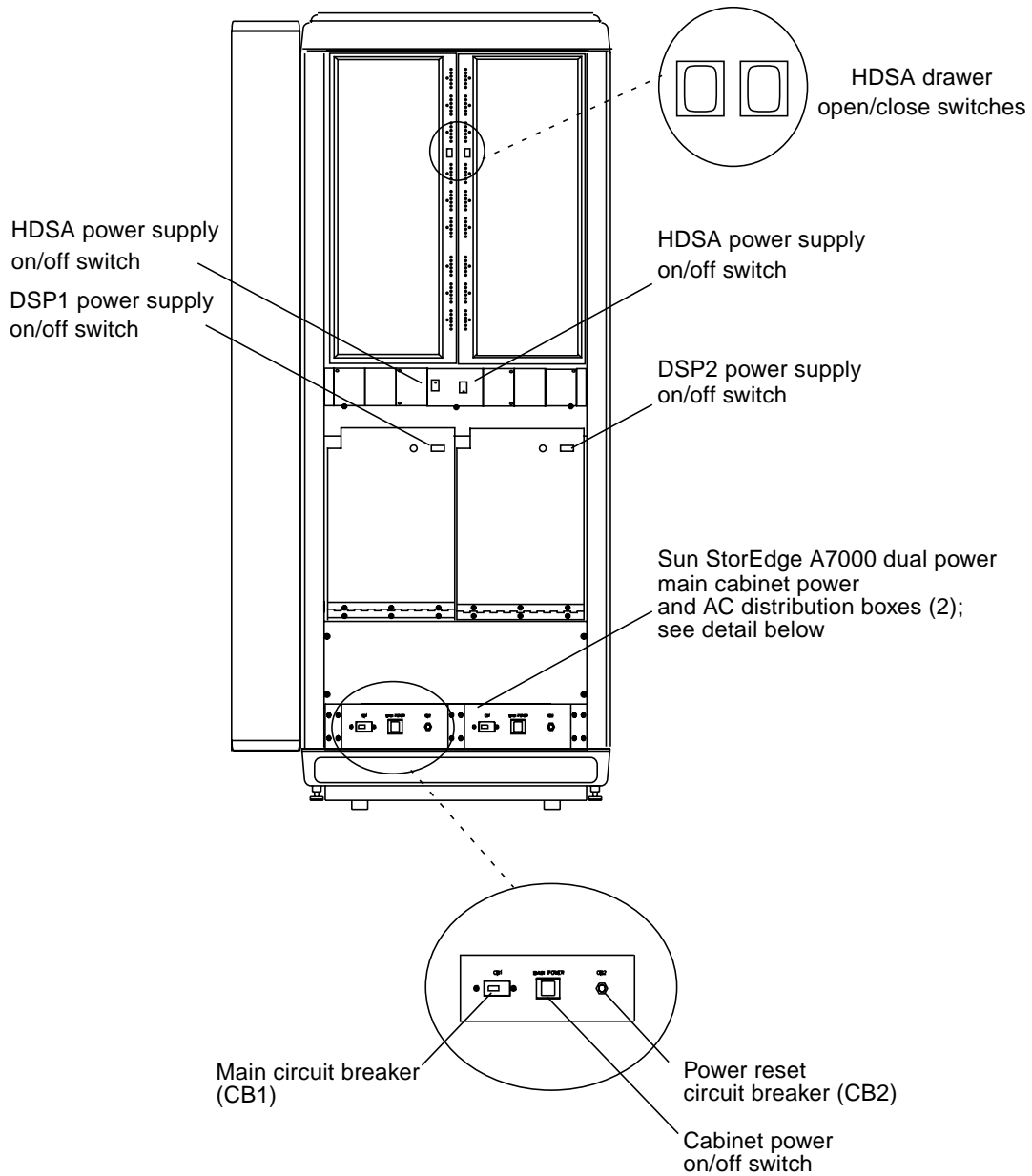
FIGURE 7-6   View of Cabinet Front; Power Switches
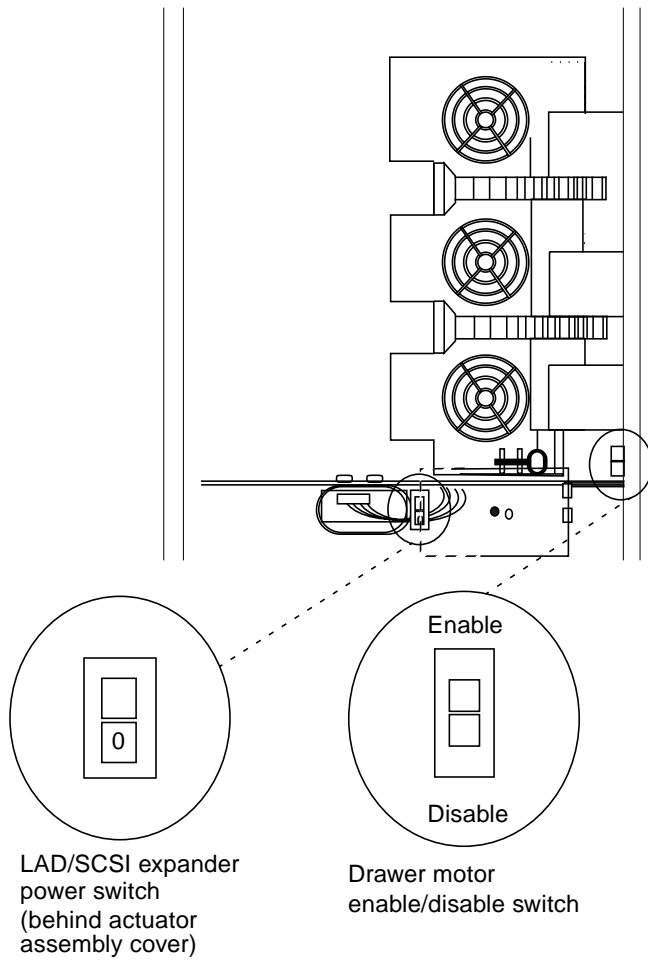
LAD/SCSI expander
power switch
(behind actuator
assembly cover)

Enable

Disable

Drawer motor
enable/disable switch

FIGURE 7-7   LAD⁄SCSI Expander Power Switch Location

I/O bay cabinet

Press the top of each switch
to turn on power to the
subsystem power supplies
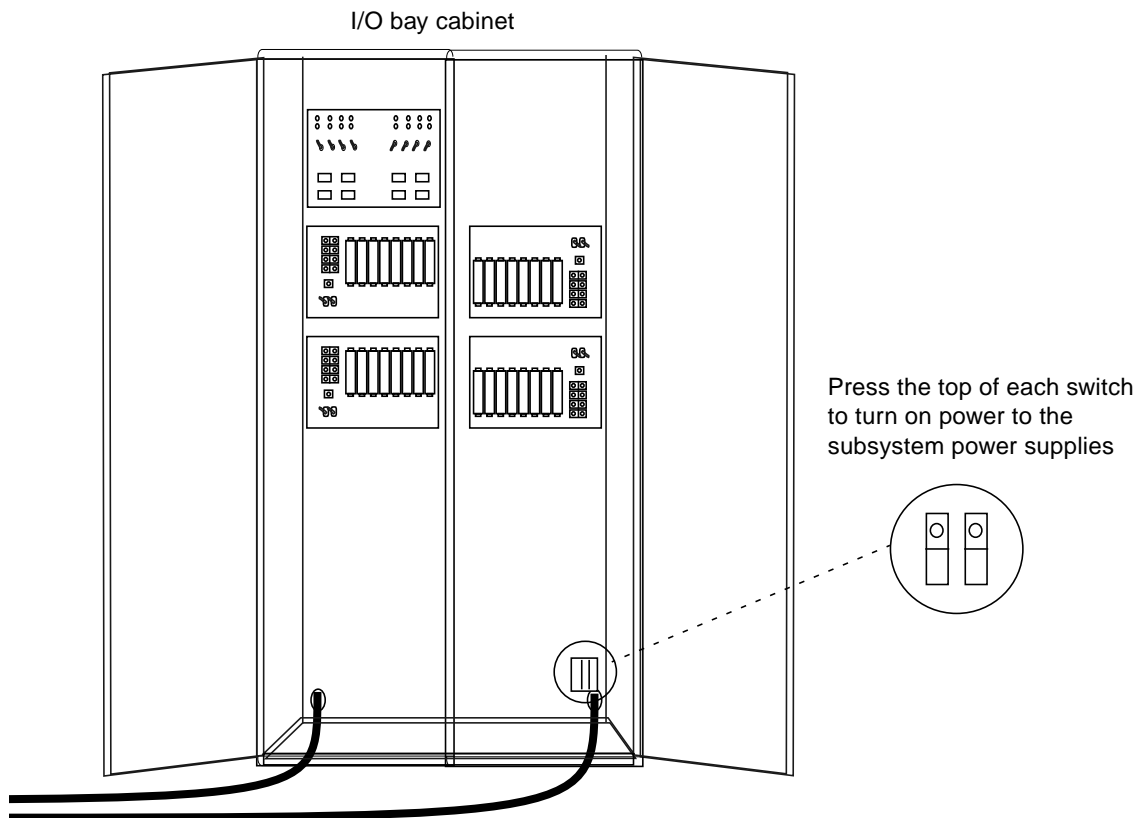
FIGURE 7-8 AC Box Power Switches

7.4.4 Before You Power On the AMS System Console

This section describes precautions for the older gray AMS brand System Console.

⚠ **Caution –** When the Sun StorEdge A7000 cabinet is first powered on, the AMS System Console power supply battery charging indicator LED may be lighted.

DO NOT POWER ON THE AMS SYSTEM CONSOLE IF THIS LED IS ON!

Refer Section 7.4.4.1 "To Turn Off the AMS System Console Power Supply LED" on page 7-15 for procedures to turn off the LED.

7.4.4.1   To Turn Off the AMS System Console Power Supply LED

> **Note –** If the AMS System Console power supply LED is off, skip this step.

Before you power on the AMS System Console, this orange LED must be OFF. To turn it off:

1. **Slide the battery cover to the left (see** FIGURE 7-9**).**

2. **Pull the battery out and then push it back in.**

3. **Slide the battery cover to the right, closing it.**

4. **When the orange LED is off, power on the AMS System Console as described in "To Power On the System Console" on page 16.**

5. **If the orange LED remains on, let the battery charge before powering the AMS System Console on.**

> **Note –** Once the AMS System Console is powered on and operating, the battery charging LED may light occasionally; this means the battery is charging and does not interfere with AMS System Console operation.

System Console power supply mounted in the carrier tray

Battery charging indicator LED

Front of AMS System Console

Battery cover   Battery
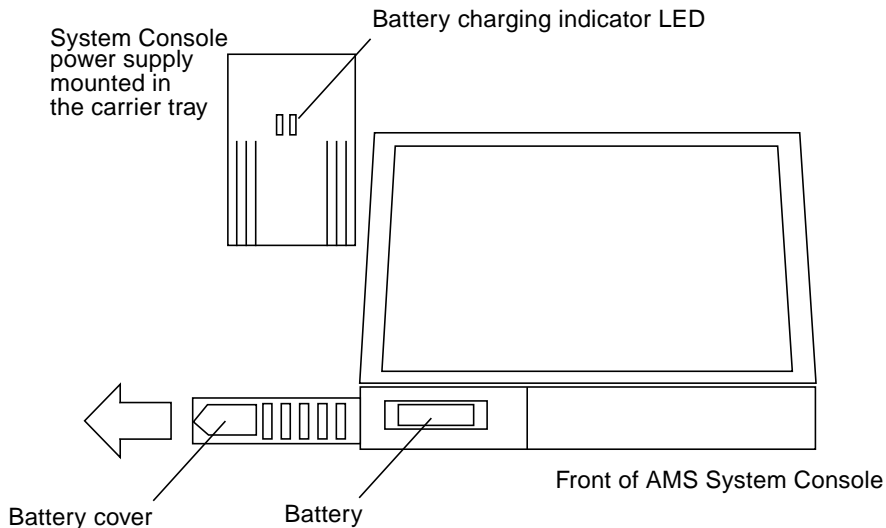
FIGURE 7-9   AMS System Console Battery and Battery Status LED

7.4.5 To Power On the System Console

The System Console is mounted in a carrier tray in the front door. To open the tray and the System Console cover, and power on the System Console:

1. **Close (but do not lock or secure) the cabinet door for this step; keep the door ajar.**

2. **Turn the spring-loaded knobs on the tray clockwise to release the tray. See** FIGURE 7-10**.**

3. **Fold down the front door tray.**

4. **Make sure the cabinet is powered on. Make sure the System Console power supply power LED is on; this power supply is located to the left of the System Console (**FIGURE 7-9**). Make sure that the power LED of the Serial Communications Subsystem (inside the cabinet rear door) is blinking. See** FIGURE 7-11**.**

Spring-loaded
tray latches

System Console
carrier tray

FIGURE 7-10 System Console Tray Location

FIGURE 7-11 Serial Communications Subsystem Power Supply LED

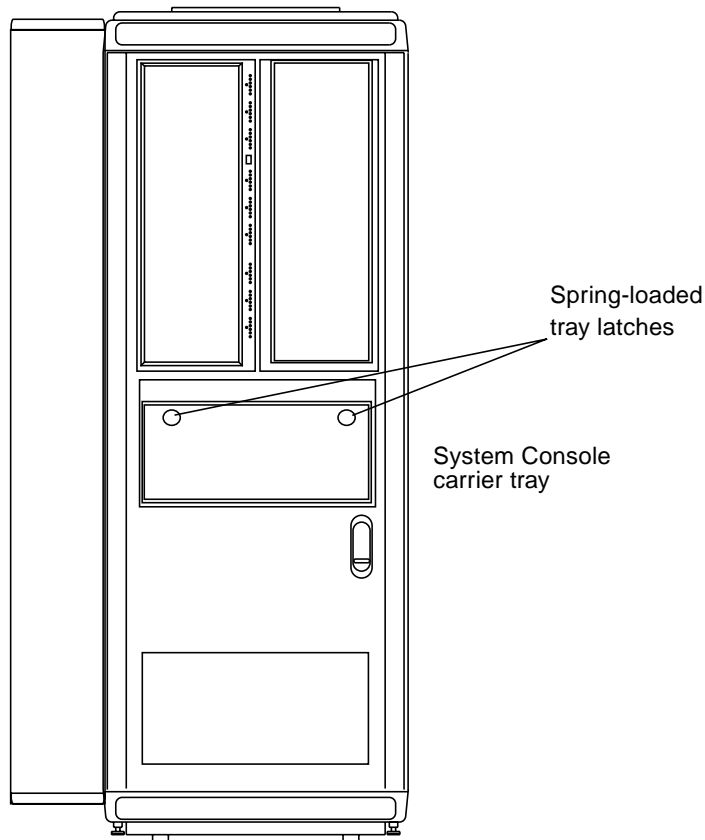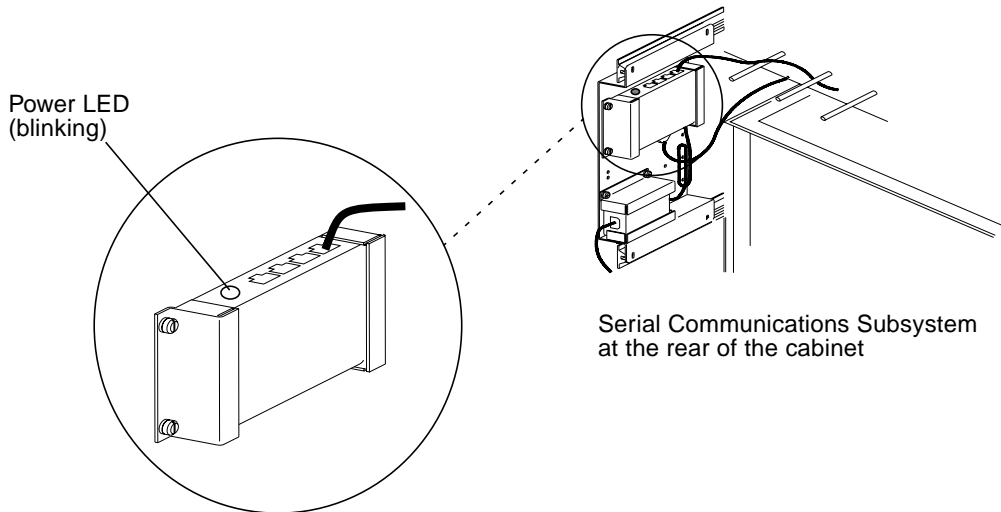5. **One screen latch is on each side of the System Console, as shown in** FIGURE 7-2**. Slide the latches forward and lift the cover.**

Note – Some System Console models have screen latches on the front, on the left and right sides. Slide the left latch to the left, and the right latch to the right; lift the cover. Other models have one screen latch in the front; push the latch in and lift the cover

---

6. **Power on the System Console; its power switch is shown in** FIGURE 7-3**. Also note the location of the pointing device and left mouse button you will be using in the next steps.**

7. **Remove any protective plastic from the System Console display.**

8. **Watch the startup process (boot) messages for any warnings or failures.**

9. **The System Console operating system and environment boots automatically. Subsystem windows open automatically; make sure one window opens for each subsystem. The subsystem windows will be titled dsp1 and dsp2.**

When the System Console is powered on and the graphical user interface appears, a mouse pointer and the System Console Application Menu Bar (FIGURE 7-12) appear on the System Console display.
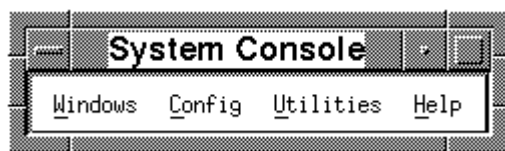
FIGURE 7-12 System Console Application Menu Bar

7.4.6 To Open Windows Into Subsystems

Note – The System Console is factory-configured so that subsystem windows open upon completion of System Console power on. Use the following procedures if windows are not open after power on.

The Sun StorEdge A7000 has two subsystems named dsp1 and dsp2. When powered on, each subsystem sends initialization and powerup messages to the System Console; you must open windows to see these messages.

To open windows corresponding to the two Sun StorEdge A7000 subsystems:

1. **Use the pointing device and move the mouse pointer to** Windows **at the Menu Bar.**

Note – On the System Console with the pointing device, move the pointer by putting your finger on the trackpad or pointing device; the pointer moves as your finger moves.

2. **Press the left mouse button. A menu appears.**

3. **Drag the mouse pointer to dsp1. This is the Sun StorEdge A7000 subsystem 1.**

4. **Release the mouse button. Window dsp1 appears and shows any communication occurring through the processor board's serial port 0.**

5. **Repeat steps 1 to 4 for dsp2.**

An alternate method to open these two windows is as follows:

1. **Move the mouse pointer to Windows at the Menu Bar.**

2. **Press the Alt-W keys. A menu appears.**

3. **Using the Down arrow key, move the mouse pointer to dsp1. This is the Sun StorEdge A7000 subsystem 1.**

4. **Press the Enter key. Window dsp1 appears and shows any communication occurring through the Processor board's serial port 0.**

5. **Repeat steps 1 to 4 for dsp2.**

7.4.7 To Power On the Subsystems

FIGURE 7-13 shows the subsystem power supply on/off switches. These slide switches move left to right to show a 1 (on) or right to left to show a 0 (off). As shown in FIGURE 7-13, the Sun StorEdge A7000 has two subsystems, dsp1 and dsp2, with a power supply switch for each.

1. **Open the front cabinet door.**

2. **Slide the subsystem power supply on/off switches to the right.**

3. **Close the door partially and go to the System Console. CPU startup messages start to appear in each subsystem window, and finish by displaying the prompt:**

```
ROM >>
```

4. **Put the cursor in the subsystem window. The mouse pointer turns into a cursor (|). Click the left mouse button to select the window. The window border changes color.**

5. **Reset the subsystem:**

```
ROM >> reset node
```

6. **Repeat steps 4 and 5 for all subsystems.**

Press 1 to turn on
left HDSA power supplies

Press 1 to turn on
right HDSA power supplies
(dual HDSA drawer models only)

DSP1   DSP2

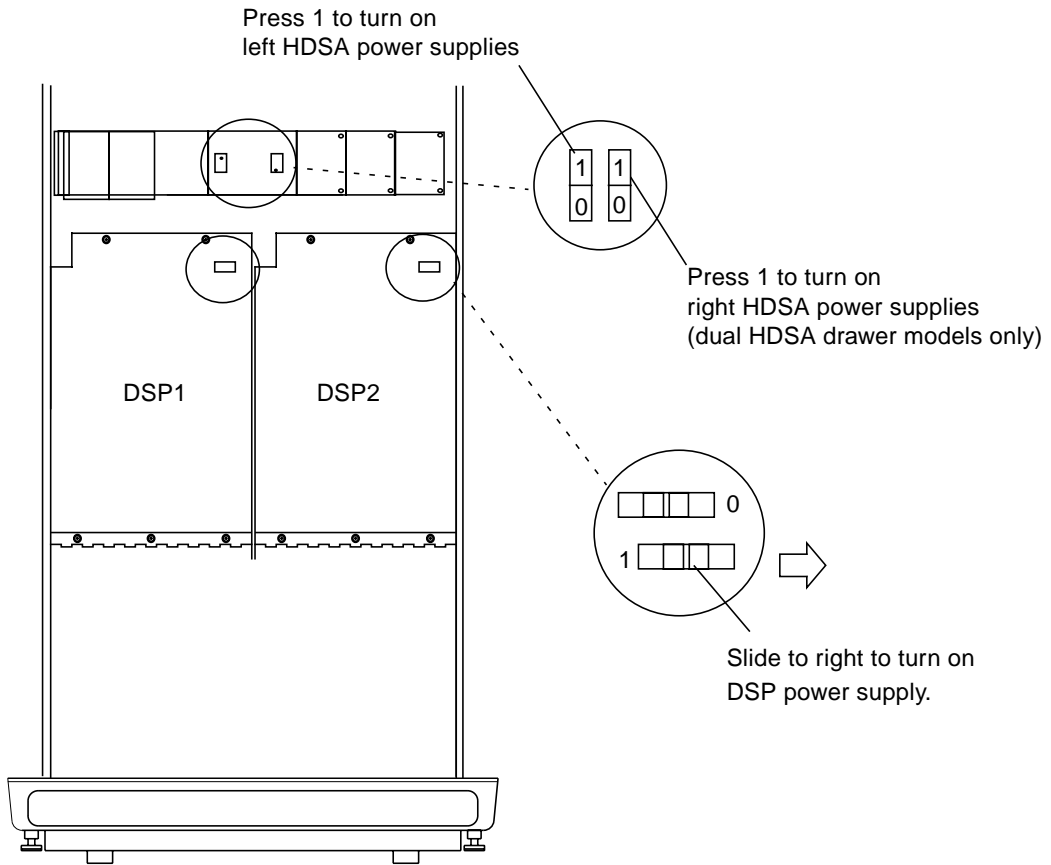Slide to right to turn on
DSP power supply.

FIGURE 7-13 HDSA and Subsystem Power Supply On/Off Switches

7.4.8   To Power On the HDSA Power Supplies

In the middle of the cabinet front just under the HDSA drawer(s) are the HDSA power supply switches (see FIGURE 7-13). These snap switches are labelled with a 0 and 1. The 0 position is off and the 1 position is on.

1. **Open the cabinet door completely.**

2. **Place one HDSA on/off switch in the 1 position.**

3. **Dual HDSA drawer models only: Place the right HDSA power supply switch in the 1 position.**

7.4.9   To Start the Subsystem Operating System Software

1. **Close the door partially and go to the System Console.**

2. **Put the cursor in window dsp1.**

3. **At the ROM >> prompt, type the following boldfaced words:**

```
ROM >> boot
```

4. **Startup messages appear, similar to the example messages in CODE EXAMPLE 7-1.**

5. **When the following message appears, you can start subsystem dsp2:**

```
The system is ready.
Console Login:
```

6. **Put the cursor in window dsp2.**

7. **At the ROM >> prompt, type the following boldfaced words:**

```
ROM >> boot
```

8. **Startup messages appear, similar to the example messages in CODE EXAMPLE 7-1.**

9. **When the following message appears, powerup is complete:**

```
The system is ready.
Console Login:
```

10. **You can now log into the subsystems. Keep the cursor in window dsp2.**

11. **Log in to dsp2 as the root user. In response to the** `Password:` **prompt, press the Return key or enter the site password:**

```
Console Login: root
Password:
```

12. **Repeat Step 11 for dsp1, putting the cursor in the dsp1 window.**

CODE EXAMPLE 7-1   Sun StorEdge A7000 Startup Message

```
ROM >>boot
Auto boot (sysboot.110) from 00 6 0
HeaderPartition ImageRev 1.8.0 for OS: Umax V
Loading COFF file from root image at 0 0 6 0 0 /unix
.
.
.
Starting CPU #1
Starting CPU #3
Starting CPU #2
NOTICE: Initializing 10 private buffers for CFS
NOTICE: SystemV NFS Release 3.2/V3
Copyright 1986,1987,1988 Lachman Associates, Inc. (LAI). All
Rights Reserved.
NOTICE: Attempting root mount on S51K FS
NOTICE: Attempting root mount on BSD FS
NOTICE: root mount successful
NOTICE: mvme328: Ctlr 0, ID 4220, Product 091 - 4, Firmware Rev
D01 - 08211996
NOTICE: STE Ctlr 0 Shio B800 FW Rev D04 Driver2.0.0U1.2 QUAD
Int Lvl 5 VectD0, SCSI IDs Ch0[0] Ch1[0] Ch2[0] Ch3[0]
NOTICE: Board0: eccmcs0: Clearing Memory..
.
.
.
maproot: Checking bootdevice entries /dev/[r]dsk/bb[0-f]
Bootdevice Check Complete.
The system is coming up. Please wait.
mem Startup ...
.
.
.
NOTICE: STE Ctlr 0 Shio B800 FW Rev D04 Driver2.0.0U1.2 QUAD
Int Lvl 5 VectD0, SCSI IDs Ch0[0] Ch1[0] Ch2[0] Ch3[0]
NOTICE: SCSI Target Mode Ctrl 0 Initialized
NOTICE: STE:started24 TMD's
SCSI Target Emulation Startup Complete
.
.
.
The system is ready.
Console Login:
```

7.4.10   To Start the DataShare Facilities (Optional)

1. **Start the DataShare™ Facilities on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# dsf start
```

2. **Repeat for dsp2.**

7.4.11   To Start the Simulation Software (Optional)

1. **Start the simulation on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# ckdadmin start
```

2. **Repeat for dsp2.**

7.4.12   To Start the SCSI Target Emulation Software (Optional)

1. **Start the simulation on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# ste start
```

2. **Repeat for dsp2.**

7.4.13 To Configure the Operating System Software for RDC

Perform the steps in Chapter 5 if your Sun StorEdge A7000 server includes Remote Dual Copy (RDC) Fiber Optic REFLECTIVE MEMORY (FORM) hardware and this is the first time you have powered on the Sun StorEdge A7000.

Sun StorEdge A7000 servers running operating system software version 3.6.4 and later compatible versions require that you configure this software to accept RDC. As shipped, these servers have the RDC software capability turned off.

7.4.14 Close the Front Cabinet Door and Fold Up the Carrier Tray

See FIGURE 7-5.

1. **Close the door firmly, but gently.**

2. **Grab the latch and turn it clockwise so that it points straight down. It will "catch" or engage.**

3. **Push the bottom of the latch in until it is flush with the rest of the latch assembly.**

4. **Close the System Console cover by pushing it down until the latches engage.**

5. **Fold up the tray. When it is nearly closed, turn the tray latches clockwise, push the tray all the way up, and release the latches to secure the tray.**

7.5 Powering Off the Sun StorEdge A7000

The power off procedure includes the following steps:

1. **Opening the System Console carrier tray and System Console cover.**

2. **Stopping the DataShare, simulation, and SCSI target software (optional).**

3. **Selecting shutdown from the System Console Application Menu Bar to shut down the subsystems. (Optional) If the autoboot feature is enabled, then abort the subsystem restart.**

4. **Shutting down the System Console.**

5. **Powering off the System Console.**

6. **Opening the front cabinet door.**

7. **Powering off the dsp2 subsystem power supply and the dsp1 subsystem power supply.**

8. **Powering off the HDSA supplies.**

9. **Powering off the cabinet power supply.**

10. **Closing the cabinet door.**

7.5.1 To Open the System Console Carrier Tray and Cover

To open the tray holding the System Console and the System Console cover:

1. **Turn the spring-loaded knobs on the tray clockwise to release the tray. See** FIGURE 7-10**.**

2. **Fold down the front door tray.**

3. **One screen latch is on each side of the System Console, as shown in** FIGURE 7-2**. Slide the latches forward and lift the cover.**

   Some System Console models have screen latches on the front left and front right sides. Slide the left latch to the left, and the right latch to the right; lift the cover.

4. **The System Console display may be blank; press any key to reactivate the display.**

> **Note –** If windows for all subsystems are not currently open, open them and then log into the subsystems as described in this chapter.

7.5.2   To Stop the DataShare Facilities (Optional)

1. **Stop the DataShare Facilities on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# dsf stop
```

2. **Repeat for dsp2.**

7.5.3   To Stop the SCSI Target Emulation Software (Optional)

1. **Stop the simulation on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# ste stop
```

2. **Repeat for dsp2.**

7.5.4   To Stop the Simulation Software (Optional)

1. **Move the mouse pointer to window dsp1 and then type:**

```
dsp1# ckdadmin stop_noswitch
```

Messages display indicating that the simulation is stopping. When the procedure stops, perform the next step.

2. **Repeat for dsp2.**

7.5.5 To Shut Down All Subsystems

1. **From the System Console Application Menu Bar, choose Utilities→shutdown.**

   The shutdown window is displayed. See FIGURE 7-14.

2. **Select all nodes.**

3. **Type Y at the Ready To Shutdown Now? prompt in the dsp1/dsp2 windows to immediately shut down.**

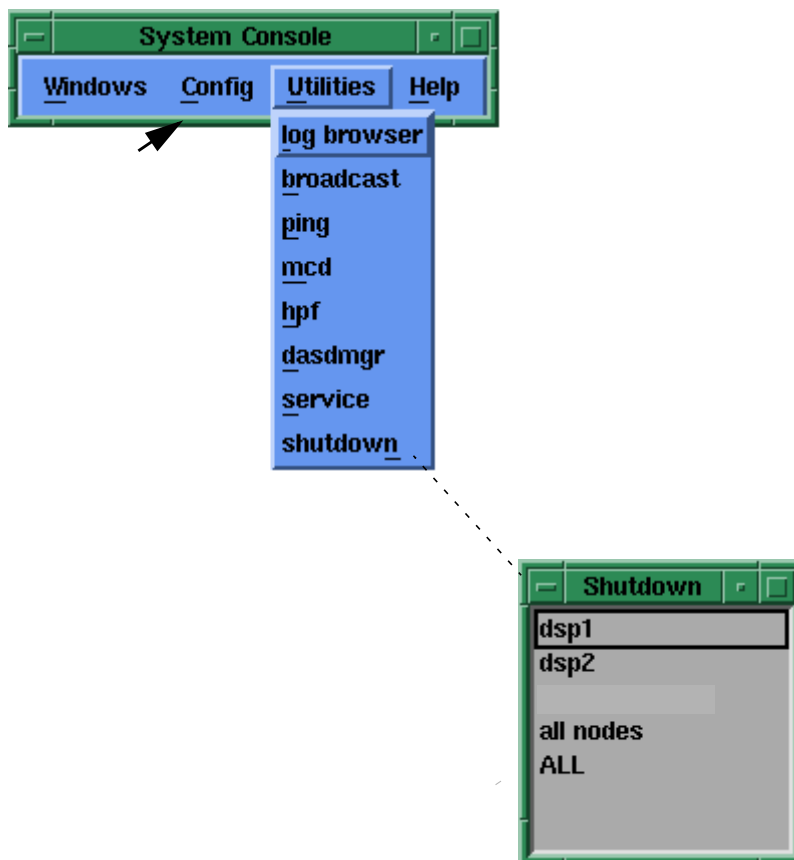   The dsp1 window displays a series of shutdown messages followed by a "The System is down" type message.

FIGURE 7-14 Shutdown Pulldown Menu and Window

7.5.6 To Abort the System Reboot (Optional)

If the autoboot feature is enabled, the subsystems attempt to reboot and startup messages start to appear.

1. **When you see the following message in the dsp1 window, press any key before 7 seconds elapse:**

```
You have 7 seconds to terminate the autoboot sequence . . .
```

If the system is not set to automatically boot, go to the next step.

2. **The following prompt appears:**

```
ROM >>
```

3. **The dsp1 window displays a series of shutdown messages followed by a "The System is down" type message.**

4. **When you see the following message in the dsp2 window, press any key before 33 seconds elapse:**

```
You have 33 seconds to terminate the autoboot sequence . . .
```

If the system is not set to automatically boot, go to the next step.

5. **The following prompt appears:**

```
ROM >>
```

The operating systems for all subsystems are now shut down.

7.5.7   To Shut Down the System Console

1. **Put the mouse pointer in any open area on the display.**

2. **Press the left mouse button.**

   A menu appears.

3. **Drag the mouse pointer to EXIT MWM or LOGOUT. Release the left mouse button.**

4. **Drag the mouse to the OK pushbutton on the dialog box; click Yes.**

   The display goes blank momentarily, and then the `Console Login:` prompt reappears.

   Note – The System Console may appear frozen after clicking Yes above; if this occurs, press Alt-PrtScr-h and type the command in Step 7. After the "Press any key to continue" message, power off the System Console.

   ---

5. **Log in to the System Console:**

   ```
   Console Login: root
   ```

6. **The system responds with a** `Password:` **prompt. Press the Enter key. The system prompt (#) appears.**

7. **Type:**

   ```
   dsp1# /etc/shutdown -y -g0 -i0
   ```

   The System Console displays a series of shutdown messages followed by a `Shutdown complete` type message.

7.5.8   To Power Off the System Console

1. **Push or slide the power switch.**

2. **Close the System Console cover by pushing it down until the latches engage.**

3. **Fold up the tray. When it is nearly closed, turn the tray latches clockwise, push the tray all the way up, and release the latches to secure the tray.**

7.5.9　To Open the Front Cabinet Door

The front cabinet door is located at the lower half of the system cabinet. The front door also contains the System Console in its tray carrier. See FIGURE 7-5. To open the front cabinet door:

1. **Insert a flat blade screwdriver in the door lock and turn it clockwise.**

2. **Pull the bottom of the latch out toward you and turn the latch assembly counterclockwise.**

3. **Pull the latch to open the door. The door must be open to perform the power off procedures.**

7.5.10　To Power Off the Subsystems

All subsystems can now be powered off.

1. **The dsp2 subsystem is the right subsystem. Slide the power supply on/off switch to the left as shown in** FIGURE 7-13**.**

2. **The dsp1 subsystem is the left subsystem. Slide the power supply on/off switch to the left. Slide the switch to the left.**

7.5.11　To Check Other Switches

1. **Power off the LAD/SCSI Expander. See** FIGURE 7-7 **for switch location.**

2. **Open the I/O Bay cabinet doors. Just above the right power cord are two switches labeled DSP1 and DSP2. Press the top of the switch to set them to OFF. See** FIGURE 7-8**.**

7.5.12　To Power Off the HDSA Supplies

In the middle of the cabinet front just under the HDSA drawer(s) are the HDSA power supply switches (see FIGURE 7-13). These snap switches are labelled 0 and 1. The 0 position is off and the 1 position is on.

1. **Open the cabinet door completely.**

2. **Place one HDSA on/off switch in the** 0 **position.**

3. **Place the other HDSA on/off switch in the** 0 **position.**

7.5.13   To Power Off the Cabinet Power Supply

1. **Press the cabinet power switch to turn off power to the cabinet (see** FIGURE 7-6**).**

2. **Throw the main circuit breaker switch CB1 switch to the left (OFF).**

3. **Repeat these steps for both AC boxes.**

7.5.14   To Close the Front Cabinet Door

Now that you have powered the Sun StorEdge A7000 off, you can close the front cabinet door and fold up the System Console carrier tray. See FIGURE 7-5:

1. **Close the door firmly but gently.**

2. **Grab the latch and turn it clockwise so that it points straight down. It will "catch" or engage.**

3. **Push the bottom of the latch in, until it is flush with the rest of the latch assembly.**

7.6 Shutting Down and Restarting One Subsystem Only (Controlled Failover, Mainframe Connect)

Note – This section applies to mainframe-connected Sun StorEdge A7000 servers only. For Sun StorEdge A7000 servers connected to an open system host computer: unmount the open system host's file systems, if the file systems reside on the failed component's subsystem

---

Occasionally, you may need to shut down one subsystem while the Sun StorEdge A7000 is still in use. This technique is called *controlled failover*, because it involves manually putting (or *varying*) channels serviced by the subsystem offline, from the mainframe side. During controlled failover, one Sun StorEdge A7000 subsystem is handling all channel communications.

When one subsystem is handling all channel traffic (that is, failed over), the cache operates in writethrough mode to protect user data.

In the following example, subsystem dsp1 is failed-over to subsystem dsp2.

The controlled failover and restart includes these steps:

1. **Log onto the subsystem dsp1 as root, through the System Console subsystem window. If the subsystem windows are not open, open them according to the steps in paragraph 7.4.6.**

2. **Check the channel device paths and device range addresses the subsystem is responsible for, and vary them offline at the mainframe computer: To view the pairs of device paths if the Sun StorEdge A7000 uses ESCON connections:**

   ```
   # /usr/install/simckd/bin/ckdadmin switchinfo
   ```

   To view the pairs of device paths if the Sun StorEdge A7000 uses Block Mux Channel (BMC) connections:

   ```
   # /usr/install/simckd/bin/bmctbar
   ```

The displayed information shows which channel interfaces go offline at failover. Vary off only these channel paths. The paths that will not be affected and the paths that will be switched must be left online. Ensure that you know which CHIPIDs on the mainframe correspond to the IF information displayed for the Sun StorEdge A7000. If you specify the wrong CHIPID, data availability will be lost when the failover occurs. Enter the following MVS commands at the mainframe console to vary paths offline:

```
vary path(xxx-xxx,yy),offline
```

```
vary path(nnn-nnn,zz),offline
```

where:

xxx-xxx is the device range in use on dsp1

yy-yy are the CHIPIDs for the paths that will be placed offline for device range xxx-xxx on dsp1

nnn-nnn is the device range in use on dsp2

zz-zz are the CHIPIDs for the paths that will be placed offline for device range nnn-nnn on dsp2

Consult the site administrator for more information.

3. **Start the controlled failover on subsystem dsp1 by stopping the disk simulation software. Type the following:**

```
# ckdadmin stop
```

The dsp2 window displays "Failover complete" messages.

4. **Shut down subsystem dsp1. Move the cursor to the System Console Application Menu Bar.**

5. **Move the mouse pointer to Utilities and press the left mouse button. A pulldown menu appears, as shown in** FIGURE 7-14.

6. **Drag the pointer to** shutdown **and release the left mouse button.**

7. **A popup window titled** Shutdown **appears, as shown in** FIGURE 7-14. **Move the mouse pointer to** dsp1 **and click on it with the left mouse button.**

8. **Press Y at the Ready To Shutdown Now? prompt in the dsp1/dsp2 windows to immediately shut down. The dsp1 window displays a series of shutdown messages followed by a "The System is down" type message.**

9. **(Optional) If the autoboot feature is enabled, the subsystem attempts to reboot and startup messages start to appear. When you see the following message in the dsp1 window, press any key before 7 seconds elapse:**

```
You have 7 seconds to terminate the autoboot sequence . . .
```

The following prompt appears:

```
ROM >>
```

10. **Perform any procedures that required the subsystem shutdown.**

11. **Restart the subsystem by powering it on (if you powered it off) and type:**

```
ROM >> boot
```

12. **Restart the simulation on dsp1 through a dsp1 window (if it does not automatically restart):**

```
# ckdadmin start
```

13. **Vary on the paths you varied off in Step 2. The device ranges and CHIPIDs are the same as used in that step. Enter the following MVS commands at the mainframe console to vary paths online:**

```
vary path(xxx-xxx,yy),online
```

```
vary path(nnn-nnn,zz),online
```

Consult the site administrator for more information.

7.7 Making an Emergency Back Up Boot Diskette for the System Console

---

Note – This procedure does not apply to System Consoles using the Solaris operating environment.

Make an emergency backup boot diskette for the System Console. You can use this diskette in case the System Console's operating system becomes corrupted and you cannot start the System Console. The procedure is simple and requires a 3.5-inch high density diskette.

1. **Put the mouse pointer in any open area on the root window display area.**

2. **Press and hold the left mouse button. A menu appears. Drag the mouse pointer to** NEW WINDOW**. Release the left mouse button.**

3. **A System Console** xterm **window appears. Move the mouse pointer to the** xterm **window.**

4. **Insert the diskette into the System Console floppy drive. Enter the following to format the diskette:**

   ```
   # /usr/sbin/format /dev/rdsk/f03ht
   ```

5. **You will need a special serial number, contained in the** /etc/.snum **file. Read this file and write down the serial number for step 6:**

   ```
   # cat /etc/.snum
   ```

6. **Make the emergency diskette by entering the following:**

   ```
   # emergency_disk diskette1
   ```

   After a few minutes, remove the diskette, label it with the date and system name, and store it in a secure location onsite.

7.8 Using `subsysbak` to Back Up and Restore Files

`subsysbak` is a utility program lets you back up, restore, or update all site- and subsystem-specific configuration files to tape, diskette, directory, system/remote console, or the system boot disk drive of the Sun StorEdge A7000. To read the entire manual page for `subsysbak`, type `man  subsysbak` in a subsystem window.

When executed from a subsystem window without specifying any options, `subsysbak` backs up that subsystem's configuration files to the System Console and subsystem system disk drive.

When executed from a System Console xterm **window** without specifying any options, `subsysbak` backs up that subsystem's configuration files to the subsystem system disk drive. TABLE 7-2 shows some options.

TABLE 7-2   Selected `subsysbak` Command Options

Command and Options	Description
`subsysbak -b -n rhost` `subsysbak -r -n rhost`	The configuration files are backed up to (`-b`) or restored from (`-r`) the `/usr/install/backup/rhost` directory on the System Console, where `rhost` is the System Console (`dspcons:`), subsystem dsp1 (`dsp1:`), or subsystem dsp2 (`dsp2:`).
`subsysbak [-b	-r] /dev/rdsk/f03ht`	Back up to or restore from the System Console floppy diskette drive.
`subsysbak [-b	-r] dspcons:`	Back up to or restore from the System Console disk drive.
`subsysbak [-b	-r] -n dsp1`	Back up to or restore from the `/usr/install/backup/dsp1` directory.
`subsysbak [-b	-r] dsp2:`	Back up to or restore from subsystem dsp2.

7.8.1 To Back Up Important System Files

The following procedures ensure that duplicates of important Sun StorEdge A7000 system files exist for advanced troubleshooting and recovery purposes. For these procedures, you will need two quarter-inch cartridge (QIC) tapes.

Note – You will also need a portable maintenance box. See Appendix C. Make sure the box is cabled to the maintenance box connectors shown in FIGURE C-1.

---

1. **At the System Console, type the following to show the name of the master subsystem:**

```
# /usr/install/mcd/bin/mcdshowmaster
```

This shows the name of the master subsystem. Typically, it is subsystem dsp1.

2. **To check database and configuration information:**

```
# mcdcheck
# mcdsyscheck -local
```

3. **Insert a tape in the portable maintenance box and back up the Master Configuration Database (MCD) files and send MCD data to the Remote Support System (RSS) software; respond to any prompts as necessary.**

```
# /usr/install/ias/bin/subsysbak -x mcdsavedata
# sendmcd
```

4. **Insert another tape in the tape drive and back up the site-specific files.**

```
# echo < /dev/rmt/0h
# /usr/install/ias/bin/subsysbak -b /dev/rmt/0h
```

5. **Insert another tape in the tape drive and make a bootable backup installation tape.**

```
# /usr/systest/backup.tape
```

This may take up to 20 minutes to complete. When finished, remove, label, and date the tape.

6. **Type the following commands to make duplicate, backup files on the subsystem disk drive; you may have to wait a few moments between commands for the prompt (#) to return:**

```
# /etc/init.d/altpartmgr -c
altpartmgr: Checking primary and alternate file system sets.
# /etc/init.d/altpartmgr -b
# /etc/init.d/altpartmgr -u
```

7. **Open an xterm window:**

   a. **Put the mouse pointer in any open area on the root window display area.**

   b. **Press the left mouse button. A menu appears. Drag the mouse pointer to NEW WINDOW. Release the mouse button.**

   c. **An xterm window is displayed. Move the mouse pointer to the xterm window.**

8. **Back up the System Console.**

```
# subsysbak
```

9. **Issue the following commands to perform an online backup.**

   a. **From the System Console, type the following:**

```
# /usr/local/bin/subsysbak
```

   b. **From each subsystem window, type the following:**

```
# /usr/lbin/subsysbak
```

7.9 ROM Monitor Firmware Features for the Service Engineer

The following paragraphs briefly describe ROM Monitor firmware features of interest to the service engineer (SE). Though the ROM Monitor has many features, only a few commands of a diagnostic nature related to field engineering tasks are described here.

Each subsystem's adapter board contains monitor firmware called the ROM Monitor. If autoboot has been disabled (by default, or, for example, by pressing any key in response to the "You have 7 seconds to terminate the autoboot sequence" powerup message), the ROM Monitor prompt ROM >> appears on the related subsystem's window.

Only a few ROM Monitor commands related to operator tasks are described here. All commands consist of arguments and/or a text string followed by pressing the Enter key: command [args] [text string]

The adapter board stores permanent subsystem configuration information in battery-backed nonvolatile random-access memory (NVRAM). At powerup or reset, the ROM Monitor copies the contents of NVRAM into the adapter boards's dynamic RAM (DRAM). The DRAM temporarily stores the subsystem configuration until the next powerup or reset, when NVRAM again overwrites DRAM with subsystem configuration information. Whatever modifications you make in NVRAM affect and are used by the ROM Monitor.

TABLE 7-3   ROM Monitor Commands

Command	Description
help	Displays brief help on commands
boot	Starts the operating system software for the Sun StorEdge A7000 system
reset node	Resets/starts the subsystems without starting the operating system software for the Sun StorEdge A7000 system
readconfig	Displays configuration information
show	Shows subsystem's configuration
test	Runs Built-In Self Tests (BISTs).
date	Reads and sets the date on the subsystem
nvram	Accepts, saves, and restores subsystem configuration data in NVRAM

7.9.1 To Get a ROM Monitor Prompt

As shipped, each Sun StorEdge A7000 system is not configured for automatic booting of the operating system. Once the Sun StorEdge A7000 operating system software is running, the only way to get to the ROM Monitor prompt is to shut down the dsp1 and dsp2 subsystems and operating system software as described in this chapter.

After startup messages start to appear, the following ROM Monitor prompt appears in all windows:

```
ROM >>
```

If automatic booting is enabled (where the operating system software automatically starts), you will see the following messages in the subsystem windows; press any key before 7 and 33 seconds elapse:

```
Message for dsp1:
You have 7 seconds to terminate the autoboot sequence . . .
Message for dsp2:
You have 33 seconds to terminate the autoboot sequence . . .
```

Then the prompt appears in all windows:

```
ROM >>
```

7.9.2 Common Subsystem Management Tasks

The most common or likely management tasks you perform using the ROM Monitor are:

- Resetting the subsystem
- Disabling and enabling the subsystem autoboot feature
- Disabling and enabling the subsystem autotest feature
- Showing a subsystem's configuration
- Saving a subsystem's configuration on tape or in NVRAM
- Starting the subsystem after making changes

7.9.3 To Reset a Subsystem and Boot the Operating System

To reset or restart a subsystem from the ROM Monitor prompt:

1. If the subsystem window is not already open, open a serial port window into the subsystem as described in this chapter.

2. Type the following:

```
ROM >> reset node
ROM >> boot
```

A long series of startup messages appear.

3. When the following message appears, the subsystem is started:

```
The system is ready.
Console Login:
```

7.9.4 To Show a Subsystem's Configuration

Record current subsystem configuration information in a log file. The ROM Monitor show command lets you see this information.

To display subsystem configuration information:

```
ROM >> show config
```

CODE EXAMPLE 7-2 shows an example display. TABLE 7-4 lists other show display options.

CODE EXAMPLE 7-2   `show config` Text

```
autoboot state:             disabled
netboot state:              disabled
altnetboot:                 disabled
boot image:                 sysboot.110
altboot image:              sysboot.110
ip boot address:            none
ip altboot address:         none
default autoboot device:    bus 0 channel 0, target 6, lun 0,
                            part 0
alternate autoboot device:  bus 0 channel 0, target 6, lun 0,
                            part 0
autoboot timeout:           7 sec.
autotest:                   disabled
autotest levels selected:   core, qmem, slots,
cpus' configured:           0, 1, 2, 3
processor brd serial num:   93s12345
adaptor brd serial num:     93s19684
assembly id:                0x504
processor brd func rev:     A
adaptor brd func rev:       C
processor brd mem size:     128Mb
adaptor brd mem size:       64Mb
More ? (Y/N)y
ethernet address:           08:00:4c:00:ff:97
scsi delay:                 0 sec.
scsi timeout:               30 sec.
bus addr 0 channel 0 scsi id:   0
bus addr 0 channel 1 scsi id:   0
clock calibration:          +00
environmental monitor:      disabled
error state:                disabled
burnin state:               disabled
error port:                 3
board set id:               7       (88110 Processor Brd. Set)
Common Console Interface:   not present
system id:                  0
Part: 531_103422_006, RCS: V1_06, Created: Tues Oct 3 22:03:50
EDT 1998
```

TABLE 7-4 `show` Command Options

Command Option	Description
show vme	Display current VMEbus configuration
show memconfig	Display current memory configuration
show scsi	Display current devices on the adapter board SCSI bus
show slots	Display current devices installed in the subsystem chassis
show serial	Display the current adapter board serial port configurations

7.9.5 To Disable and Enable the Autoboot Feature

To determine if autoboot is enabled for a particular subsystem, type the following from the ROM Monitor prompt in a subsystem window:

```
ROM >> readconfig autoboot
```

The subsystem window displays one of the following messages, where x is the subsystem number 1 or 2:

```
subsystem dspx: autoboot: enabled
subsystem dspx: autoboot disabled
```

7.9.5.1 To Disable Subsystem Autobooting

Caution – Values changed by the `setconfig` command apply to any subsequent reboot (caused by power on or `boot/reset` node commands). However, if the ROM Monitor detects a difference between the NVRAM-stored configuration and the actual configuration, any autoboot operation aborts and the following message displays on the console:

```
WARNING: CPU / MEMORY / SCSI Configuration changed, Autoboot
aborted; Must accept new configuration to autoboot.
```

7.9.5.2 To Enable Subsystem Autobooting

Type the following from the ROM Monitor prompt in a subsystem window:

```
ROM >> setconfig autoboot enable
ROM >> nvram accept
Are you sure you want to save the configuration? (y/n) y
dspx: nvram modified
```

7.9.6 To Enable and Disable the Autotest Feature

As shipped, the Sun StorEdge A7000 has the autotest feature enabled. The following levels of diagnostic tests execute during the automatic testing sequence, as described in Chapter 4:

■ Hardware Confidence tests

■ Built-in Self Tests (BISTs)

■ Extended Diagnostics (slots)

To determine if autotest is enabled for a particular subsystem, type the following from the ROM Monitor prompt in a subsystem window:

```
ROM >> readconfig autotest
```

The subsystem window displays one of the following messages, where x is the subsystem number 1 or 2:

```
subsystem dspx: autotest: enabled
subsystem dspx: autotest disabled
```

7.9.6.1 To Disable Subsystem Autotesting

Type the following at the ROM Monitor prompt in a subsystem window:

```
ROM >> setconfig autotest disable
ROM >> nvram accept
Are you sure you want to save the configuration? (y/n) y
dspx: nvram modified
```

7.9.6.2   To Enable Subsystem Autotesting

Type the following from the ROM Monitor prompt in a subsystem window:

```
ROM >> setconfig autotest enable
ROM >> nvram accept
Are you sure you want to save the configuration? (y/n) y
dspx: nvram modified
```

7.9.7   To Read Subsystem Chassis Configurations

The **readconfig** and **setconfig** commands provide more detail for reading and setting a chassis configuration. Typing readconfig or setconfig at the ROM Monitor prompt returns a list of all valid command parameters. The following text provides brief examples.

■ To see all information about a card in chassis slot 2:

```
ROM >> readconfig slot 2 all
Slot 2: board type: vme
Slot 2: board state: Configured
Slot 2: board data: no bist
Slot 2: csr 1 address: 0xfff40800
Slot 2: csr 2 address: 0xfffc0000
Slot 2: csr 3 address: 0
Slot 2: extended image: rmsdiag
```

■ To read what card type is in slot 1:

```
ROM >> readconfig slot 1 type
Slot 1: board type: adapter
```

■ To determine if the card is in NVRAM:

```
ROM >> readconfig slot 1 state
Slot 1: board state: configured
```

7.9.8 To Save and Restore a Subsystem Configuration

After changing a subsystem's configuration (for example, adding cards), you save the configuration in adapter card NVRAM.

1. **Initialize NVRAM with the configuration:**

```
ROM >> nvram accept
Are you sure you want to save the configuration? (y/n) y
dsp1: nvram modified
```

2. **Repeat for subsystem dsp2.**

3. **Boot the Sun StorEdge A7000. See Section 7.9.9 "To Restart the Subsystems After Making Changes" on page 7-48.**

4. **Open an xterm window:**

   a. **Put the mouse pointer in any open area on the root window display area.**

   b. **Press the left mouse button. A menu appears. Drag the mouse pointer to NEW WINDOW. Release the mouse button.**

   c. **An xterm window is displayed. Move the mouse pointer to the xterm window.**

5. **Save the NVRAM data on dsp1:**

```
# save_nvram dsp1
```

6. **Save the NVRAM data on dsp2:**

```
# save_nvram dsp2
```

7.9.9 To Restart the Subsystems After Making Changes

This procedure shows how to restart the subsystem operating system software after you have made changes or interrupted the startup according to Section 7.9.1 "To Get a ROM Monitor Prompt" on page 7-41.

1. **Put the mouse pointer in window dsp1. The mouse pointer turns into a cursor (|).**

2. **At the** ROM >> **prompt, reset the subsystem:**

```
ROM >> reset node
```

3. **After the reset, type:**

```
ROM >> boot
```

4. **A long series of startup messages appear.**

5. **When the following message appears, you can next restart subsystem dsp2:**

```
The system is ready.
Console Login:
```

6. **Repeat for all subsystems.**

7.10   If Your System Console Is Not Responding

This section describes a few steps you can take if the System Console or modem appears frozen or unresponsive. As a last resort, the System Console model with the pushbutton latch on cover has a Reset button at the right rear side:
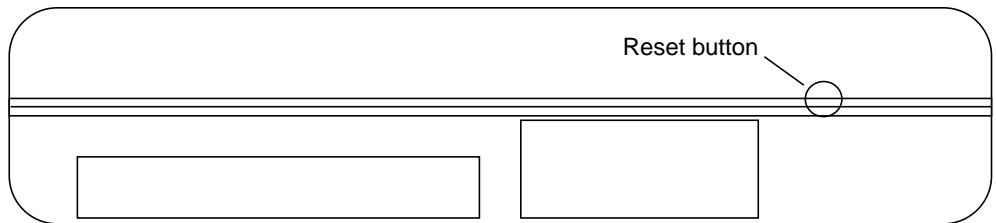
Right side, rear of System Console

FIGURE 7-15 System Console Reset Button

7.10.1   Windows Opened into the Subsystems Disappear or Appear Frozen

If previously-opened subsystem windows disappear, try reopening them according to procedures in Section 7.4.6 "To Open Windows Into Subsystems" on page 7-18. If this fails or the windows appear frozen (that is, you cannot type in them or otherwise get them to respond), try the following:

1. **Press Alt-PrtScr-h. This sequence starts a character-based session.**

2. **If step 1 is successful, the System Console's port monitor software is probably not responding. To check port monitor status:**

```
For the Toshiba System Console:
# sacadm -l -p zsmon
For all other System Consoles:
# sacadm -l -p pm0
```

The System Console displays:

```
PMTAG   PMTYPE  FLGS   RCNT    STATUS      COMMAND
pm0     pm      -      0       ENABLED     /usr/lib/saf/pm #
```

If the port monitor is running, the STATUS field above should display ENABLED or STARTING. If it displays DISABLED or STOPPED, it is not running.

3. **To start the port monitor, type:**

```
# sacadm -s -p pm0
```

4. **Repeat step 2 to check port monitor status. (If the STATUS field does not display ENABLED or STARTING, call Sun Enterprise Services.)**

5. **Try to restart the System Console's graphical user interface (GUI) software. First, find the X server process ID number:**

```
# ps -e | grep X
```

This command displays information similar to the following, where 252 is the process ID number:

```
252 80 vt01 3:00 X
```

6. **Next, kill (stop) the X server process:**

```
# kill -KILL 252
```

Repeat Step 5 to make sure the process is killed.

7. **Restart the System Console:**

```
# system_console
```

The above command restarts the System Console GUI and should display the
Application Menu Bar. Open windows into the subsystem(s).

8. **If the subsystem windows are still frozen, call Sun Enterprise Services. If
possible, reboot the System Console to allow remote support. Follow the steps in
paragraph 7.5.7, but type** init 6 **instead of the** shutdown **command shown.**

7.10.2   The System Console Appears Frozen

Except for hardware failure, this condition has been observed when the System Console's Power Management feature is enabled (it should not be enabled). This feature is controlled in the System Console's BIOS software. These steps assume you can reboot the System Console.

1. **Reboot the System Console: Follow the steps in paragraph 7.5.7, power off, then power on the System Console.**

2. **As the System Console displays introductory information (CPU type, memory configuration—this information appears in the first moments after power on), press the following keys at the same time: Ctrl Alt S. The first BIOS utility menu page appears.**

   Depending on the System Console model, the BIOS menu pages are slightly different, but the Power Management feature is the first item on BIOS menu page 2.

3. **Press the PgDn key to display page 2 (it may differ slightly on your System Console):**

   ```
   ** Power Management Control **

   Power Saving Mode: Enabled (This is in page 2 of 2)

   System Doze Timer: 2 Seconds
   HDD Local Standby Timer: 2 Minutes
   System Global Standby Timer: 2 Minutes
   System Auto Suspend Timer: 1 Minute
   Suspend To Disk: Disabled
   Low Battery Activity: Disabled
   ```

4. **Use the arrow keys to move the cursor to highlight Power Saving Mode. Press the - (minus) or + (plus) key to disable it.**

5. **Save this change to the BIOS settings by pressing the Esc key and the F4 key (to save values, exit SETUP, and reboot).**

7.10.3 The System Console Modem Is Not Responding

Generally, the modem does not function properly (not dialing out from or allow dialing into the console) when one of the following conditions occurs:

- A UNIX process is holding the modem `ttyXXh` device
- The modem firmware needs to be reset

7.10.3.1 A UNIX Process is Holding the Modem `ttyXXh` Device

1. **The modem `ttyXXh` device is usually `/dev/tty03h` for Sun StorEdge A7000 servers using a PCMCIA modem card and `/dev/tty00h` for those international Sun StorEdge A7000 servers using an external modem. This process can be a `cu` command, `uucp` command, dial-up login session, or `rmt` session over this dial-up login session.**

2. **Type one of these commands to determine if a process is holding the device:**

```
# ps -e | grep cu
# ps -e | grep uucp
# who -u | grep ttyXXh
# ps -ef | grep rmt | grep -v grep
```

where XX is either 01 or 03 as noted in step 1). If any of these commands displays an output, then that process is holding up the modem `ttyXXh` device.

3. **To release the modem `ttyXXh` device, kill the process holding it or reboot the console. Note the first process ID number (or last, for the who command) listed in the output of any of the above commands. To kill the process, type:**

```
# kill -HUP processIDnumber
```

4. **Repeat the command that displayed the output to make sure the process is killed. If the process is not killed, type:**

```
# kill -KILL processIDnumber
```

5. **Reset the modem:**

```
# cu -l ttyXXh
```

where XX is either 00 or 03 as noted in Step 1. The screen displays:

```
Connected
atz
~..quit
```

6. **Reboot the System Console:**

```
# init 6
```

7.10.3.2   Modem Firmware Needs to Be Reset

For example, the modem firmware needs to be reset, due to an abnormal phone line disconnection at either end. The best way to reset the modem is to hard reset it. (For those internationally-installed Sun StorEdge A7000 servers where an external modem is used, you can hard reset the modem without having to reboot the System Console.)

Where an internal PCMCIA modem is used, you must hard reset the modem by rebooting the System Console.

If the modem is physically damaged, or if all previous steps fail, try a new supported modem.

Note – Sometimes you must wait for quite a few seconds for the modem to settle down before you can try to reset it again.

If the cu command is successful in the previous steps, then most likely the modem is OK.

If a cu command prints an error like DEVICE NOT AVAILABLE or DEVICES FAILED, a process is still using the modem.

If you see a process executing cu or uucp, most likely the Remote Support System software is using the modem. In this case, call the Sun Enterprise Services.

7.11   Licensing DataShare Products

The `dsflicense` script lets you license, unlicense, and check the status of
DataShare products. The syntax for `dsflicense` is:

`dsflicense license` *{product_name1 product_name2...]*

`dsflicense unlicense` *{product_name1 product_name 2...]*

`dsflicense check` *{product_name1 product_name 2...]*

- Licensing a DataShare product which requires other products to also be licensed
  results in those products automatically being licensed
- Unlicensing a DataShare product on which other products depend prompts the
  user to unlicense those products also
- Checking a product license shows the license status of all DataShare products.
  You can check specific products by specifying the product name

Currently supported product names are:

- `dsf`—core DataShare
- `dsob`—DataShare Open Backup
- `dasd_tools`—DASD tools

To use the script, execute it from the dsp1 subsystem window.

7.11.1   Checking a License

Checking a license returns three possible statuses for a product: licensed, not
licensed, or partially licensed. You cannot relicense a product that is already
licensed, or unlicense a product that is not licensed.

- To check a specific product license:

```
# dsflicense check dsf

Datashare Product Licensing Status:
    dsf: not licensed
```

■ To check all licenses:

```
# dsflicense check

Datashare Product Licensing Status:

    dsf: not licensed
    dsob: not licensed
    dasd_tools: not licensed
```

■ A partially licensed product usually indicates that an error occurred during the licensing procedure. To correct the partially licensed condition for a product:

```
# dsflicense unlicense product_name
# dsflicense license product_name
```

7.11.2   Licensing and Unlicensing a Product

■ To license a product such as DataShare:

```
# dsflicense license dsf

Licensing product: dsf
Product dsf licensed successfully.
```

■ Licensing DASD tools require that DataShare also be licensed:

```
# dsflicense license dasd_tools

Licensing product: dasd_tools
Product dasd_tools requires that product dsf be licensed.

Licensing product: dsf
Product dsf licensed successfully.
Product dasd_tools licensed successfully.
```

■ To unlicense a product such as DataShare:

```
# dsflicense unlicense dsf

Unlicensing product: dsf
Product dsf unlicensed successfully.
```

■ Unlicensing a DataShare product on which other products depend prompts the user to unlicense those products also:

```
# dsflicense unlicense dsf

Unlicensing product dsf.
Product dasd_tools requires that product dsf be licensed to
function properly.

Unlicense product dasd_tools? (yes or no) yes

Unlicensing product dasd_tools.
Product dasd_tools unlicensed successfully.
Product dsf unlicensed successfully.
```

7.12 System Console Emergency Boot Procedure

If the System Console's Solaris operating environment becomes corrupted and the System Console will not start, you can boot from the Solaris CD-ROM.

To boot from the CD-ROM:

- Configure the CD-ROM drive on the System Console
- Boot from the Solaris operating environment CD-ROM

7.12.1 To Configure the CD-ROM Drive On the System Console

1. **Power on the System Console.**

   The following message is displayed:

   ```
   Press ESCAPE to interrupt autoboot in 5 seconds
   ```

2. **Press the Escape key.**

   A message appears, prompting you to press the F2 function key to enter the BIOS settings menu.

3. **Press the F2 key to continue. When a menu appears, press the F2 key again.**

   The next menu allows you to choose between booting from a disk (the default) or a CD-ROM.

4. **Using the space bar, move the cursor down to CD and press the F2 key to select booting from a CD-ROM.**

5. **When the "Select type of installation:" prompt appears, type b -s.**

   ```
   Select type of installation: b -s
   ```

   You have 30 seconds to complete this step. The root prompt (#) now displays.

6. **Type the following to mount the hard drive:**

```
# mount /dev/dsk/c0d0s0/mnt
```

7. **Change to the** /mnt **directory:**

```
# cd /mnt
```

You are now at the root directory of the hard drive.

8. **Make all necessary changes to the root files on the hard drive.**

7.12.2   Boot The System Console

● **Unmount the hard drive and reboot the System Console.**

```
# cd /
# unmount /mnt
# reboot
```

Parts Catalog

This chapter shows the major assemblies and lists part numbers for the Sun StorEdge A7000 intelligent storage server.

Sun Microsystems, Inc. maintains an internal web site for the *Field Engineer Handbook*. Search for the Parts Breakdown for Disk Arrays in Volume 2 for a complete list of Sun StorEdge A7000 field replaceable units. The web address is:

`http://edist.corp/fehandbook/`

TABLE 8-1 Parts List

Description	Part Number	Reference Designator
HDSA bulk power chassis	300-1386-xx	1
HDSA power supply converter module	300-1387-xx	1A
14-slot chassis	540-3749-xx	2
Power supply assembly, subsystem	300-1384-xx	3
AC distribution unit	540-4013-xx	3A
SCSI expander card w/out bus term	375-0044-xx	4
SCSI expander card	375-0042-xx	4A
SCSI expansion chassis, dual	540-3768-xx	5
Processor board	501-5070-xx	6
Adapter board	501-5078-xx or 501-5323-xx	7
Cache memory card	565-(1458, -1459, -1460, -1461 -1462 -1463)-xx	8
Integrated SCSI target mode controller	375-0038-xx	9
Ultra-Wide SCSI target mode controller	375-0058-xx	9A
Integrated SCSI controller	375-0067-xx	9B
Quad-Channel BMC card	565-1469-xx	10
Dual-Channel ESCON to VME interface card	501-5075-xx	11
Integrated SCSI controller w/RAID	375-0067-xx	12
HDSA tray fan chassis	370-3378-xx	13
Kit, boot drive assembly	540-3788-xx	14
System boot disk drive	370-3925-xx	14
Disk array chassis	540-3666-xx	15
9.1 GB disk drive assembly	540-3668-xx	16

TABLE 8-1 Parts List *(Continued)*

Description	Part Number	Reference Designator
Blower assembly	540-3665-xx	17
System Console	565-1510-xx	18
Linear actuator device (LAD) power supply	300-1385-xx	18A
RDC FORM Hardware		19
Transition module interface (TMI) card	501-5285-xx	
Fiber transition module (FTM) card	501-5068-xx	
Arbitration termination board (ATB)	501-5076-xx	
DC/DC converter	375-0063-xx	
Subassembly, fan chassis	540-3762-xx	
10-slot 6U card cage	370-3509-xx	

System cabinet

Optional HDSA
expansion cabinet
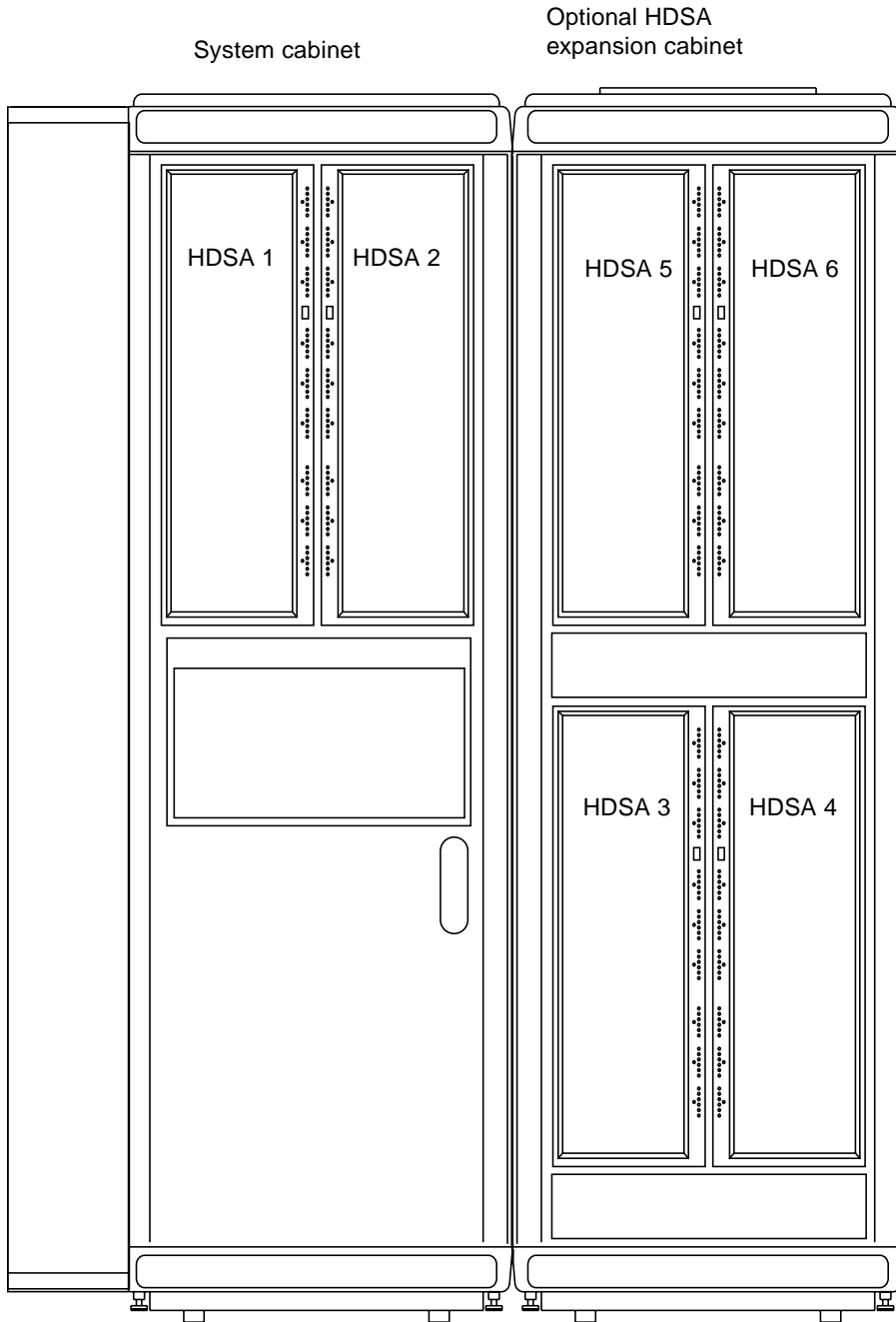
FIGURE 8-1 Sun StorEdge A7000 System and HDSA Expansion Cabinets

15 (9x)
16 (54x)

15 (9x)
16 (54x)

14 (2x)

1

18 (not
shown; in front
door tray assembly)

3 (2x)

17

19

3A (2x)
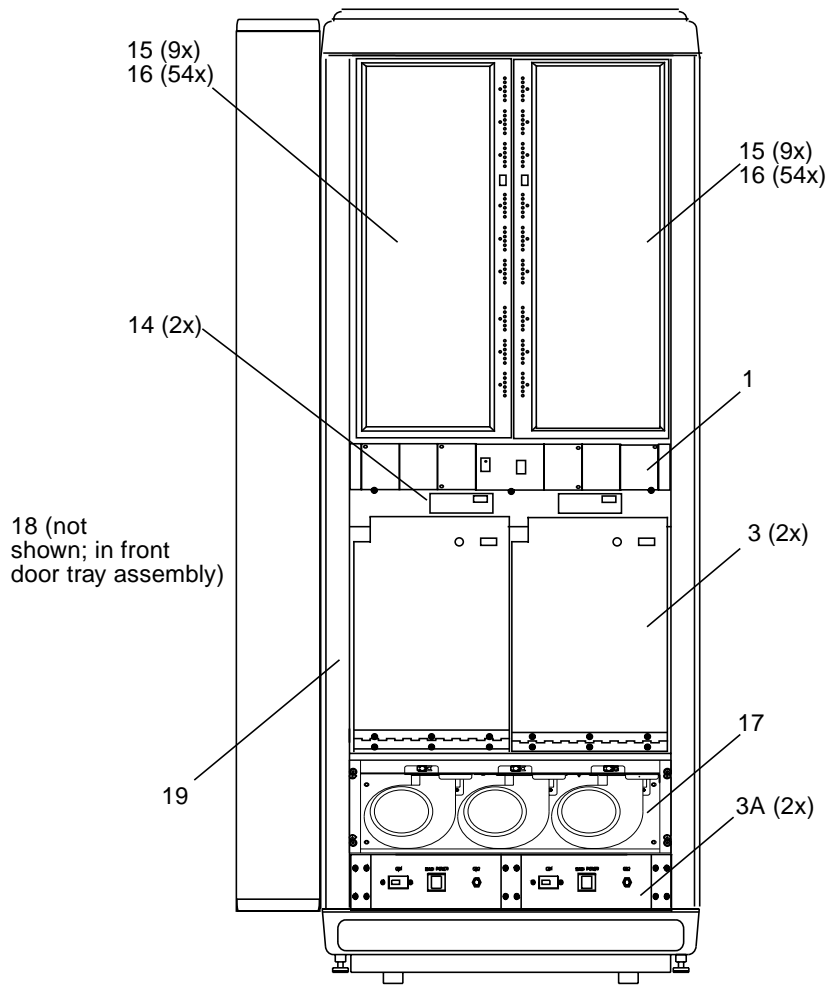
FIGURE 8-2 Sun StorEdge A7000 System Cabinet, Front View

13 (3x)

18A

2 (2x);
6, 7, 8
9, 9A,
9B, 10
11, 12

4, 4A, 5
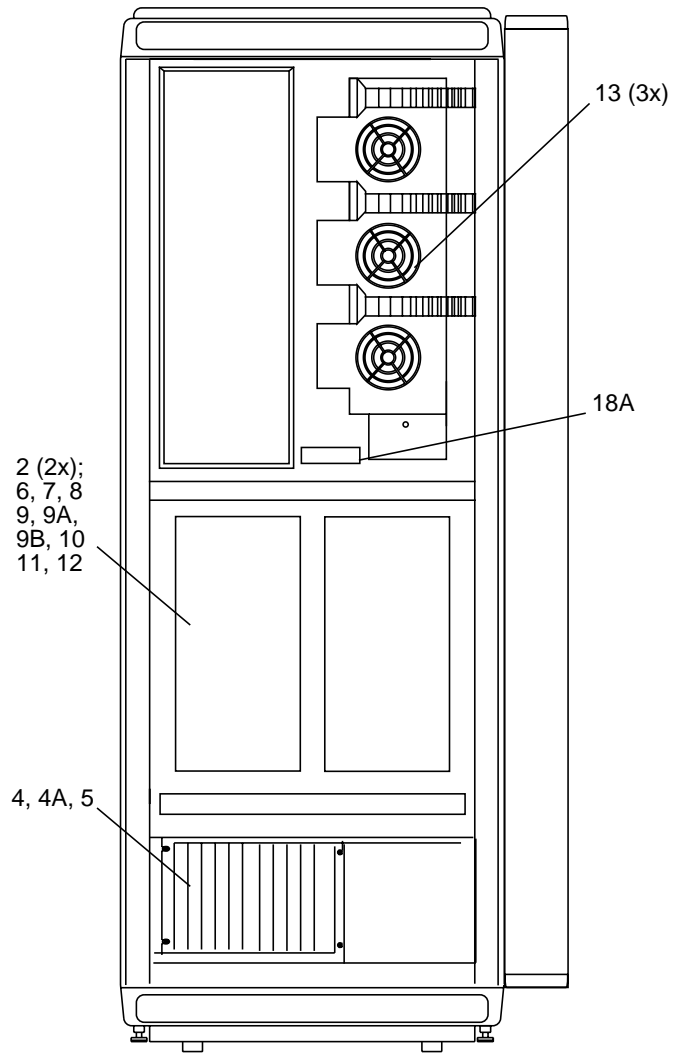
FIGURE 8-3   Sun StorEdge A7000 System Cabinet, Rear View
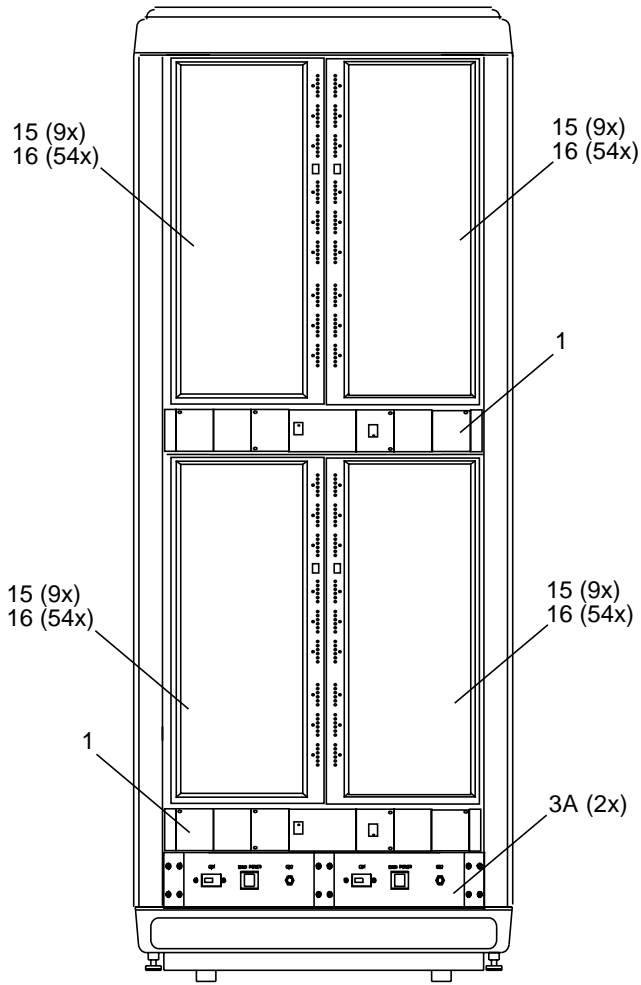
FIGURE 8-4   Sun StorEdge A7000 HDSA Expansion Cabinet, Front View
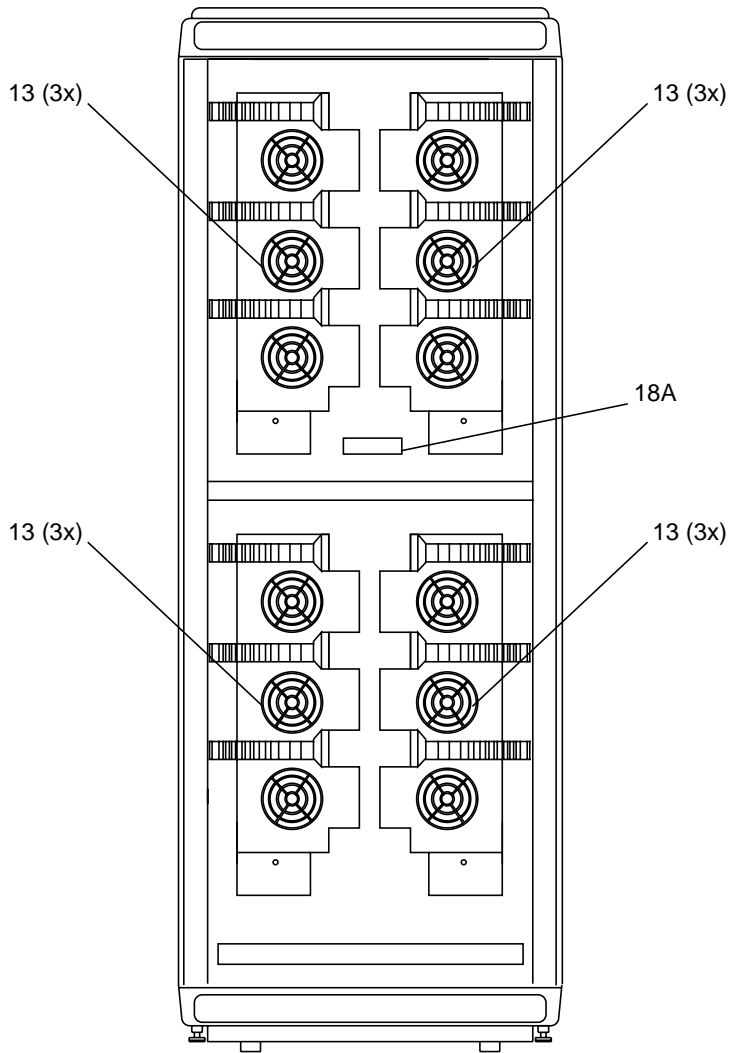
FIGURE 8-5   Sun StorEdge A7000 HDSA Expansion Cabinet, Rear View

Power Conditioning Unit

This appendix describes the following information about the power conditioning unit (PCU) provided with the Sun StorEdge A7000:

■ How to Change or View PCU Parameters—page A-2
■ Alarm Codes—page A-7

A.1　How to Change or View PCU Parameters

The PCU has many parameter values you can change to program the PCU. These parameters are located in two places: in the `/etc/upscf` file (one copy stored on each subsystem, changed using the System Console) and on the PCU's internal processor (changed through the PCU front panel buttons).

PCU parameters are set before the Sun StorEdge A7000 is shipped; sometimes parameter values must be changed at the customer site. The *Sun StorEdge A7000 Installation Guide* contains more information about these parameters.

A.1.1　The PCU Configuration File

Note – To edit the `/etc/upscf` file, you must be able to use an ASCII text editor. Any lines in this file beginning with a pound sign (#) are text comments or disabled parameters and do not affect PCU operation.

The `/etc/upscf` configuration file contains 21 parameters. TABLE A-1 lists and describes them.

TABLE A-1 PCU `/etc/upscf` File Parameters

Parameter With Default Value	Description
ups_port "/dev/tty03"	The name of the control terminal interface (tty) connecting to the PCU.
	Sun StorEdge A7000 servers using a single PCU: Add the word `passive` to this line on subsystem dsp2 only: ups_port "/dev/tty03" passive
	Sun StorEdge A7000 servers with dual PCU option: there are two `ups_port` lines in the `/etc/upscf` file; add the word *passive* at the end of both lines on dsp2 only.
glitch 15	The amount of time, in seconds, a power outage must last before PCU software takes any action. Add the word `show` to the end of this line to display messages about power outages shorter than the amount of time indicated by `glitch`.
accept_on_battery 390	The amount of time, in seconds, after a power outage the Sun StorEdge A7000 will accept new channel command words (CCWs) from the host mainframe.
recharge_time 21600	The amount of time, in seconds, for the PCU batteries to completely recharge from a totally depleted state.
batt_clock estimate	The source value for remaining battery power. This can be taken from the PCU directly or calculated.
max_battery 900	The amount of time, in seconds, Sun StorEdge A7000 can run on a fully charged battery.
max_destage 180	The amount of time, in seconds, needed to flush all cache.
max_shutdown 180	The amount of time, in seconds, to shut down the Sun StorEdge A7000 operating system. Value of 0 means do not shut down.
allow_shutdown 240	The amount of time difference, in seconds, between operating system shutdown and automatic power disconnect. Value of 0 means PCU will run until batteries are depleted.

TABLE A-1   PCU `/etc/upscf` File Parameters *(Continued)*

Parameter With Default Value	Description
`lost_comm_time 10`	The amount of time, in seconds, Sun StorEdge A7000 will tolerate a lost connection with the PCU. The `lost_comm_action` parameter defines the action Sun StorEdge A7000 takes when PCU-to-Sun StorEdge A7000 communication is lost.
`lost_comm_action Report`	The action to take when Sun StorEdge A7000 loses communication with PCU. `Report` means to log the error. `Destage` means to switch the cache to writethrough mode.
`heartbeat 60`	How frequently, in seconds, Sun StorEdge A7000 requests status from PCU. **Sun StorEdge A7000 servers with dual PCU option:** the recommended amount of time, in seconds, is 30.
`err_file "/usr/adm/errfile"`	The name of the error file where errors and messages are logged.
`console_log False`	`False` specifies that error messages do not display on the System Console window. `True` shows error messages.
`low_time_set 15`	Defines the minimum amount of runtime in minutes before the PCU reports a problem, while power is on. This parameter helps determine whether the PCU battery is good while power is still available.

`memory_alarm Report`
`check_batt_alarm Report`
`inverter_alarm Report`
`low_time_alarm Report`
`low_batt_alarm Report`
`breaker_alarm Report`
`overload_alarm Report`
`high_temp_alarm Report`
`wiring_fault_alarm Report`
`high_batt_alarm Report`
	Alarm conditions, and the action taken when the alarm occurs. Here, `Report` means the alarm messages display on the System Console window and are stored in the `/usr/adm/errfile`. `Destage` means to switch the cache to writethrough mode. The `Destage` action has a performance impact on the Sun StorEdge A7000, but it anticipates a sudden unexpected loss of power from the PCU.

`cmd_set_wrthru "/usr/install/scm/bin/`
`sd_cadmin node_hint set wrthru`
`/dev/null 2>&1"`
	Reserved command; do not edit.

`cmd_clr_wrthru "/usr/install/scm/bin/`
`sd_cadmin node_hint clear wrthru  /dev/null`
`2>&1"`
	Reserved command; do not edit.

Parameter With Default Value	Description
`cmd_is_dirty "/usr/install/scm/bin/sd_stats -D >/dev/null 2>&1"`	Reserved command; do not edit.
`#cmd_ckdstop "/etc/init.d/simckd stop >/dev/null 2>&1"` `cmd_ckdstop "/etc/init.d/simckd stop_noswitch >/dev/null 2>&1"`	For dual PCU configurations where each PCU is on its own power grid and supplying power to each subsystem, set up each PCU to be active and use the normal `stop` command so that failover will occur.

A.1.2   Program and View PCU Parameters at the PCU Front Panel

The front panel of the PCU has five buttons used to program and view its output voltage; an LED display to the left of the buttons shows the programming results or parameter values. See FIGURE A-1.

Note – The *Sun StorEdge A7000 Installation Guide* describes parameters you can change.
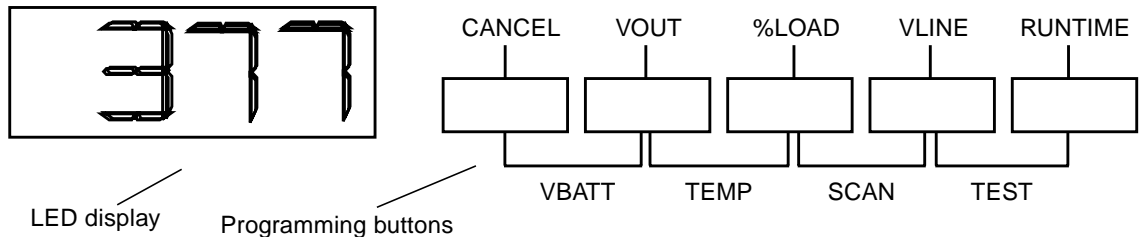
FIGURE A-1   PCU Front Panel Used To Program PCU Output Voltage

The PCU has many parameters, numbered from 00 to 134. Some parameters can be changed, some parameters are display-only and cannot be changed. This section describes how to change the parameters.

1. **Connect and power on the PCU, according to the** *Sun StorEdge A7000 Installation Guide.*

2. **At the front of the PCU, put the key switch in the AUTO position.**

3. **At the PCU front panel, press and hold the CANCEL and RUNTIME buttons at the same time for more than two seconds. Release the buttons when the display shows** `P-00.`

4. **Press the CANCEL button. The display shows** `0.`

5. **Press and hold the %LOAD button until the display shows** `377`**, and then release it. (If you press the button and it increments past** `377`**, press the VOUT button to go back.)**

6. **Press the RUNTIME button. The display shows** `1.`

7. **Press the CANCEL button. The display shows** `P-00.`

8. **Press the %LOAD button until the display shows** `P-XX`**, where** `XX` **is the parameter number you want to change. (If you press the button and it increments past the parameter, press the VOUT button to go back.)**

9. **Press the CANCEL button to toggle to the parameter value. Note that this button lets you toggle between the parameter value and the parameter number.**

10. **To change the parameter value, press the %LOAD button to increase it and press the VOUT button to decrease it.**

11. **With the display showing the correct value, press the RUNTIME button.**

12. **Press the VLINE button twice to quit the programming procedure.**

A.2 Alarm Codes

The LED display at the PCU front panel shows alarms codes if the PCU has detected an alarm condition. TABLE A-2 lists each alarm code and description.

The PCU also sounds alarms by beeping. To silence the alarm, press the CANCEL button. Pressing this button does not clear the alarm condition or solve the problem.

TABLE A-2   PCU Alarm Codes

Alarm Code	Alarm	Description	Possible Solution/Action
A-00	Low Runtime	The PCU is running on battery power and amount of runtime is low; PCU shows alarm code and amount of runtime remaining.	Perform an orderly shutdown of the Sun StorEdge A7000. Do not shut off the PCU. When AC input returns, PCU will restart and start recharging its batteries.
A-01	Overload	Sun StorEdge A7000 or other equipment is drawing more power than PCU can provide.	Press %LOAD key to see percentage of total power Sun StorEdge A7000 is drawing. This condition may require partial or full shutdown of Sun StorEdge A7000. Call Sun Enterprise Services if condition continues.
A-02	Circuit Breaker Warning	Overloading equipment is drawing high current from PCU (circuit breaker here is PCU's internal electronic breaker).	PCU shuts down; shutdown Sun StorEdge A7000. Reset PCU by pressing CANCEL key for two seconds. Power the Sun StorEdge A7000 on. Call Sun Enterprise Services if condition continues.
A-03	High Ambient Temperature	Temperature inside PCU is too high for safe operation.	Check computer room temperature. Make sure PCU vents are not blocked. Call Sun Enterprise Services if condition continues.
A-04	Check Battery	Possible battery failure.	Replace batteries. Call Sun Enterprise Services for assistance.

Alarm Code	Alarm	Description	Possible Solution/Action
A-05	Check Inverter	Possible problem with PCU inverter.	May need to replace PCU. Call Sun Enterprise Services for assistance.
A-06	Memory Error	PCU has failed startup memory test.	Restart. If failure continues, may need to replace PCU. Call Sun Enterprise Services for assistance.
A-07	High Battery	Battery voltage is high. Possible defective battery or incorrect voltage parameter settings.	May need to replace PCU batteries. Call Sun Enterprise Services for assistance.
A-08	Low Battery	Battery voltage too low for PCU to run on battery power.	If AC input voltage is too low to keep batteries charged, PCU shuts down (and also shows a Low Runtime code of A-00). Batteries s recharges when AC input power returns.
A-09	Check Fan	PCU fan not operating.	Call Sun Enterprise Services for assistance.
A-10	Reserved		
A-11	Batteries Disconnected	Batteries not properly connected.	Call Sun Enterprise Services for assistance.
A-12	Tap Regulator Alarm	Internal PCU problem.	PCU may start running on battery power. May need to replace PCU. Call Sun Enterprise Services for assistance.
A-13	Low AC Out	PCU AC output voltage is too low.	Call Sun Enterprise Services for assistance.
A-14	High AC Out Warning/ Shutdown	PCU AC output voltage is too high.	PCU will shutdown. Perform orderly shutdown of Sun StorEdge A7000. Call Sun Enterprise Services for assistance.
A-15	Check MOV	Internal PCU metal-oxide varistor problem.	Call Sun Enterprise Services for assistance.

TABLE A-2 PCU Alarm Codes *(Continued)*

Alarm Code	Alarm	Description	Possible Solution/Action
A-16	Auto Bypass	PCU is in internal bypass mode. Powers Sun StorEdge A7000, but does not regulate the power or provide battery backup.	May need to replace batteries or PCU. Call Sun Enterprise Services for assistance.
A-17	Check Fuse Board	Possible problem with PCU fuse board.	Call Sun Enterprise Services for assistance.
A-18	Reserved		
A-19	Check Power Supply	Possible problem with internal PCU power supply.	Call Sun Enterprise Services for assistance.

Installing the HDSA Expansion Cabinet

Note – This procedure requires two or more people to perform.

This section describes the procedure for installing the high-density storage array (HDSA) expansion cabinet. Two useful documents are the *Sun StorEdge A7000 Service Manual* (805-6489) and *Sun StorEdge A7000 Installation Guide* (805-4632).

Note – If you are connecting power conditioning units (PCU) in the Sun StorEdge A7000 expansion cabinet installation, consult the *Sun StorEdge A7000 Installation Guide* and *Sun StorEdge A7000 Physical Planning Manual* before installation.

FIGURE B-1 shows the Sun StorEdge A7000 system cabinet and optional HDSA expansion cabinet, with up to four full disk drawers. These cabinets must be physically and electrically connected, with cables connecting the HDSA expansion cabinet drives to the controllers in the system cabinet.

■ If you are installing the system and expansion cabinets as part of a new installation from the factory, all SCSI controller and expander cards are already installed in the system cabinet. This installation type involves physically and electrically connecting the cabinets.

■ If you are installing the expansion cabinet as an x-option add-on field upgrade, you need to also install SCSI controller and expander cards in the system cabinet. Record all new component part numbers, revisions, serial numbers, and chassis card slot locations as you install the components. You will need this information for the Master Configuration Database (MCD) update procedure.

FIGURE B-2 shows an installation flowchart.
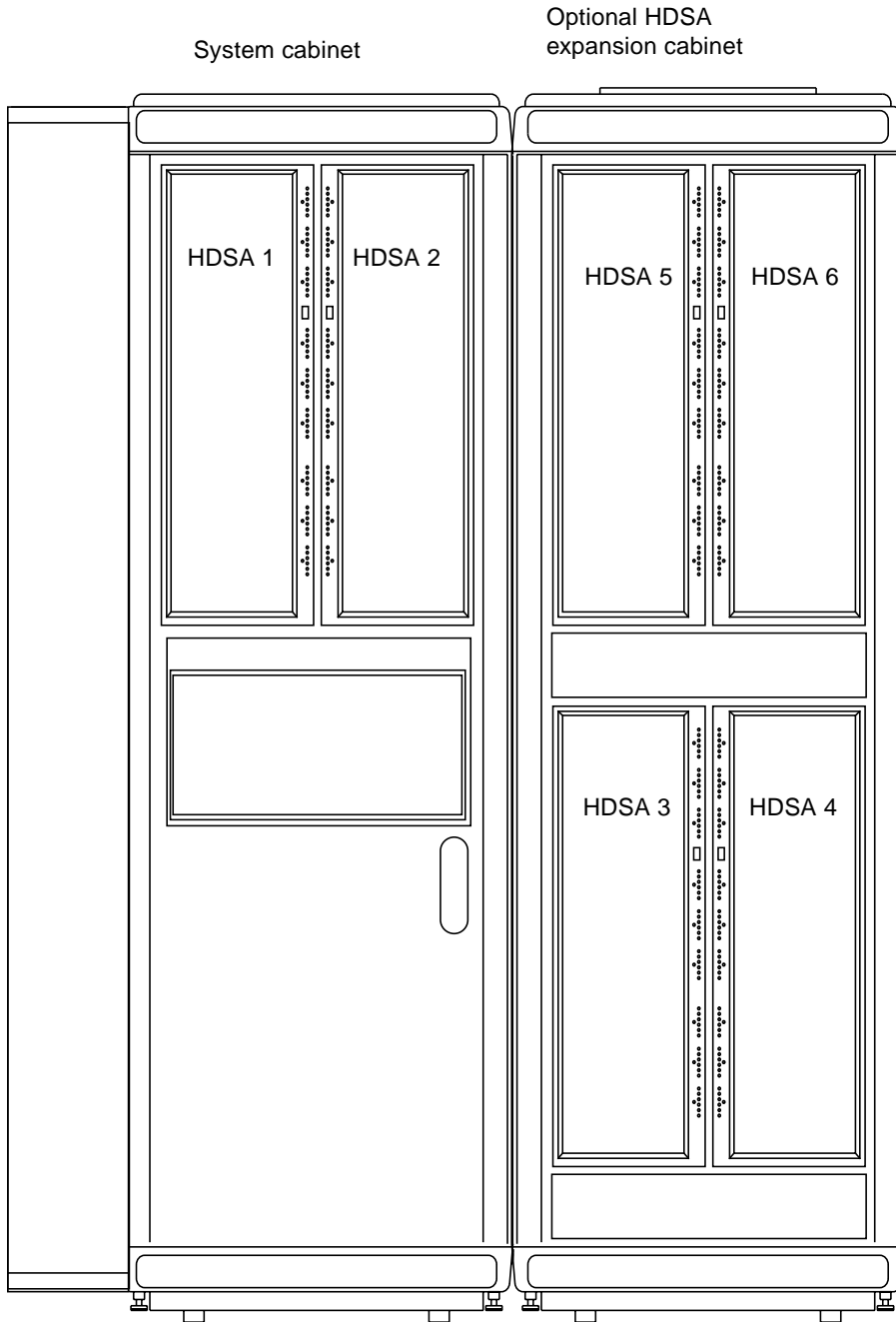
FIGURE B-1 Sun StorEdge A7000 With Expansion Cabinet
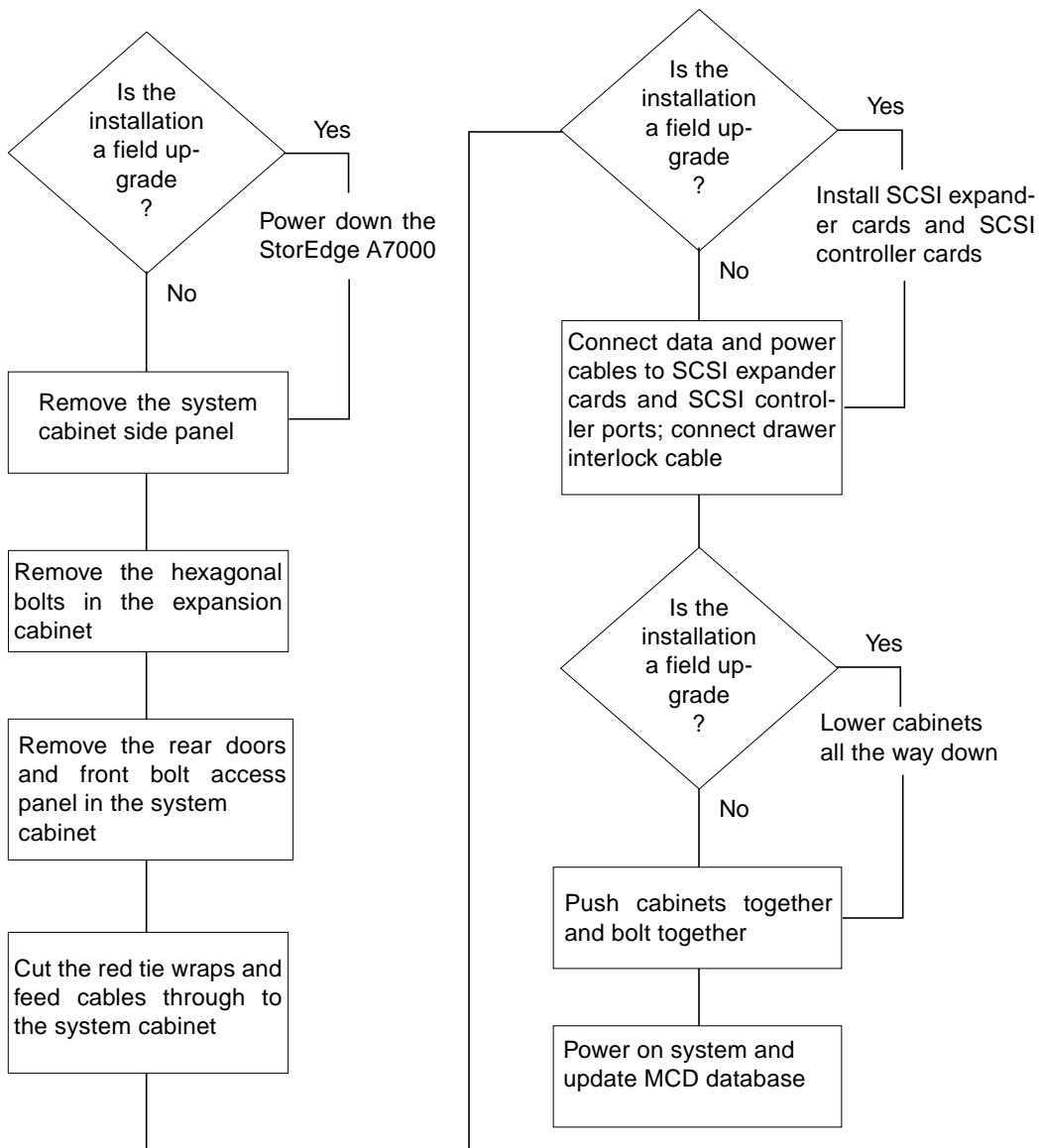
FIGURE B-2 Expansion Cabinet Installation Flowchart

B.1　Required Tools List

- Tie wrap cables in assorted sizes
- Adjustable wrench or each of the following:
  - 5/16-inch open end wrench
  - 7/16-inch open end wrench
- Tools in English-unit sizes:
  - 5/16-inch socket
  - 7/16-inch socket
  - 1/4-inch drive socket set
  - 1/8-inch long shaft flat blade screwdriver
- Large flat blade screwdriver
- No. 1 and No. 2 Philips screwdrivers
- Needle-nosed pliers
- Small adjustable wrench
- Diagonal cutters
- Label maker with cartridges or marker
- Carpenter's level or equivalent one-foot level
- Step stool
- Flashlight

B.2　Before You Begin...

- Always wear the electrostatic discharge (ESD) wrist strap that connects to the system cabinet when working inside the cabinets.
- Keep all cabinet power cords plugged into their receptacles to maintain ground during these procedures.

B.3   Power Off the Sun StorEdge A7000

Skip this section if this is a new installation and go to Section B.4 "Preparing the Cabinets" on page B-12.

Power off the Sun StorEdge A7000 if you are installing the expansion cabinet as a field upgrade. Keep the power cords plugged into their receptacles to maintain earth ground. The power off procedure includes the following steps:

1. **Opening the System Console carrier tray and System Console cover.**

2. **Stopping the DataShare, simulation, and SCSI target software (optional).**

3. **Selecting shutdown from the System Console Application Menu Bar to shut down the subsystems. (Optional) If the autoboot feature is enabled, then abort the subsystem restart.**

4. **Shutting down the System Console.**

5. **Powering off the System Console.**

6. **Opening the front cabinet door.**

7. **Powering off the dsp2 subsystem power supply and the dsp1 subsystem power supply.**

8. **Powering off the HDSA supplies.**

9. **Powering off the cabinet power supply.**

10. **Power off the power conditioning unit.**

B.3.1   Open the System Console Carrier Tray and Cover

1. **Turn the spring-loaded knobs on the tray clockwise to release the tray.**

2. **Fold down the front door tray.**

3. **One screen latch is on each side of the System Console. Slide the latches forward and lift the cover.**

Some System Console models have screen latches on the front left and front right sides. Slide the left latch to the left, and the right latch to the right; lift the cover.

4. **The System Console display may be blank; press any key to reactivate the display.**

B.3.2　Stop the DataShare Facilities (Optional)

1. **Stop the DataShare Facilities on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# dsf stop
```

2. **Repeat for dsp2.**

B.3.3　Stop the SCSI Target Emulation Software (Optional)

1. **Stop the simulation on dsp1 through a dsp1 window (if it does not automatically start):**

```
dsp1# ste stop
```

2. **Repeat for dsp2.**

B.3.4　Stop the Simulation Software (Optional)

1. **Move the mouse pointer to window dsp1 and then type:**

```
dsp1# ckdadmin stop_noswitch
```

Messages display indicating that the simulation is stopping. When the procedure stops, perform the next step.

2. **Repeat for dsp2.**

B.3.5　Shut Down All Subsystems

1. **From the System Console Application Menu Bar, choose Utilities→shutdown.**

The shutdown window is displayed. See FIGURE 8-6.

2. **Select all nodes.**

3. Type Y at the Ready To Shutdown Now? prompt in the dsp1/dsp2 windows to immediately shut down.

The dsp1 window displays a series of shutdown messages followed by a "The System is down" type message.
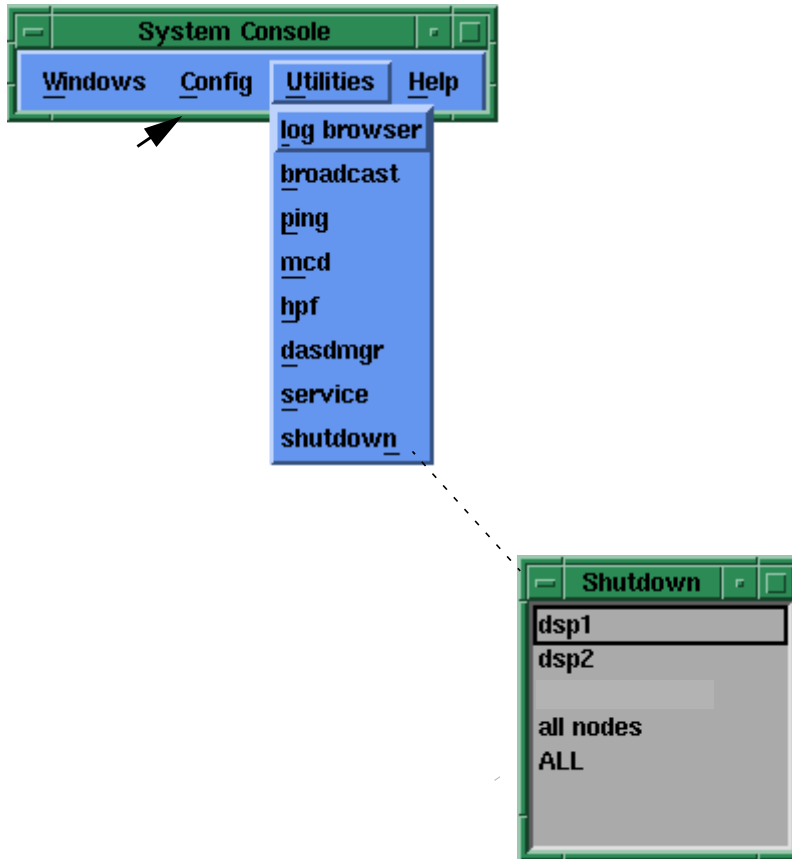
FIGURE 8-6 Shutdown Pulldown Menu and Window

B.3.6 Abort the System Reboot (Optional)

If the autoboot feature is enabled, the subsystems attempt to reboot and startup messages start to appear.

1. **When you see the following message in the dsp1 window, press any key before 7 seconds elapse:**

```
You have 7 seconds to terminate the autoboot sequence . . .
```

If the system is not set to automatically boot, go to the next step.

2. **The following prompt appears:**

```
ROM >>
```

3. **The dsp1 window displays a series of shutdown messages followed by a "The System is down" type message.**

4. **When you see the following message in the dsp2 window, press any key before 33 seconds elapse:**

```
You have 33 seconds to terminate the autoboot sequence . . .
```

If the system is not set to automatically boot, go to the next step.

5. **The following prompt appears:**

```
ROM >>
```

The operating systems for all subsystems are now shut down.

B.3.7   Shut Down the System Console

1. **Put the mouse pointer in any open area on the display.**

2. **Press the left mouse button. A menu appears. Drag the mouse pointer to EXIT MWM. Release the left mouse button.**

3. **Drag the mouse to the OK pushbutton on the QUIT MWM dialog box; click Yes.**

   The display goes blank momentarily, and then the `Console Login:` prompt reappears.

   Note – The System Console may appear frozen after clicking Yes above; if this occurs, press Alt-PrtScr-h and type the command in Step 6. After the "Press any key to continue" message, power off the System Console.

   ---

4. **Log in to the System Console:**

   ```
   Console Login: root
   ```

5. **The system responds with a** `Password:` **prompt. Press the Enter key. The system prompt (#) appears.**

6. **Type:**

   ```
   dsp1# /etc/shutdown -y -g0 -i0
   ```

   The System Console displays a series of shutdown messages followed by a `Shutdown complete` type message.

B.3.8   Power Off the System Console

1. **Push or slide the power switch.**

2. **Close the System Console cover by pushing it down until the latches engage.**

3. **Fold up the tray. When it is nearly closed, turn the tray latches clockwise, push the tray all the way up, and release the latches to secure the tray.**

B.3.9 Open the Front Cabinet Door

The front cabinet door is located at the lower half of the system cabinet. The front door also contains the System Console in its tray carrier. To open the front cabinet door:

1. **Insert a flat blade screwdriver in the door lock and turn it clockwise.**

2. **Pull the bottom of the latch out toward you and turn the latch assembly counterclockwise.**

3. **Pull the latch to open the door. The door must be open to perform the power off procedures.**

B.3.10 Power Off the Subsystems

All subsystems can now be powered off.

1. **The dsp2 subsystem is the right subsystem. Slide the power supply on/off switch to the left.**

2. **The dsp1 subsystem is the left subsystem. Slide the power supply on/off switch to the left. Slide the switch to the left.**

B.3.11 Check Other Switches

1. **Power off the LAD/SCSI Expander. See** FIGURE B-3 **for switch location.**

2. **Open the I/O Bay cabinet doors. Just above the right power cord are two switches labeled DSP1 and DSP2. Press the top of the switch to set them to OFF.**

B.3.12 Power Off the HDSA Supplies

In the middle of the cabinet front just under the HDSA drawer(s) are the HDSA power supply switches. These snap switches are labelled 0 and 1. The 0 position is off and the 1 position is on.

1. **Open the cabinet door completely.**

2. **Place one HDSA on/off switch in the** 0 **position.**

3. **Place the other HDSA on/off switch in the** 0 **position.**

B.3.13 Power Off the Cabinet Power Supply

1. Press the cabinet power switch to turn off power to the cabinet.

2. Throw the main circuit breaker switch CB1 switch to the left (OFF).

3. Repeat these steps for both AC boxes.

B.3.14 Power Off the PCU

Power off any power conditioning units (PCUs) connected to the Sun StorEdge A7000.
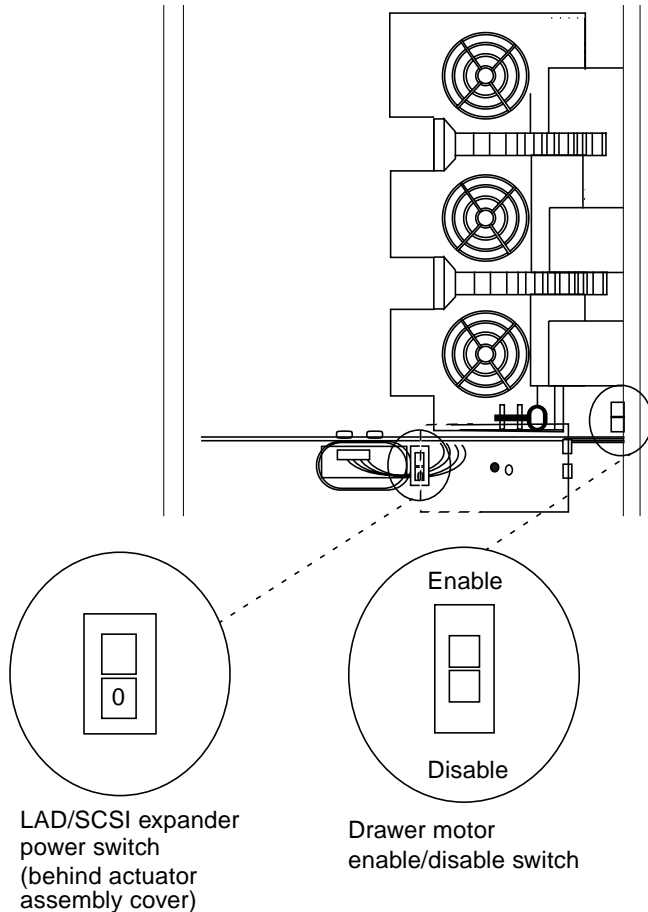
FIGURE B-3   LAD⁄SCSI Expander Power Switch Location

B.4   Preparing the Cabinets

Note – Skip Step 2 if the base cabinet side skin panel is already removed.

---

1. **Place the cabinets on a level floor, front-to-back and side-to-side as shown in**
   FIGURE B-4**.**

2. **Go to the right side of the system cabinet and remove the side-skin panel door.**

   Using a large slotted screwdriver, turn the release latches on the left side clockwise;
   turn the release latches on the right side counterclockwise. **See** FIGURE B-5**.**

3. **Remove the 12 retainer brackets with an adjustable wrench or a 5/16 open-ended**
   wrench. Set aside the brackets and hardware.

4. **Using a 7/16-inch socket wrench, remove the hexagonal-head bolts and washers**
   from the free end of the RFI connector frame on the HDSA expansion cabinet.
   Keep this hardware for connecting the cabinets in later steps; you will need seven
   sets of bolts and washers. See FIGURE B-6**.**
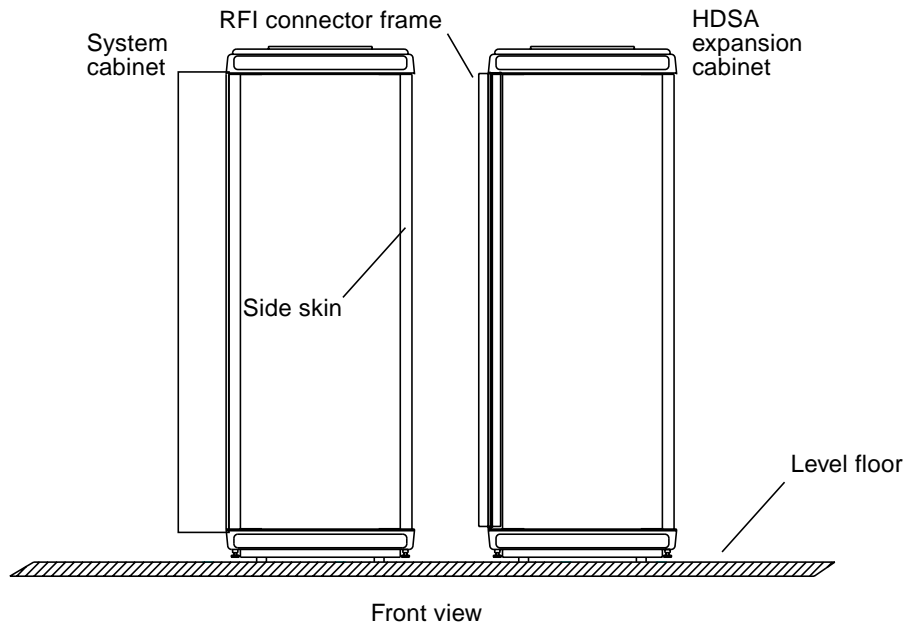
FIGURE B-4   Cabinet Orientation

Cabinet

Retainer bracket
12 places; see Detail B

Side skin panel

Quarter-turn release latch
12 places; see Detail A

Detail A

Side skin

Cabinet
frame

Quarter-turn
release latch

Retainer
bracket

Screw 10-32 X 5/16 in
(2 per bracket)

Detail B

Mounting holes for
retainer bracket

Cabinet frame

Retainer bracket
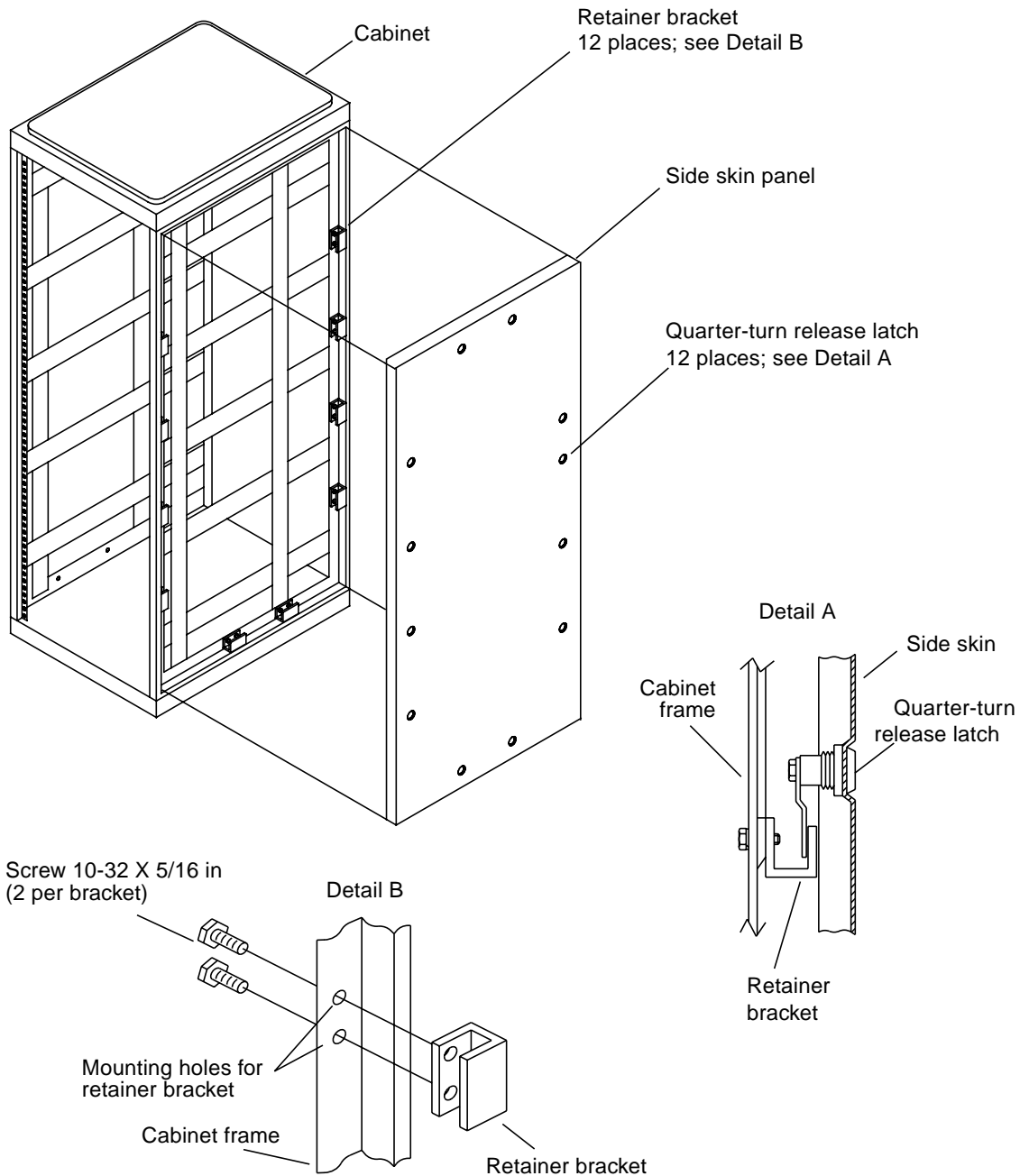
FIGURE B-5 Side Skin Panel Removal

Hex-head bolt and washer locations
see detail

Flat washer
1/4-20 LG pattern

Stand-off
1/4-20 X 2 7/8 in

RFI connector frame

Hex-head bolt
1/4-20 X 3/4 in

Lock washer
1/4-20

Frame vertical member detail

RFI connector frame
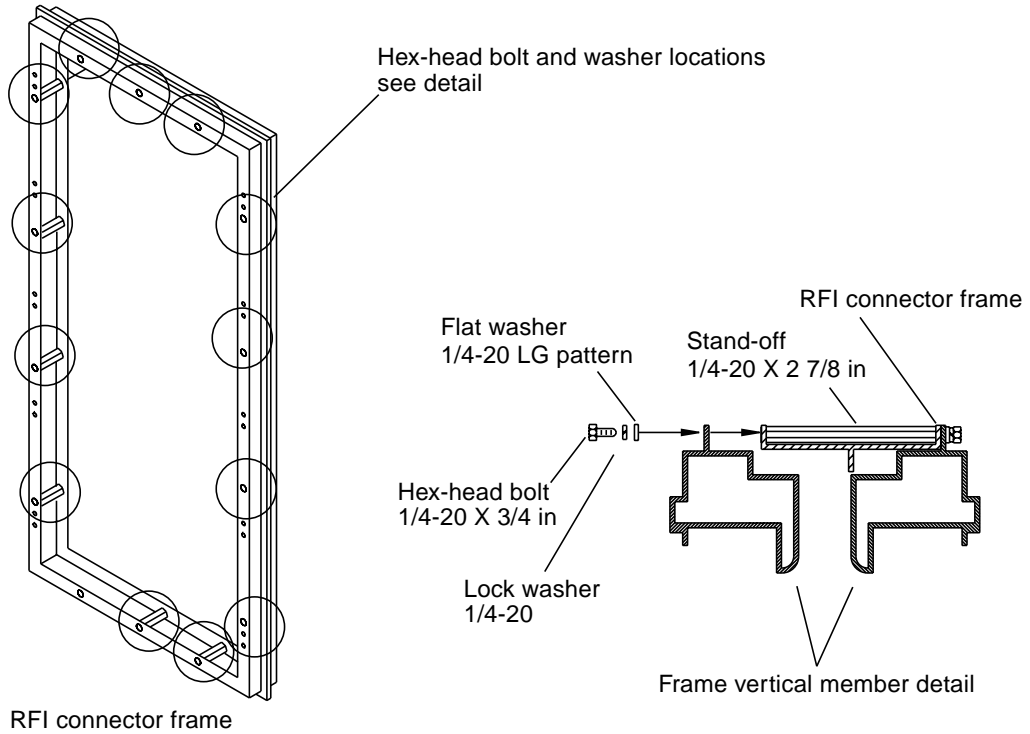
FIGURE B-6 RFI Connector Frame Bolts

5. **For easier access to the bolts you tighten later, remove the rear doors of each cabinet. For each cabinet:**

   a. **Open the rear door.**

   b. **Remove the pins at each hinge.**

   c. **Lift the door up and off.**

6. **Open the system cabinet front door.**

7. **At the bottom right of the cabinet blower, remove the two Philips screws securing the bolt access panel. Set the plate and screws aside. See** FIGURE B-7**.**
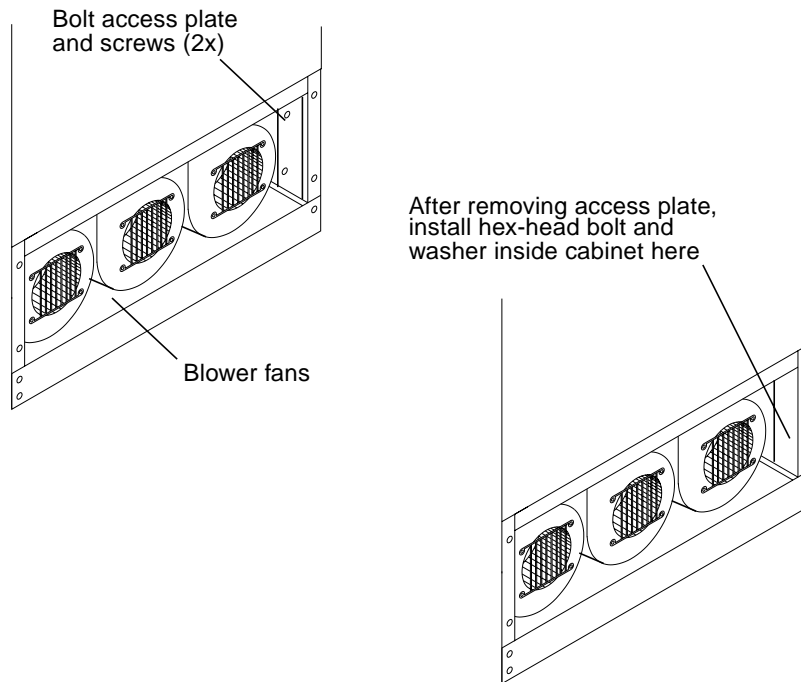
FIGURE B-7   System Cabinet Front, Bolt Access Plate and Screws

B.5 Feed Cables Into the System Cabinet

1. **Inside the system cabinet and HDSA expansion cabinet, cut any red tie wraps used to secure power and data cables in place during shipping.**

2. **Feed the cables into the system cabinet. Pull them through and put them in a convenient place so you can work with them.**

B.6 Install or Connect the SCSI Expander Cards and Cables

If the SCSI expander cards are already installed, skip to Section B.6.1 "Connect the SCSI Expander Cables" on page B-19. Otherwise, start with Step 1. Find the SCSI expander cards (also called splitter or ATTO cards) shipped with the cabinet. Starting with the bottom row in the expander chassis, fill the open slots. Start with the first open slot and install them left to right. When the bottom row is filled, fill the top slots from left to right.

1. **Lift the spring-loaded retainer screw on the top right side of the expander chassis. Lift the chassis off the peg and swing the chassis out. This provides easier access when you need to cable the cards. See** FIGURE B-8.

2. **Remove the card retaining bracket screws and bracket.**

3. **On each SCSI expander card, remove the inline terminator on the rear of the card. Set aside the terminator; you re-install it later.**

4. **Record the serial number, part number, and slot location of each card you install.**

5. **Find the power harness that contains the power connectors for the expander cards. Connect a power connector to each SCSI expander card. Depending on the configuration, you may not need to connect or use all plugs.** FIGURE B-9 **shows the power connectors on the cards.**

6. **The power harness you just installed contains a mating plug to connect to power from the expansion cabinet. Find the power cable and mated connector from the expansion cabinet and connect it.**

7. **Replace the card retaining bracket and screws.**

8. **Replace the inline terminator on each card.**
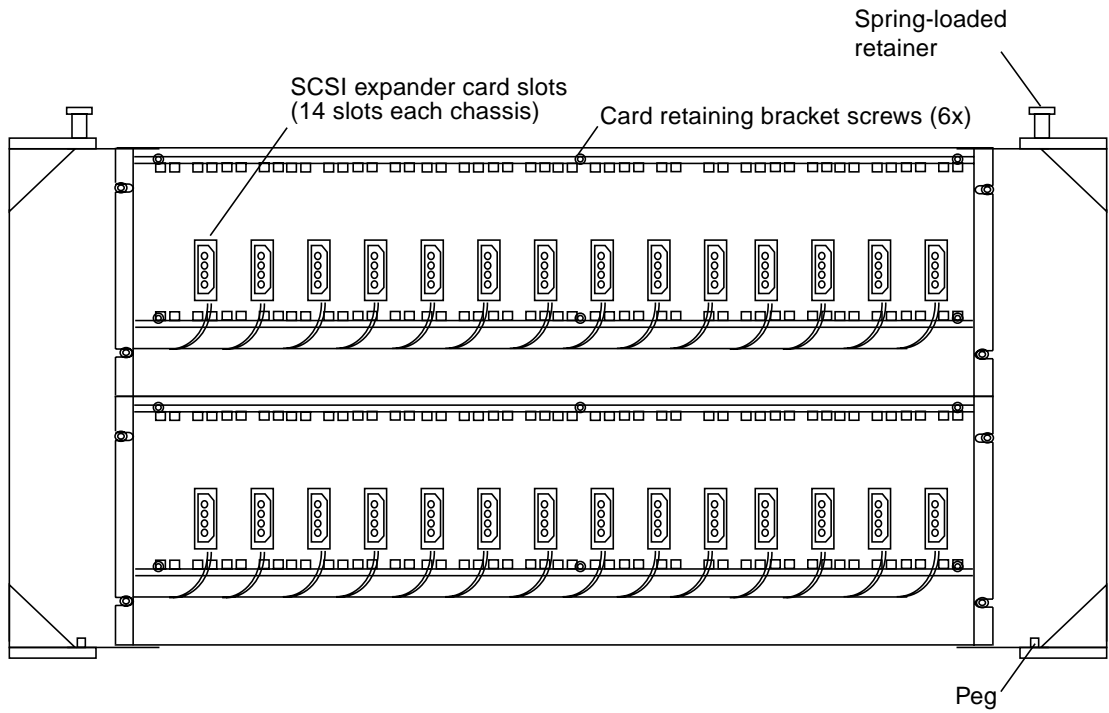
FIGURE B-8 Dual SCSI Expander Chassis
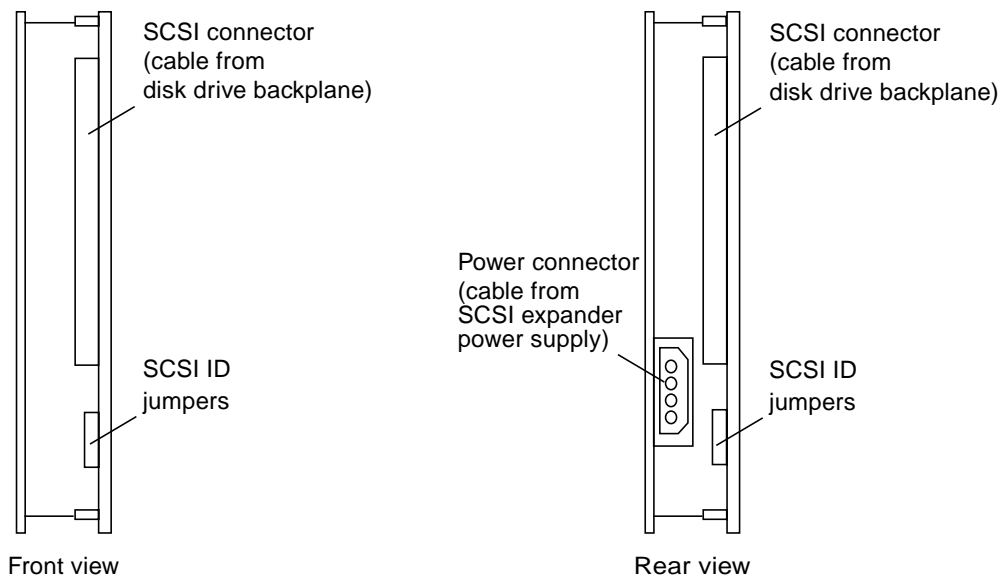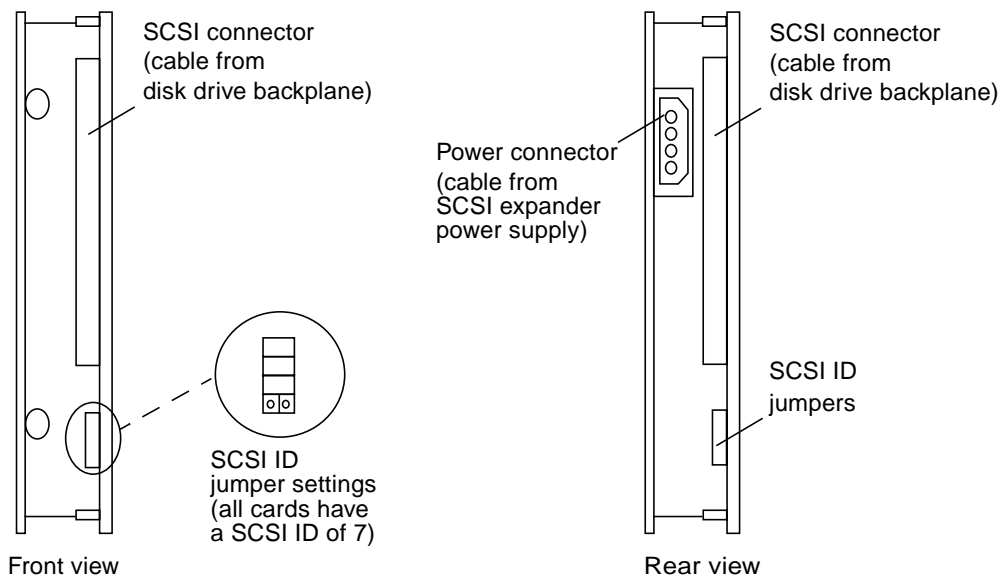
FIGURE B-9 SCSI Expander Card Connectors and Jumpers, Both Card Types

B.6.1 Connect the SCSI Expander Cables

Some expansion cabinet cables connect to the SCSI expander cards in the SCSI expander chassis. Two SCSI cables connect to each SCSI expander card.

The cables from the disk drive bundles are labeled like the examples in FIGURE B-10 for each SCSI expander card. TABLE B-1 shows the SCSI expander card labeling. TABLE B-2 shows how each disk drive bundle is labeled in the cabinet drawers.

1. **Locate the SCSI expander card for the SCSI controller cable connector. For example, the cables from the first disk drive bundle in HDSA drawer 3 are labeled** `DSP2/78/P2/EXP10` **and** `DSP1/78/P2/EXP10`**. See** TABLE B-2**. These cables correspond to the SCSI expander card in slot 10 of the bottom SCSI expander chassis. See** TABLE B-1**.**

2. **Connect the** `DSP2` **labeled cable to the front connector on the SCSI expander card. Connect the** `DSP1` **labeled cable to the rear connector on the SCSI expander cable.**

3. **Replace the chassis. Pull up the spring-loaded retainer on the right, and align the hole in right side with it. Align the chassis with the peg on the bottom.**

4. **Stow any unused cables under the SCSI expander chassis.**

D = disk drive bundle
S = SCSI expander card
F = front of card
R - rear of card
* = SCSI expander card slot (for example, EXP10)
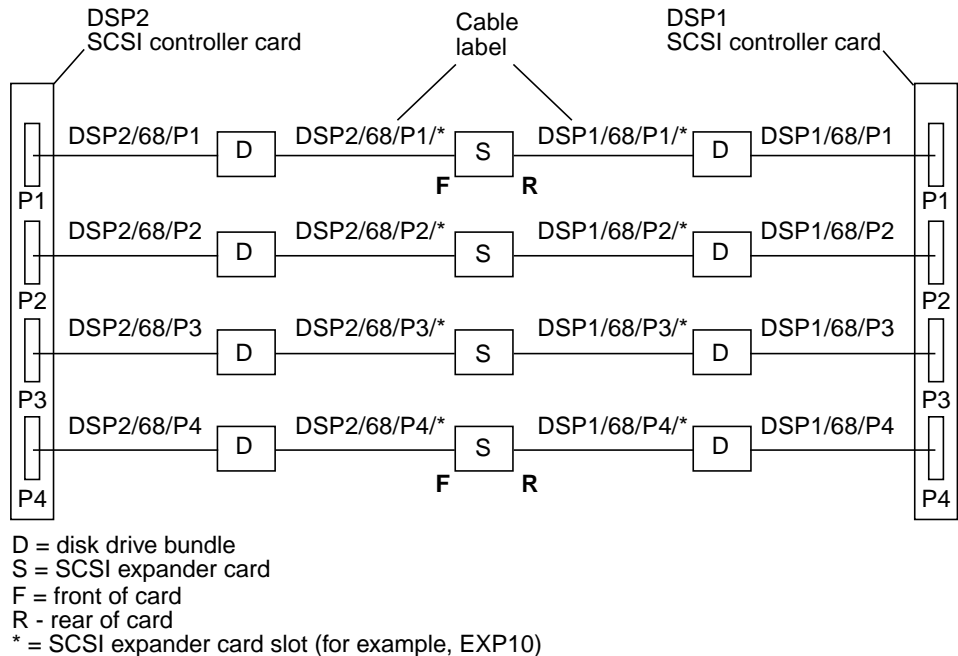
FIGURE B-10 SCSI Expander and Controller Cards Connection and Labeling Example

TABLE B-1   SCSI Expander Card Labeling

Card Slot (Left to Right)	Card Label, Bottom Chassis	Card Label, Top Chassis
1	DSP1/2/6800/P1	DSP1/2/8000/P3
2	DSP1/2/6800/P2	DSP1/2/8000/P4
3	DSP1/2/6800/P3	DSP1/2/8800/P1
4	DSP1/2/6800/P4	DSP1/2/8800/P2
5	DSP1/2/7000/P1	DSP1/2/8800/P3
6	DSP1/2/7000/P2	DSP1/2/8800/P4
7	DSP1/2/7000/P3	DSP1/2/9000/P1
8	DSP1/2/7000/P4	DSP1/2/9000/P2
9	DSP1/2/7800/P1	DSP1/2/9000/P3
10	DSP1/2/7800/P2	DSP1/2/9000/P4
11	DSP1/2/7800/P3	DSP1/2/9800/P1
12	DSP1/2/7800/P4	DSP1/2/9800/P2
13	DSP1/2/8000/P1	DSP1/2/9800/P3
14	DSP1/2/8000/P2	

TABLE B-2 System and HDSA Expansion Cabinet Disk Labeling

Cabinet	Drawer		
System Cabinet, Row	Labels, HDSA 1 (Left Drawer)		
Top	DSP2/68/P4	DSP1/68/P4	DSP2/70/P1
Middle	DSP1/68/P3	DSP2/68/P3	DSP1/68/P2
Bottom	DSP2/68/P1	DSP1/68/P1	DSP2/68/P2
	Labels, HDSA 2 (Right Drawer)		
Top	DSP1/78/P1	DSP2/78/P1	DSP1/70/P4
Middle	DSP2/70/P3	DSP1/70/P3	DSP2/70/P4
Bottom	DSP1/70/P2	DSP2/70/P2	DSP1/70/P1
Expansion Cabinet, Row	Labels, HDSA 3 (Bottom Left Drawer)		
Top	DSP2/80/P1	DSP1/80/P1	DSP2/80/P2
Middle	DSP1/78/P4	DSP2/78/P4	DSP1/78/P3
Bottom	DSP2/78/P2	DSP1/78/P2	DSP2/78/P3
	Labels, HDSA 4 (Bottom Right Drawer)		
Top	DSP1/88/P2	DSP2/88/P2	DSP1/88/P1
Middle	DSP2/80/P4	DSP1/80/P4	DSP2/88/P1
Bottom	DSP1/80/P3	DSP2/80/P3	DSP1/80/P2
	Labels, HDSA 5 (Top Left Drawer)		
Top	DSP2/90/P2	DSP1/90/P2	DSP2/90/P3
Middle	DSP1/90/P1	DSP2/90/P1	DSP1/88/P4
Bottom	DSP2/88/P3	DSP1/88/P3	DSP2/88/P4
	Labels, HDSA 6 (Top Right Drawer)		
Top	DSP1/98/P3	DSP2/98/P3	DSP1/98/P2
Middle	DSP2/98/P1	DSP1/98/P1	DSP2/98/P2
Bottom	DSP1/90/P4	DSP2/90/P4	DSP1/90/P3

B.7 Install the SCSI Controller Cards

If the extra SCSI controller cards needed for the expansion cabinet disk drives are already installed, skip to Section B.8 "Connect the SCSI Controller Cables" on page B-22. Otherwise, start with Step 1.

1. **Record the serial number, part number, and slot location of each card you install.**

2. **Set the jumpers for each card. Chapter 3 of the** *Sun StorEdge A7000 Service Manual* **contains jumper settings for this card.**

3. **Slide the card into the slot and press it to make sure the backplane connectors engage. Fill the slots starting at slot 7 and above. Make sure that filler cards occupy any empty slots.**

4. **Using a small slotted screwdriver, secure the card to the chassis card cage with the two captive screws.**

B.8 Connect the SCSI Controller Cables

Note – Do not connect any unused SCSI cables to the SCSI controller card ports. Stow these cables inside the bottom of the system cabinet.

---

1. **Locate the SCSI cables from the system and expansion cabinets that connect from the disk drives to the SCSI controller card ports. These cables are labeled.**

The cables from the first disk drive bundle in HDSA drawer 3 are labeled `DSP2/78/P2` and `DSP1/78/P2`. See TABLE B-2. These cables correspond to the SCSI controller port P2, base address 0x7800 on the cards in chassis dsp1 and dsp2.

FIGURE B-11 shows how the SCSI port are labeled and how they correspond to the labeled cables. See also FIGURE B-10.

2. **Connect the SCSI cable connectors to the SCSI controller card ports.**
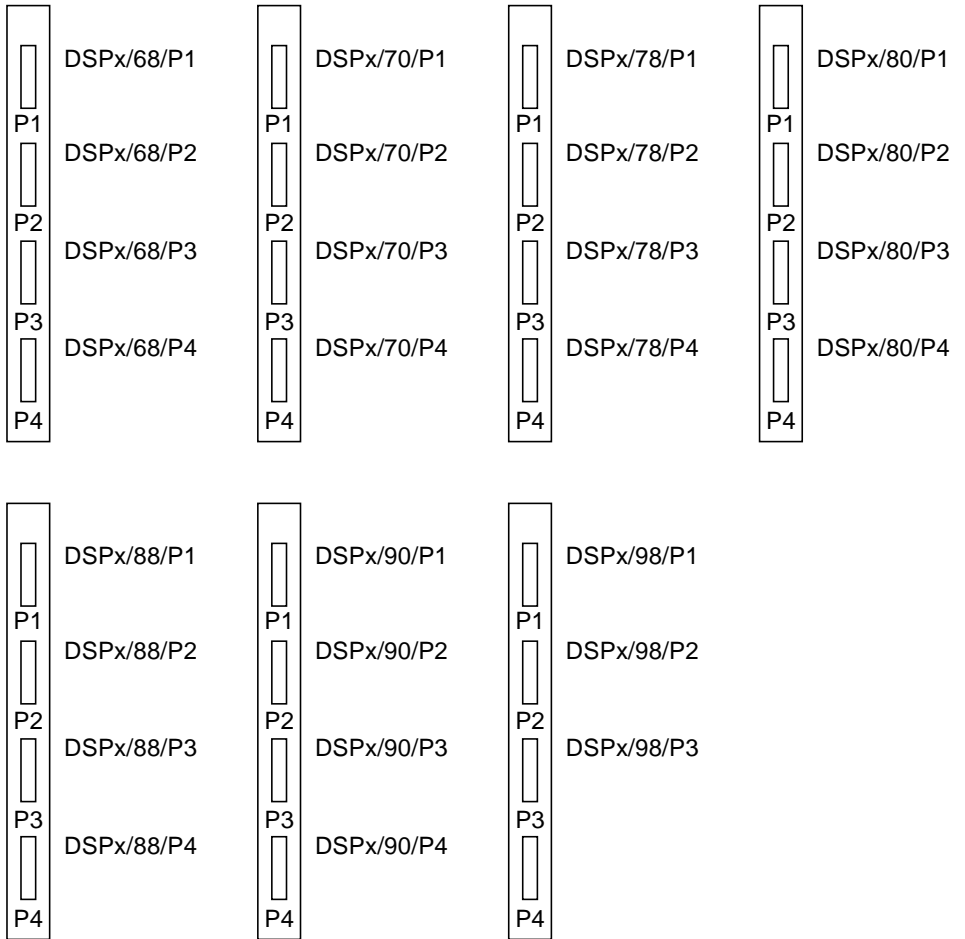
FIGURE B-11 SCSI Controller Port Labeling

B.9 Physically Connecting the Cabinets

> ⚠ **Caution –** While performing the following steps, it is extremely important that the RFI gasket is not damaged, bent, or crimped while inserting the RFI connector frame. To prevent damage, bring the cabinets together in a slight "V" shape.

1. **If you are installing the expansion cabinet as an x-option add-on field upgrade, lower both cabinets all the way down.**

   Use an adjustable wrench or an open end 7/16-inch wrench to screw down the cabinet leveling legs until contact with the floor is made. Refer to the *Sun StorEdge A7000 Installation Guide* for more information.

2. **Position the cabinets to be connected, with the RFI connector frame close to the RFI gasket of the second cabinet. See** FIGURE B-12**. Note the position of the bottom outside surface of the RFI connector frame to the inside of the RFI gasket.**

3. **If the RFI connector frame is free to enter the RFI gasket, push the two cabinets together to where the attachment bolts may be installed and proceed to Step 5.**

   As cabinets and RFI connector frame come together, keep the faces (rear or front) even. Align all screw holes properly for final assembly.

   If the RFI connector frame is not free to enter the RFI gasket, proceed to Step 4.
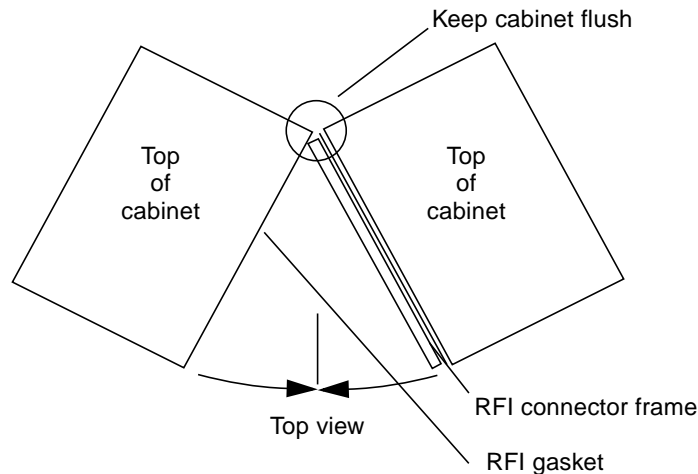
FIGURE B-12 Pushing Cabinets Together

4. If the RFI connector frame is not free to enter the RFI gasket of the second cabinet, you may need to adjust one of the two cabinets and make it level with the other cabinet. Adjust the four leveling legs down (using an adjustable wrench or an open end 7/16 inch wrench), lifting the bottom of the frame slightly above the inside face of the RFI gasket.

Caution – Do not overtighten RFI connector frame bolts. Overtightening may bend the frame.

Caution – In the step below, remove only one pin at a time to move a drawer. Never remove both pins at the same time. The cabinet can become unbalanced and tip, threatening personal safety.

5. Fully extend the system cabinet right HDSA drawer (HDSA drawer 2, shown in FIGURE B-1**). A metal pin installed at the rear of the cabinet near the bottom HDSA cable track prevents the drawer from moving manually. See** FIGURE B-13**.**

    a. Remove the pin; the drawer may slide forward a bit.

    b. Go to the front of the cabinet and pull the drawer all the way forward, until it is fully extended.
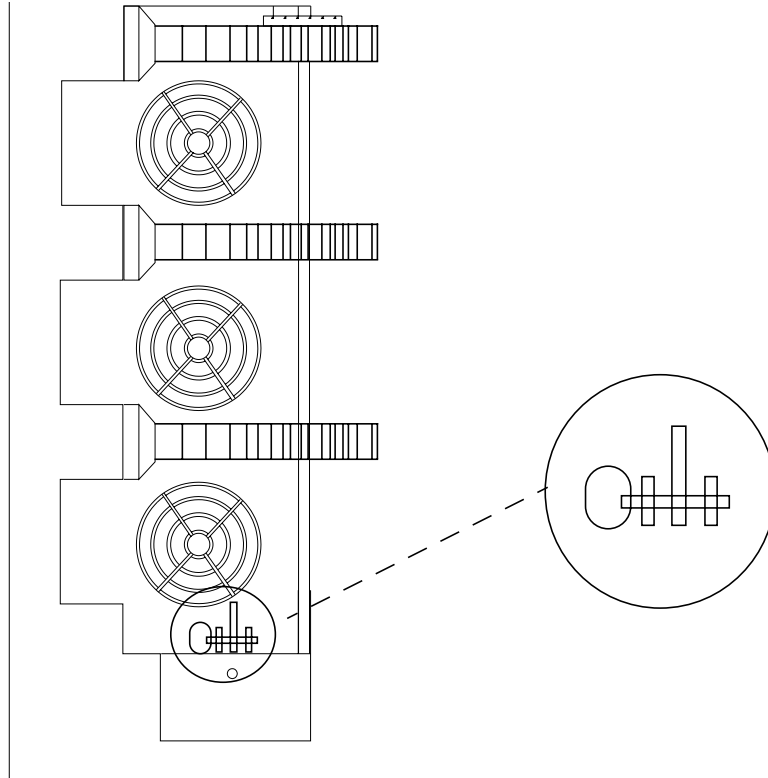
FIGURE B-13 HDSA Drawer Retractor Pin

6. **Insert the hexagonal-head attachment bolt and washers in the each of the openings at the front of the cabinet shown in** FIGURE B-14 **and tighten. You can access these bolt openings from the front or rear of the cabinet.**

7. **Replace the bolt access panel and close the front door.**

8. **Go to the front of the cabinet and push HDSA drawer 2 into the cabinet.**

9. **Go to the rear of the cabinet and replace the pin you removed in Step 5.**

10. **Replace the system cabinet rear doors.**
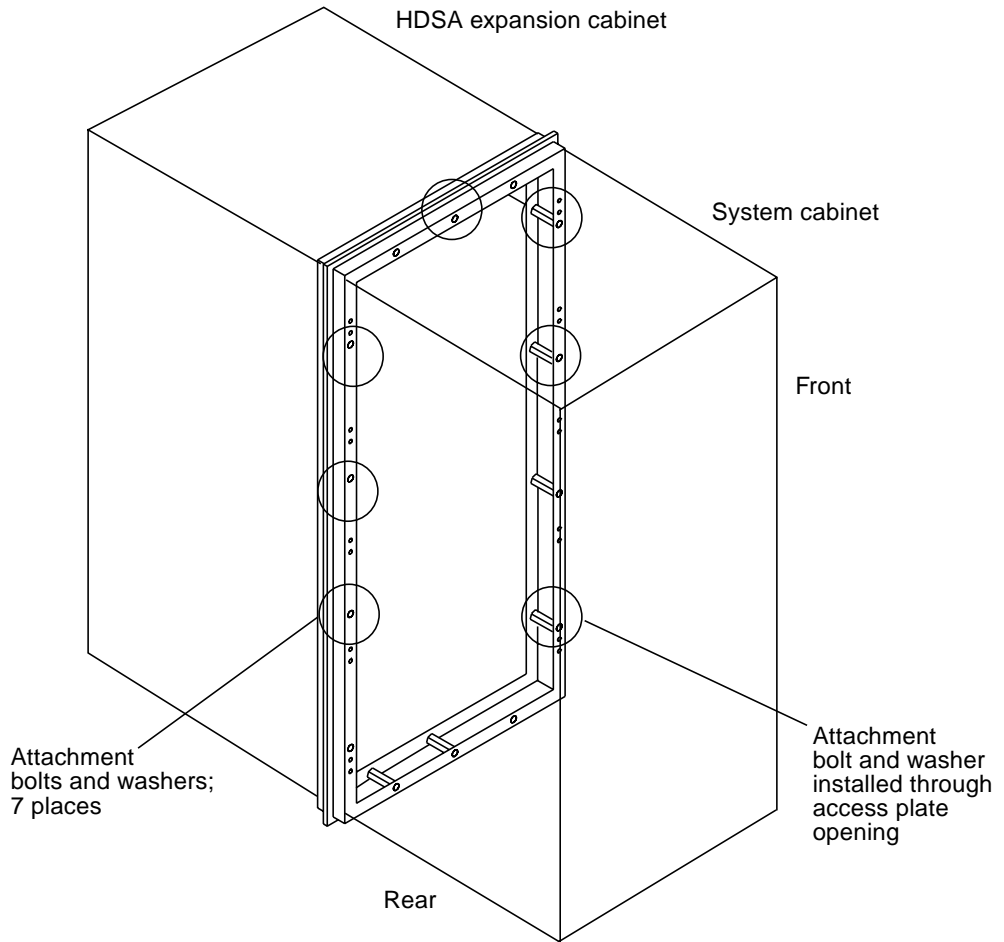
FIGURE B-14 Attachment Bolt and Washer Locations

B.10 Connect the HDSA Drawer Interlock Cables

The two drawer DC motors in the system cabinet have connectors that daisy-chain to the four drawer motors in the expansion cabinet.

1. **Open the rear door of the system and expansion cabinets.**

   FIGURE B-15 shows the drawer motor connectors. Connector P4 on each motor holds the black and white twisted pair drawer interlock cables.

2. **Route these cables through the system cabinet to the expansion cabinet. Each cable has a connector labeled J1 or J2.**

3. **Connect J1 to J1/P1 and J2 to J2/P2 according to the diagram in** FIGURE B-16. **Note that the connections in the system cabinet are already installed.**

4. **Make sure the yellow Caution label is not removed during this procedure. If it does, re-attach it using tie-wrap cables.**
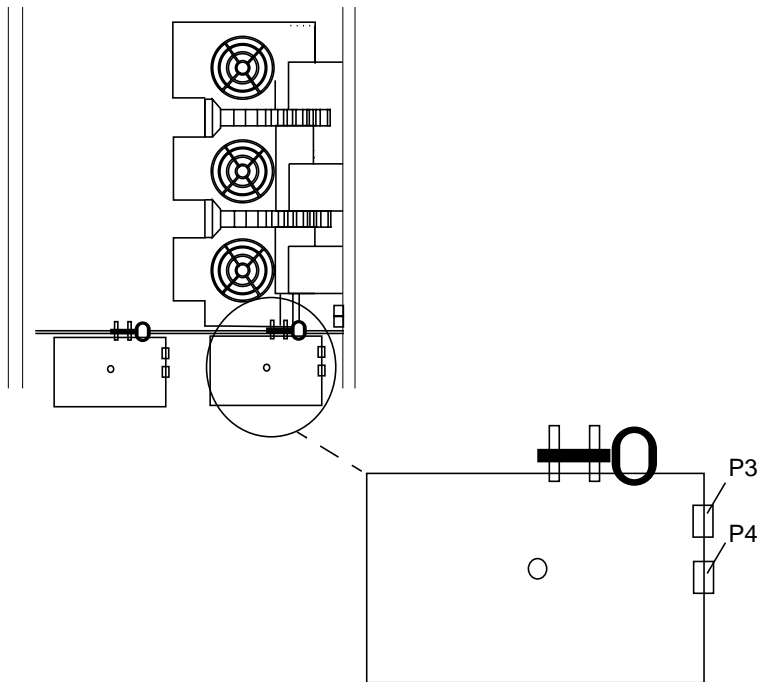
FIGURE B-15 Drawer Motor Connectors
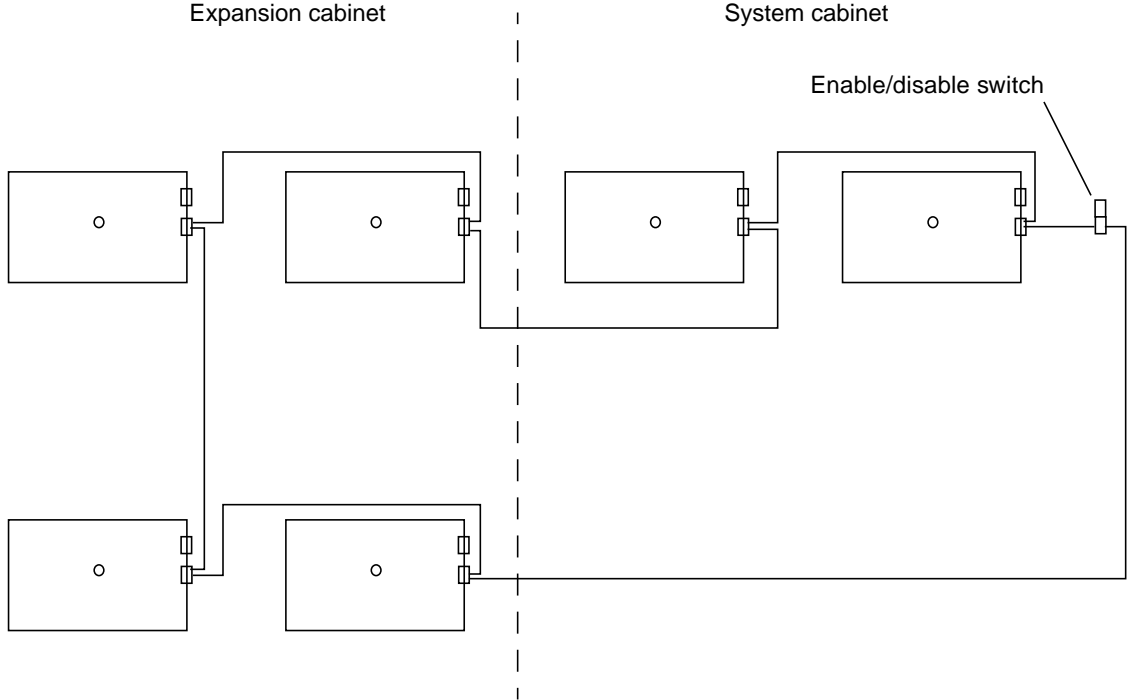
FIGURE B-16 Drawer Interlock Connection Diagram

B.11 Completing the Installation

To complete the installation, consult the *Sun StorEdge A7000 Installation Guide* to:

- Install power conditioning units (PCUs)
- Install disk drives
- Level the cabinets
- Power on the Sun StorEdge A7000

B.12 Updating the Master Configuration Database

If you installed the expansion cabinet as an x-option add-on field upgrade, you recorded all new component part numbers, revisions, serial numbers, and chassis card slot locations as you installed the components. You need this information for the Master Configuration Database (MCD) update procedure.

To update MCD, refer to the *Master Configuration Data Hardware Modification Tool User's Guide.*

Portable Maintenance Box

The portable maintenance box can be used by service engineers to back up or download data to the Sun StorEdge A7000 servers. The Sun StorEdge A7000 server does not contain onboard quarter-inch cartridge (QIC) tape drives, but does contain SCSI connectors to provide a connection to an external tape drive. These connectors are cabled to the maintenance box, which typically contains a QIC tape drive, disk drive, power supply, and fan.

FIGURE C-1 shows where the SCSI connectors are located. FIGURE C-2 shows a maintenance box.

I/O bay cabinet

Power cords

SCSI connectors
for Maintenance Box

Modem   Serial   ETHERNET

DSP1 maint

DSP2 maint
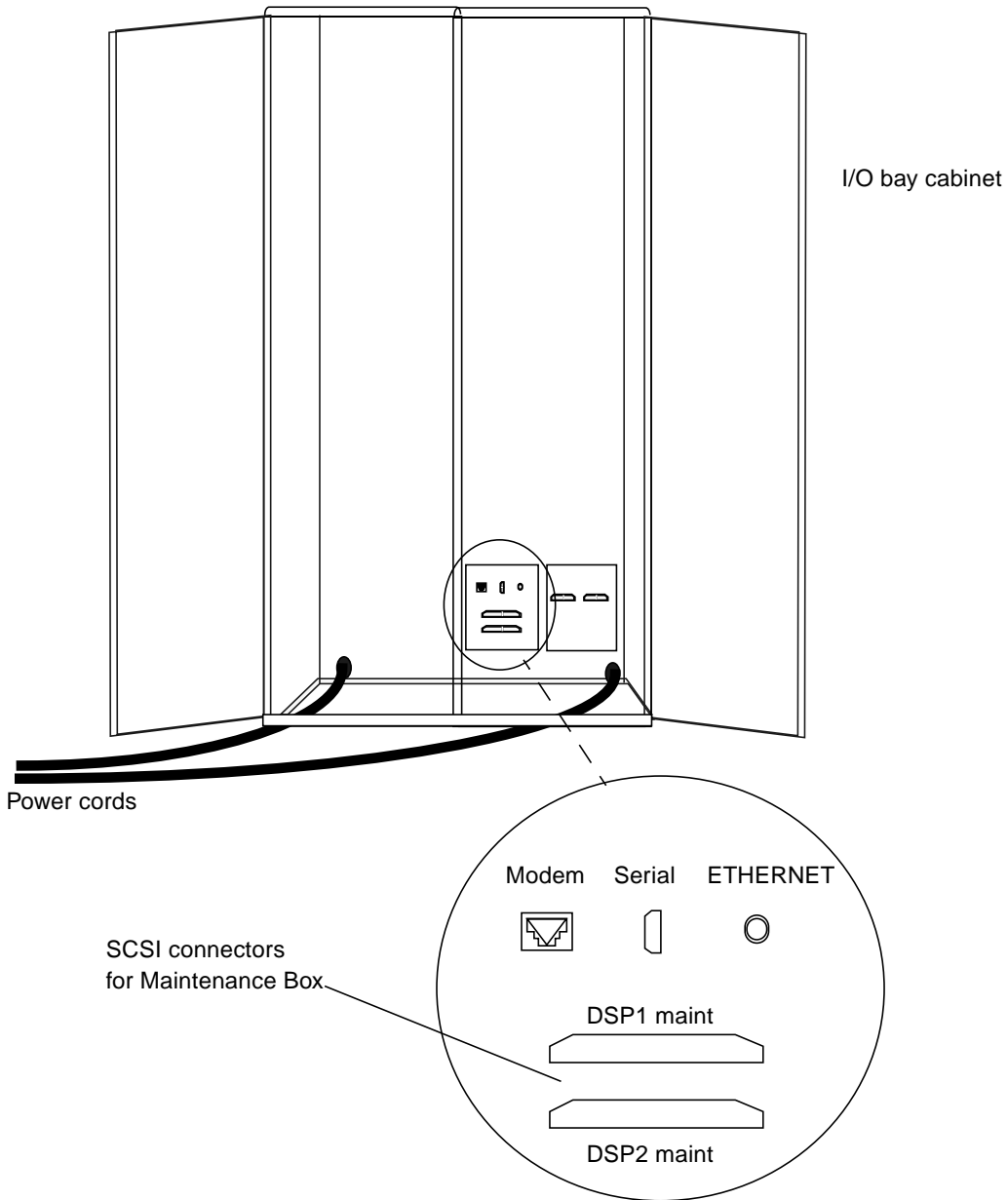
FIGURE C-1   Sun StorEdge A7000 Maintenance Box SCSI Connectors
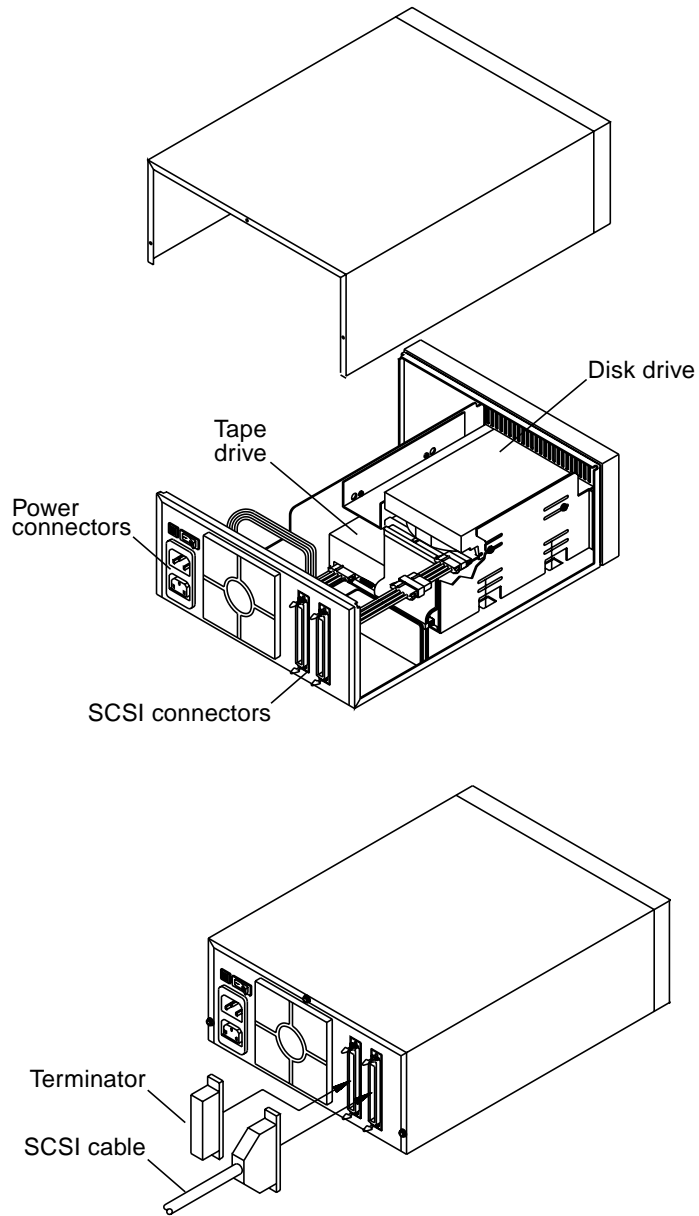
FIGURE C-2 Portable Maintenance Box

Glossary

ATB	Arbitration Termination Board.
BISTs	Built-in self-tests; tests built into the processor card.
coldstart	to power on the StorEdge A7000 server from a completely-powered off state.
controlled failover	to manually put (or *vary*) channels serviced by the subsystem offline.
DASD	Direct Access Storage Device.
DMA	Direct Memory Access.
DRAM	Dynamic Random Access Memory storage on the processor card.
dsp1, dsp2	names of the two subsystems in the StorEdge A7000 server.
ECC	Error Correction Code.
EDRAM	ECC-protected DRAM.
EMI	Electromagnetic Interference.
ESCON	Enterprise Systems Connection
failover	see *controlled failover.*
FIFO	first-in/first-out.
FORM	Fiber optic REFLECTIVE MEMORY.
FRU	Field-replaceable unit.
FTM	Fiber transition module.
GB	Gigabyte.
GUI	Graphical User Interface; operator communicates with the StorEdge A7000 server through graphical icons, windows, and trackball mouse actions (such as pointing and clicking).

HDSA	High-density storage array; drawer containing disk drives, used in StorEdge A7000 server.
HR	Host in Remote; testing mode for cache memory cards.
KW	Kiloword.
LED	light emitting diode.
LL	Local Loopback; testing mode for Cache Memory modules.
LOTO	Lockout/tagout.
MB	Megabyte.
MCA	MEMORY CHANNEL adapter card.
NR	Node in Remote; testing mode for cache memory cards.
NVRAM	Nonvolatile RAM storage on the processor card; used to store ROM Monitor configuration information.
PCB	Printed circuit board.
PCMCIA	Personal Computer Manufacturer Card Interface Adapter; the System Console contains two PCMCIA slots.
RAID	Redundant Arrays Of Independent Disks.
RAM	Random Access Memory.
RFI	Radio Frequency Interference.
RM(S)	REFLECTIVE MEMORY (System).
ROM Monitor	monitor-level firmware which resides on each subsystem's Processor card.
RX	receive.
SCSI	Small Computer System Interface; communications bus type used by StorEdge A7000 server disk drives.
SRAM	Static Random Access Memory.
subsystem	The combination of symmetric multiprocessor processor card and option boards in a 14-slot chassis with operating system software; it supports the HDSA in the StorEdge A7000 server.
System Console	notebook computer located in a carrier tray in the front door of the StorEdge A7000 server cabinet; the operator interface.
TX	transmit.

vary to put the system or BMC channels in a state, such as online or offline (*to vary channels offline*—to remove the channels from being serviced by the mainframe computer).

VME Versa Modulo Europa.

WSC Write Sense Controller.

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