Altos S205F / S200F User's Manual

Issue 1.0

1 May, 2004

Notices

Changes may be made periodically to the information in this publication without obligation to notify any person of such revision or changes. Such changes will be incorporated in new editions of this manual or supplementary documents and publications. This company makes no representations or warranties, either expressed or implied, with respect to the contents hereof and specifically disclaims the implied warranties of merchantability or fitness for a particular purpose.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopy, recording, or otherwise, without the prior written permission of Acer Incorporated.

Issue 1.0   1 May, 2004

Preface

What is in this manual
This user's manual gives you step-by-step instructions on how to install, configure and connect a Altos S205F / S200F storage subsystem to your host computer system, and how to use and maintain the system.

Who should use this manual
This user's manual e assumes that you have a working knowledge of the Fibre Channel Arbitrated Loop (FC-AL) and Advanced Technology Attachment (ATA) environments into which you are installing the Altos S205F / S200F Storage System system. If you do not have these skills, or are not confident with the instructions in this manual, do not proceed with the installation.

About this manual
This user's manual provides the following information:

- Chapter 1, "Introduction", on page 1 provides an overview of the Alto S205F / S200F storage subsystem and describes of the modules which make up the subsystem.

- Chapter 2, "Getting Started", on page 19 provides step-by-step instructions for installation and initial set-up.

- Chapter 3, "Operation", on page 39 tells you how to power on/off the Alto S205F / S200F, monitor the LEDs and start the drives.

International Standards

The Alto S205F / S200F storage system complies with the requirements of the following agencies and standards:

- CE
- UL 60950
- TUV/GS
- BSMI

Potential for Radio Frequency Interference

USA Federal Communications Commission (FCC)

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. The supplier is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

European Regulations

This equipment complies with European Regulations EN 55022 Class A: Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipments and EN50082-1: Generic Immunity.

Safety

All plug-in modules are part of the fire enclosure and must only be removed when a replacement can be immediately added. The system must not be run without all units in place.

Permanently unplug the unit if you think that it has become damaged in any way and before you move it.
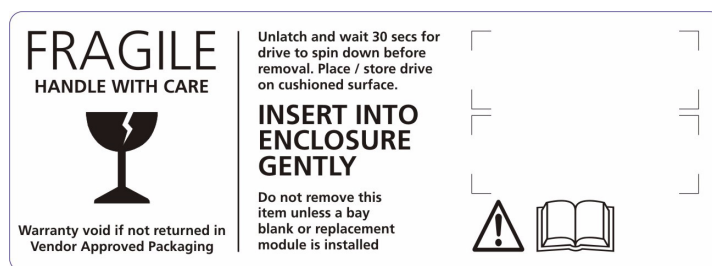
Drive Carrier Module Caution Label:
  – Do not operate with modules missing
  – Spin down time 30 seconds

• An Alto S205F / S200F enclosure can weigh up to 37kg (81lb). Do not try to lift it by yourself.
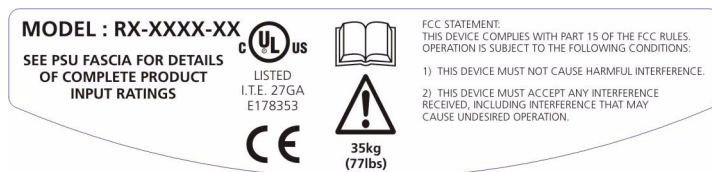
Chassis Warning Label: Weight Hazard

- Do not lift the Alto S205F / S200F by the handles on the PSU/Cooling module, they are not designed to support the weight of the populated enclosure.

- In order to comply with applicable safety, emission and thermal requirements no covers should be removed and all bays must be fitted with plug-in modules.

- The Alto S205F / S200F unit must only be operated from a power supply input voltage range of 100-120 VAC or 200-240 VAC.

- The plug on the power supply cord is used as the main disconnect device. Ensure that the socket outlets are located near the equipment and are easily accessible.

- The equipment is intended to operate with two working PSUs.

S/N: ZZVPPPPPSSSSSSS

Barcode to appear here

XYR P/N: XXXXX-XX

Barcode to appear here

RX-XXXX-XX-

DO NOT REMOVE
THIS ITEM UNLESS A
BAY BLANK OR
REPLACEMENT
MODULE IS
INSTALLED

YY WW

Controller Module Caution Label: Do not operate with modules missing

MODEL: RS-PSU-450-AC2N
INPUT : 100-120 / 200-240 VAC
7 / 3.5 A
60 / 50 Hz
0.7 KVA
OUTPUT :
+12V   20 A max
+5V   35 A max   Total ≤ 440 Wdc
+3.3V   15 A max
+5.1 Vsb 2 A

YY WW   COUNTRY OF ORIGIN

S/N: ZZVPPPPPSSSSSSS

Barcode to appear here

XYR P/N: XXXXX-XXX

Barcode to appear here

DO NOT REMOVE THIS
ITEM UNLESS A BAY
BLANK OR REPLACEMENT
MODULE IS INSTALLED.
SERVICE BY TRAINED
PERSONNEL ONLY.

HIGH POT / SAFETY
GROUND PASS
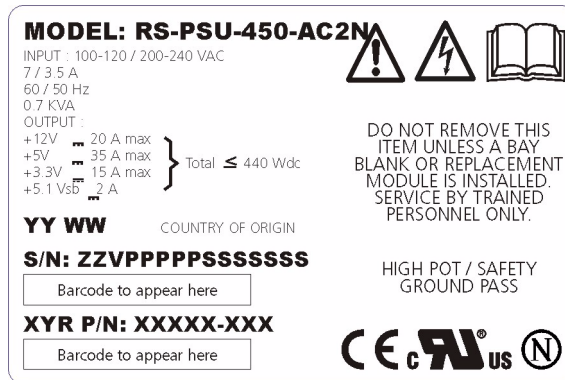
PSU/Cooling Module Caution Label: Do not operate with modules missing

- A faulty Power Supply/Cooling module must be replaced with a fully operational module within 24 hours.

- If powered by multiple AC sources, disconnect all supply power for complete isolation.

CAUTION	• Disconnect power cord before removing module • Powered by multiple power sources • Disconnect all supply power for complete isolation • See manual for correct supply cord details	**Input ratings for complete product:** • High Pot / Safety Ground Pass • 100-120 / 200-240 V AC • 7 / 3.5 A • 50 / 60 Hz • 0.7 KVA
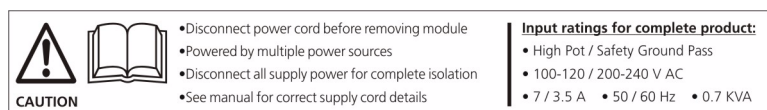
PSU Warning Label: Power Hazards

- The power connection should always be disconnected prior to removal of the Power Supply/ Cooling module from the enclosure.

- A safe electrical earth connection must be provided to the power cord. Check the grounding of the enclosure before applying power.

- Provide a suitable power source with electrical overload protection to meet the requirements laid down in the technical specification.

Warning   Do not remove covers from the PSU. Danger of electric shock inside. Return the PSU to your supplier for repair.

PSU Safety Label: Electric Shock Hazard Inside

Caution   *If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.*

Fibre Channel Host & Expansion Connectors

Important   If fitted with Optical modules, the modules must be a UL (or other North American NRTL) RECOGNISED COMPONENT and the laser in the module must comply with Laser Class 1, US 21 CFR (J) and EN 60825-1.

If passive copper cables are connected, the cable must not have a connection to the supply pins, pins 15 & 16.

Battery Safety

The battery is user replaceable, please refer to the Battery Replacement Procedure.

Warning   There is a danger of explosion if the battery is incorrectly replaced.

- Dispose of used batteries in accordance with the manufacturer's instructions and National regulations.

Rack System Precautions

The following safety requirements must be considered when the unit is mounted in a rack.

- The rack design should incorporate stabilizing features suitable to prevent the rack from tipping or being pushed over during installation or in normal use.

- When loading a rack with the units, fill the rack from the bottom up and empty from the top down.

- System must be operated with low pressure rear exhaust installation (Back pressure created by rack doors and obstacles not to exceed 5 pascals [0.5mm Water gauge])

- The rack design should take into consideration the maximum operating ambient temperature for the unit, which is 35°C with a single Power Supply/Cooling module fitted and 40°C when dual Power Supply/Cooling modules are fitted.

- The rack should have a safe electrical distribution system. It must provide overcurrent protection for the unit and must not be overloaded by the total number of units installed in the rack. Consideration of the units nameplate rating should be used when addressing these concerns.

- The electrical distribution system must provide a reliable earth for each unit and the rack.

- Each power supply in each unit has an earth leakage current of 1.2mA. The design of the electrical distribution system must take into consideration the total earth leakage current from all the power supplies in all the units. The rack will require labelling with "HIGH LEAKAGE CURRENT. Earth connection essential before connecting supply".

- The rack when configured with the units must meet the safety requirements of UL 60950 and IEC 60950.

ESD Precautions

Caution   *It is recommended that you fit and check a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling Altos S205F / S200F Storage System plug-in modules and components. Avoid contact with backplane components and module connectors, etc.*

Data Security

- Power down your host computer and all attached peripheral devices before beginning installation.

- Each enclosure contains up to 16 removable disk drive modules. Disk units are fragile. Handle them with care, and keep them away from strong magnetic fields.

- *All* the supplied plug-in modules and blanking plates must be in place for the air to flow correctly around the enclosure and also to complete the internal circuitry.

- If the subsystem is used with modules or blanking plates missing for more than a few minutes, the enclosure can overheat, causing power failure and data loss. Such use may also invalidate the warranty.

- If you remove any drive module, you may lose data.
  - If you remove a drive module, replace it immediately. If it is faulty, replace it with a drive module of the same type and capacity

- Ensure that all disk drives are removed from the enclosure before attempting to manhandle or move the rack installation.

- Do not abandon your backup routines. No system is completely foolproof.

Special Tools and Equipment

There are no special tools required but in order to complete the assembly of some configurations you may need the following (not supplied):

- Security keys (one of these should be included with your Altos S205F/S200F Storage System enclosure for use with the drive locks).

Related Documentation

- Altos S200F Storage System Quick Installation Guide
- Altos S205F Storage System Quick Installation Guide
- Altos RAIDWatch User's Guide
- Altos S205F Text-Mode Management Reference Guide

Revision History

Version	Date	Description of Change
1.0	1 May, 2004	Initial Release

Chapter 1

Introduction

1.1 The Altos S205F / S200F Storage System

Figure 1–1   Altos S205F / S200F Storage System

1.2   The Enclosure Core Product

The Altos S205F / S200F Storage System design concept is based on a subsystem together with a set of plug-in modules. The Altos S205F / S200F Storage System subsystem as supplied comprises:

- **Chassis** and **Backplane** with integral **Operators Panel**.(See Figure 1–11)

- Up to 16 Serial ATA (SATA) **Drive Carrier modules** (See Figure 1–12)
    – Serial ATA (SATA) drives with appropriate switching card.

- Dummy drive carrier modules.

- Two plug-in **Power Supply/Cooling modules**:
    – AC, 450W PSU (See Figure 1–7)

- Either one or two I/O Modules:
    – For Altos S205F - single or dual RAID I/O Modules(See Figure 1–9)
    – For Altos S200F - single or dual JBOD I/O Modules (See Figure 1–10).

- Blank I/O module.

1.2.1   Enclosure Chassis

The chassis consists of a sheet metal enclosure assembly containing a Backplane printed circuit board (PCB) and module runner system. This chassis assembly also includes an integral Operators (Ops) Panel, mounted at the rear.

The chassis assembly contains 16 drive bays at the front, each of which accommodates a plug-in drive carrier module. The 16 drive bays are arranged in 4 rows of 4 drives. At the rear, the chassis assembly contains the integral ops panel module and four plug-in module bays to house two Power Supply/Cooling modules and two Controller I/O modules.

The Backplane PCB provides logic level signal and low voltage power distribution paths. Figure 1–2 and Figure 1–3 show front and rear views of an Altos S205F Storage System chassis. Figure 1–4 and Figure 1–5 show front and rear views of an Altos S200F Storage System chassis.

The chassis is fitted with 19 inch Rack mounting features which enables it to be fitted to standard 19 inch racks and uses 3EIA units of rack space.

- A Bay is defined as the space required to house a single 1.0" high 3.5 inch disk drive in its carrier module. e.g. a 1 x 4 bay module would take the space of 1 drive width by 4 drive bays high (in rack mount configuration).

- A 4 x 4 Chassis fitted with 19 inch Rack mounting features enables it to be fitted to standard 19 inch racks. It uses 3EIA units of rack space

Figure 1–2 Altos S205F Enclosure Chassis (Front) * SES Drives (there must be a drive present in Bay 1/1 or 4/4 to enable SES communications to operates).

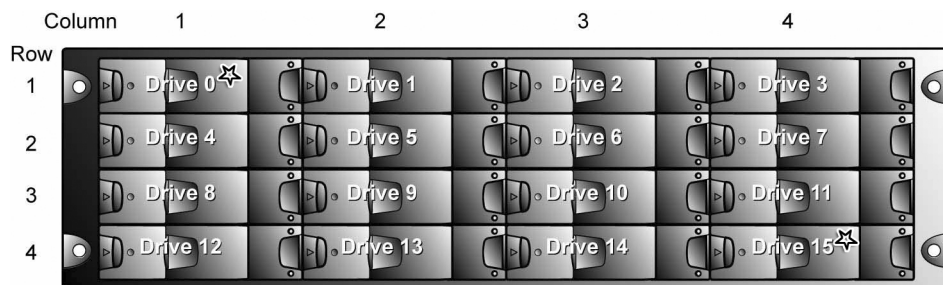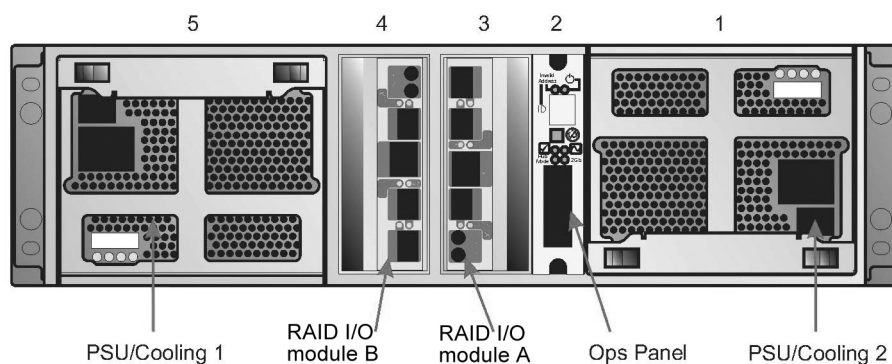**Figure 1–3** Altos S205F Enclosure Chassis (Rear)
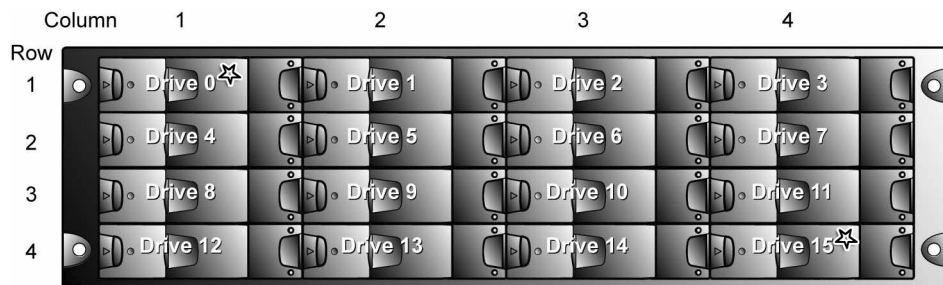
Figure 1–4 Altos S200F Enclosure Chassis (Front) * SES Drives (there must be a drive present in Bay 1/1 or 4/4 to enable SES communications to operates).
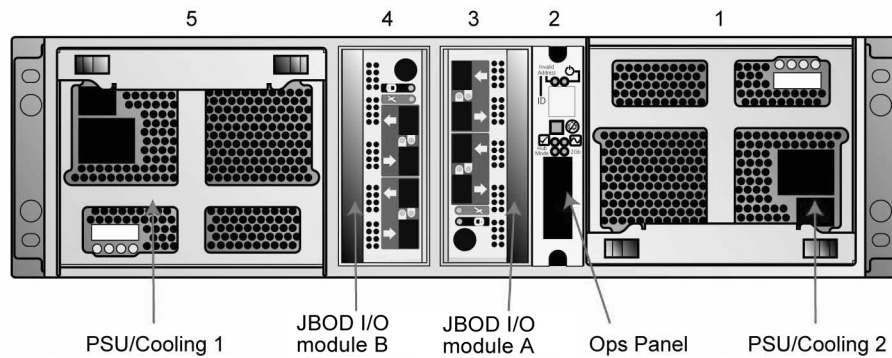
Figure 1–5 Altos S200F Enclosure Chassis (Rear)

1.2.2   Tower Option

An optional tower kit is available, which can be fitted to the rack chassis described here.
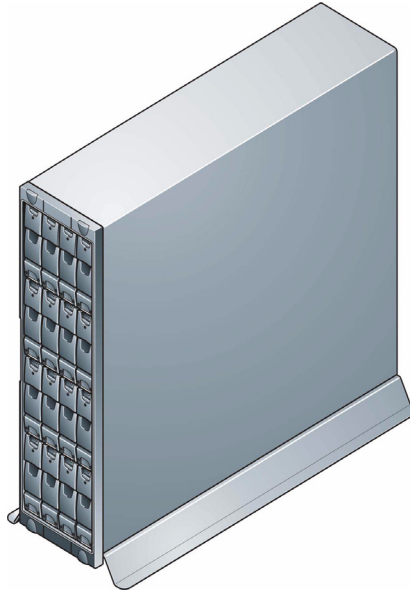
Figure 1–6   Altos S205F / S200F Storage System Tower Option

1.3   The Plug-in Modules

An Altos S205F / S200F Storage System Enclosure requires the following modules for normal operation:

- 2 x Power Supply/Cooling modules
- 1 x Operator Panel
- 1 or 2 x I/O modules
    - RAID I/O module for Altos S205F
    - JBOD I/O module for Altos S200F
- Up to 16 SATA drive carrier modules and/or dummy drive carrier modules, as required.

Note   No drive bays should be left completely empty.

1.3.1   Power Supply/Cooling Module

One Power Supply/Cooling module is available for the Altos S205F / S200F Storage System:

- Auto ranging AC 450W Power Supply/Cooling module

1.3.1.1 AC Power Supply/Cooling Module

Two Power Supply/Cooling modules (Figure 1–7) are supplied mounted in the rear of the enclosure as part of the subsystem core product.
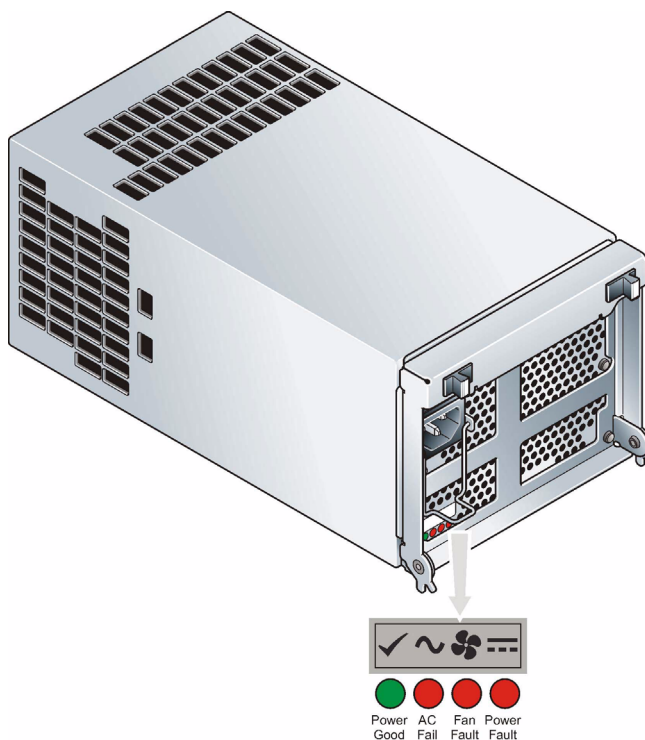
Figure 1–7   AC Power Supply/Cooling Module

PSU voltage operating ranges are nominally 115V or 230V AC, selected automatically.

Four   LEDs mounted on the front panel of the Power Supply/Cooling module (see Figure 1–7) indicate the status of the PSU and the fans.

1.3.1.2 Multiple Power Supply/Cooling Modules

The Altos S205F / S200F Storage System must always be operated with two Power Supply/Cooling modules fitted. The two Power Supply/Cooling modules operate together so that if one fails the other maintains the power supply and cooling while you replace the faulty unit.

Module replacement should only take a few minutes to perform but must be completed within 10 minutes from removal of the failed module.

1.3.2 Operators Panel

Supplied as an integral part of the Enclosure core product, a typical Operators (Ops) Panel is shown in Figure 1–8.
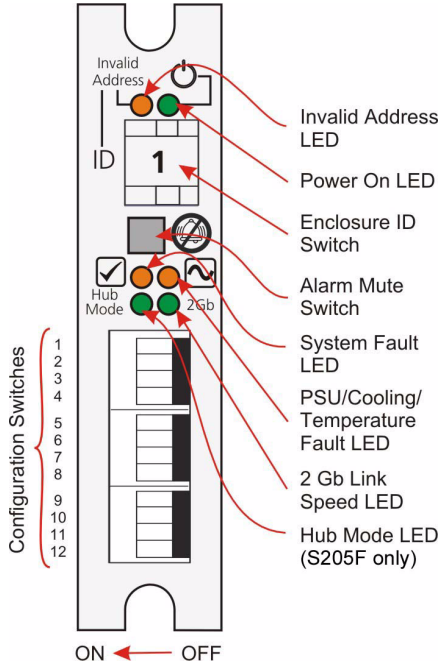
Figure 1–8   Ops Panel

The Ops Panel provides the enclosure with a micro controller which is used to monitor and control all elements of the Enclosure.

1.3.2.1 Ops Panel Indicators and Switches

The Ops Panel includes Light Emitting diodes (LEDs) which show the status for all modules, an Audible Alarm which indicates when a fault state is present, a push-button Alarm Mute switch and a thumb wheel SEL_ID Address Range selector switch.

The Ops Panel switch functions are shown in Table 1–1 and Table 1–2.

Table 1–1   Altos S205F Ops Panel Switch Functions (*Default settings at 2Gb/s*)

Switch Number *See Sw 11	Function	Recommended Setting	Definition
1	Not Used	OFF	Not Used
2	Not Used	OFF	Not Used
3	Hub Mode	OFF	OFF = Hub Disabled ON = Hub Enabled (Direct Only)
4	Not Used	OFF	Not Used
5 6	RAID host hub speed	ON ON	OFF/OFF = 1GB ON/OFF = 2GB OFF/ON or ON/ON = Auto Select
7	Not Used	OFF	Not Used
8	Not Used	OFF	Not Used
9 10	Drive Addressing Mode Selection	ON ON	ON/ON= Mode 0
11	SOFT SELECT	ON	ON = Selects functions using the hardware switches
12	Not Used	OFF	Not Used

Table 1–2   Altos S200F Ops Panel Switch Functions (*Default settings at 2Gb/s*)

Switch Number *See Sw 11	Function	Recommended Setting		Definition
1	Not Used	OFF		
2	Not Used	OFF		
3	Not Used	OFF		
4	Not Used	OFF		
5 & 6	Not Used	OFF		
7 & 8	Drive Loop Speed Select	Sw 7	Sw 8	
		ON	OFF	Force 2Gb/s
		OFF	OFF	Force 1Gb/s
9 & 10	Drive Addressing Mode Selection	Sw 9	Sw 10	
		ON	ON	Mode 0
		OFF	ON	Mode 1
		ON	OFF	Mode 2 *(not supported)*
		OFF	OFF	Mode 3 *(not supported)*
11	SOFT SELECT	ON		Selects functions using the hardware switches
12	Not Used	OFF		

Important   Switch settings are only read at Power On.

1.3.3   Controller Input/Output Module

The Altos S200F JBOD storage subsystem includes an enclosure with rear facing bays which houses one or two SATA control interface adaptor, known as JBOD I/O modules (see Figure 1–10). While Altos S205F Storage System storage subsystem includes an enclosure with rear facing bays which houses two Loop Resiliency Circuit (LRC) I/O modules with integrated Infortrend IFT-1728RMN SATA RAID I/O modules, known as RAID modules (see Figure 1–9). The controller supports RAID levels 0, 1, 0+1, 3, 5, 10, 30 and 50.

The plug-in I/O modules have been designed for integration into a Altos S205F / S200F Storage System storage subsystem, providing external FCAL cable interfacing with up to 16 SATA disk drives.

Processors housed on the I/O modules provide enclosure management and interface to devices on the Backplane, PSU, Controller and Ops Panel, to monitor internal functions.

The module incorporates the following LED indicators:

Table 1–3 Altos S205F RAID I/O Module LEDs

LED Functions	Color	Description
Battery Fail	Amber	When ON this LED denotes the following status: • Battery voltage is lower than 2.5V. • Battery temperature is abnormal (normal 0° - 45°C on charge state) • BBU is not present When FLASHING, the LED denotes BBU is under charging. When OFF, the LED denotes BBU charge is done.
Expansion Port Signal Good	Green	When ON this LED denotes that running FC signal is good.
RJ45 Ethernet Connection	Green Green	LED1: Static ON while LAN port status is link. LED2: FLASHING while LAN port status is active.
System	Amber	When ON this LED denotes that the Controller is failed or SES Services card is failed.
Cache Active	Amber	When ON this LED denotes the following status: • When system is with power, ON denotes cache memory contains data or ECC errors are detected. • When system is without power, ON denotes cache memory contains data and is held up by BBU.
Host Port 1 Signal Good	Green	When ON this LED denotes that incoming FC signal is GOOD.
Host port 0 Signal Good	Green	When ON this LED denotes that incoming FC signal is GOOD.

Table 1–4 Altos S200F JBOD I/O Module LEDs

LED	Definition	Color	Normal Status	Fault Status
FC Host Port 0 Signal Good	**Incoming FC signal is GOOD.** **No connection or incorrect connection** **Invalid SFP connection**	Green	On	 Off Flashing
FC Host Port 1 Signal Good	**Not used.**	Green	On	 Off Flashing
Router Status	**Storage Router Device Ready** **Storage Router Device not ready or defective**	Green	On	Off
Module Fault	**Fault present (also *On when booting)* **Successful JBOD I/O module initialization**	Amber	Off	On

9
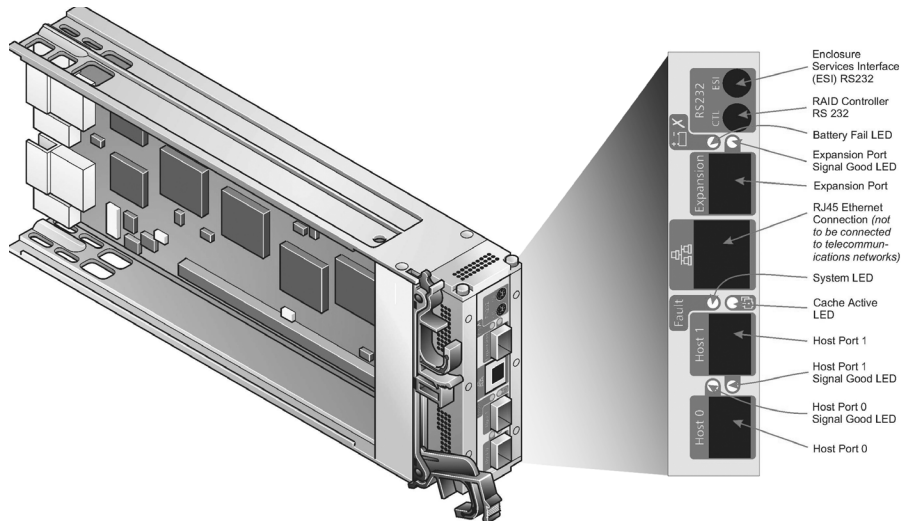
Figure 1–9   Altos S205F RAID I/O Module

The Altos S205F RAID I/O Module operates at 1 or 2 Gb/s.

- One external port for expansion to further enclosures is provided by an SFP connector

- Two external ports to the host controllers are provided from the RAID I/O Module with Form Factor (SFP) GBIC modules, auto-bypass at the output ports is provided.

- An RJ45 10/100 Base T Ethernet controller management port is provided on the LRC board, interfacing to the controller through 2 RS232 serial and GPIO lines.

Caution   *The RJ45 Ethernet connector on the LRC module must not be connected to telecommunications networks.*

- The RAID I/O Module also incorporates a standby Li-ion battery pack, 72 hours cache hold up time (512MB), or 60 hours cache hold up time (1GB). The battery cell has thermal protection and is connected to the RAID I/O Module by flying lead.
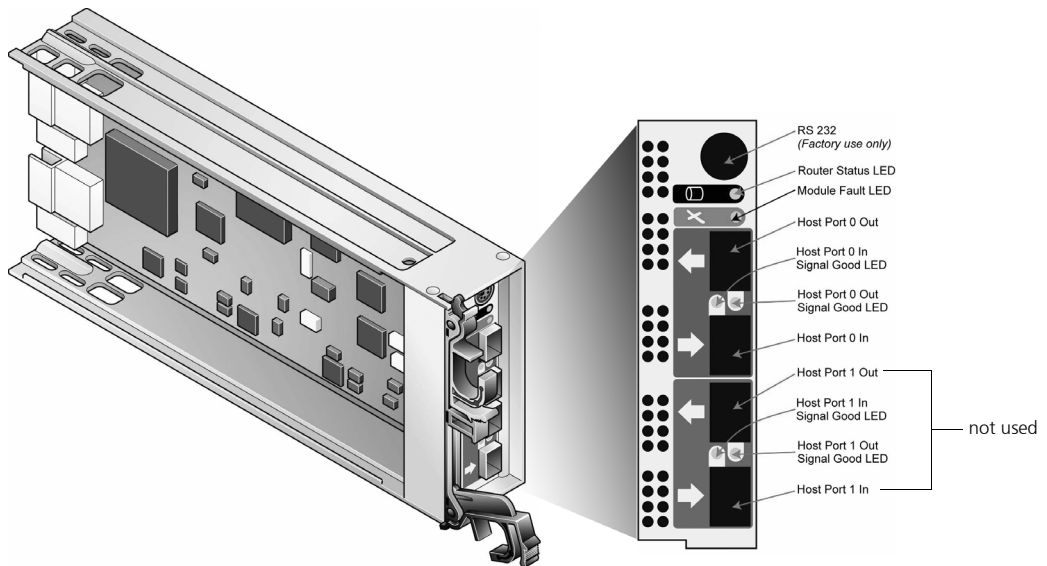
Figure 1–10   Altos S200F JBOD I/O Module
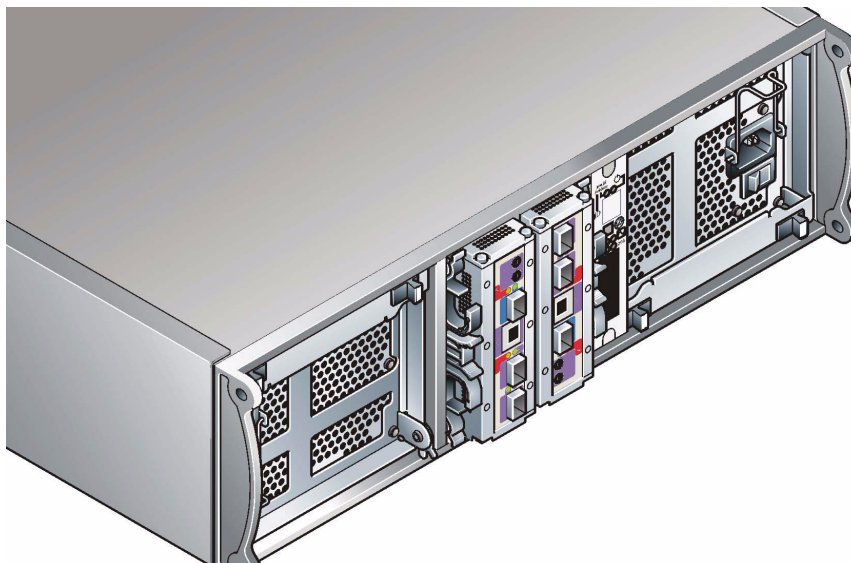
Figure 1–11   Altos S205F / S200F Storage System Enclosure with I/O Modules and AC PSUs Installed

1.3.4   Supported Configuration Tools

- RAIDWatch

- R232 Management User Interface (MUI)

1.3.5   Drive Carrier Module

The Drive Carrier Module comprises a hard disk mounted in a carrier. Each drive bay will house a single Low Profile 1.0 inch high, 3.5 inch form factor disk drive in its carrier.The carrier has mounting locations for SATA drives.

Each disk drive is enclosed in a die-cast aluminum carrier which provides excellent thermal conduction, radio frequency and electro-magnetic induction protection and affords the drive maximum physical protection.

The front cap also supports an ergonomic handle which provides the following functions:
- Camming of carrier into and out of drive bays.
- Positive 'spring loading' of the drive/backplane connector.
- An anti-tamper lock operated by a torx socket type key.
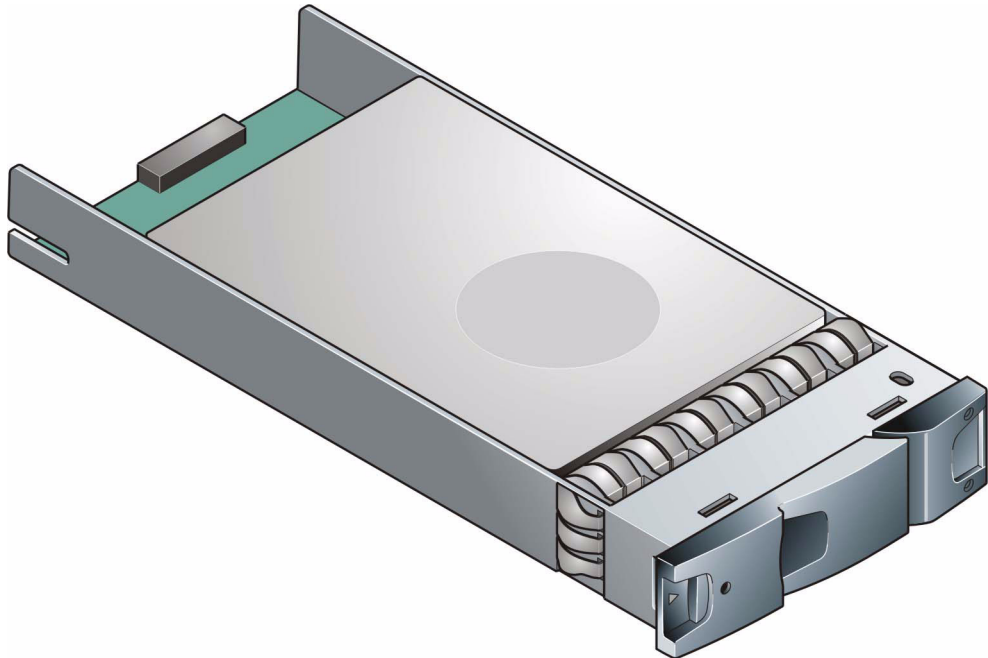
Figure 1–12   Drive Carrier Module

1.3.5.1   SATA Transition Card

For Serial ATA use a Transition card is attached to the rear of each drive, this provides a SCA-2 interface to the drive carrier using the same pins as Fibre Channel.

There is one Transition card providing 1.5 Gb/s for standard Serial ATA drives.

Transition cards provide two paths to each drive, thus improving system availability.

1.3.5.2   Drive Status Indicators

Each drive carrier incorporates two indicators, an upper (Green) and lower (Amber). In normal operation the green indicator will be ON and will flicker as the drive operates.

1.3.5.3   Anti-tamper Locks

Anti-tamper locks are fitted in the drive carrier handles (Figure 1–13) and are accessed through the small cutout in the latch section of the handle.These are provided to disable the normal 'pinch' latch action of the carrier handle.
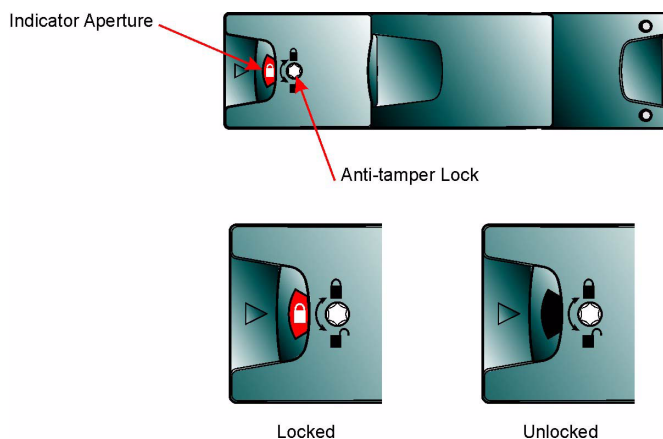
Figure 1–13   Anti-tamper Lock

1.3.6   Dummy Carrier Modules

Dummy carrier modules are provided for fitting in all unused drive bays. They are designed as integral drive module front caps with handles and must be fitted to all unused drive bays to maintain a balanced airflow.

1.3.7   Blank Modules

Warning   Operation of the Enclosure with *ANY* modules missing will disrupt the airflow and the drives will not receive sufficient cooling. It is *ESSENTIAL* that all apertures are filled before operating the unit. Dummy Carriers and/or Blank modules are available for this purpose.

1.4   Visible and Audible Alarms

The functional modules have associated status LEDs. The Ops Panel shows a consolidated status for all modules.

LEDs show constant green for good or positive indication. Constant Amber LEDs indicate there is a fault present within that module.

The Ops Panel also incorporates an Audible Alarm to indicate when a fault state is present and also an Alarm Mute push-button.

Warning   The Ops Panel is an integral part of the enclosure chassis assembly and can only be replaced by trained personnel.

1.5 Altos S205F / S200F Storage System Technical Specification

1.5.1 Dimensions

Rack Enclosure	inches	millimeters
Height	5.1	130
Width across mounting flange	19	483
Width across body of enclosure	17.6	447
Depth from flange to rear of enclosure body	21	531
Depth from flange to maximum extremity of enclosure (rear hold down)	21.7	550
Depth from flange to furthest extremity at front of unit	0.5	13
Depth overall	22.2	563

Tower Enclosure	inches	millimeters
Height	22.27	501
Width *(including mounting feet)*	10.22	230
Depth	23.24	523
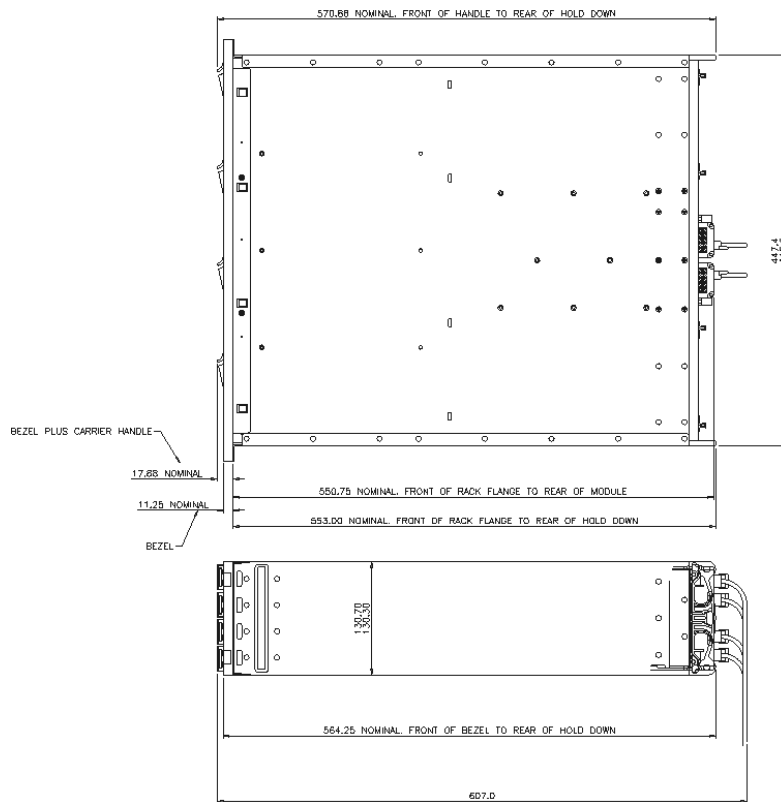
Table 1–5   Altos S205F / S200F Storage System Chassis Dimensions

1.5.2   Weight

Maximum Configuration	Rack mount:	37kg (81lb)
	Tower:	40kg (88lb)
Empty Enclosure (Rack)		9kg (19.8lb)
PSU/Cooling Module		4kg (8.8lb)
Controller I/O Module		0.9kg (1.98lb)
Tower Conversion Kit		3kg (6.6lb)

1.5.3   AC Power (450W PSU)

Voltage Range	100-120 / 200-240 VAC Rated
Voltage Range Selection	Automatic
Frequency	50/60 Hz
Inrush Current	50A @ 260VAC
Power Factor	>0.98
Harmonics	Meets EN61000-3-2

1.5.4   PSU Safety and EMC Compliance

Safety Compliance	
	UL 60950
	IEC 60950
	EN 60950
EMC Compliance	CFR47 Part 15B Class A
	EN55022
	EN55024

1.5.5   Power Cord
(minimum requirements)

Cord Type	SV 0r SVT, 18 AWG minimum, 3 conductor
Plug	250V, 10A
Socket	IEC 320 C-14, 250V, 15A

1.5.6 Environment

Table 1–6   Ambient Temperature and Humidity

	Temperature Range	Relative Humidity	Max. Wet Bulb
Operational	5°C to 40°C	20% to 80% non-condensing	23°C
Non-Operational	0°C to +50°C	8% to 80% non-condensing	27°C
Storage	**1°C to +60°C**	**8% to 80% non-condensing**	**29°C**
Shipping	-40°C to +60°C	5% to 100% non-precipitating	29°C

Airflow	System must be operated with low pressure rear exhaust installation (Back pressure created by rack doors and obstacles not to exceed 5 pascals [0.5mm Water gauge])
Altitude, Operational	0 to 2000 m (0 to 7,000ft) (10,000ft at maximum ambient of 35°C)
Altitude, Non-Operational	-305 to 12,192m (-1000 to 40,000ft)
Shock, Operational	Vertical axis 5g peak 1/2 sine, 10ms
Shock, Non-Operational	30g 10ms 1/2 sine
Vibration, Operational	0.21grms 5-500 Hz Random
Vibration, Non-Operational	1.04grms 2-200 Hz Random
Vibration, Relocation	0.3g 2-200 Hz sine
Acoustics	Sound Pressure Operating - Less than 58 dB LpA average measured at the bystander positions. *(The 4 bystander positions are 1m horizontal and 1.5m off the floor positioned front, back, left and right. The unit under test will be measured on the floor)* Measured at 20°C
Orientation & Mounting	19" Rack mount (3EIA Units)
• Rack Rails	To fit 800mm depth Racks compliant with IEC 297
• Rack Characteristics	**Back pressure not exceeding 5 pascals (0.5mm water gauge)**
Safety & Approvals	CE, UL, cUL
• EMC	EN55022 (CISPR - A), FCC A

1.5.7 Altos S205F RAID I/O Module Specification

Speed	1.5Gb/s internal to each drive, 1Gb/s or 2Gb/s external host ports
	• Creates connections to a single loop of 16 drives
Mounting	Rear, single bays 3 and/or 4 *(see Figure 1–3)*
Connectors	• Expansion Port: 1 x SFP connector
	• Host Port:
	– 2 x SFP connector, optical LC to LC cable
Power Dissipation	5A @ 3.3V, 1A @ 5V
RAID Levels supported	0, 1, 0+1, 3, 5, 10, 30, and 50

1.5.8 Altos S200F JBOD I/O Module Specification

Speed	1.5Gb/s internal to each drive, 1Gb/s or 2Gb/s external
	• Creates connections to a dual loop of 16 drives
	• 1 External FC loop with two SFP connections
Mounting	Rear, single bays 3 and/or 4 *(see Figure 1–5)*
Connectors	• 1 or 2 x Expansion Ports: SFP connector
	• Host Port 1 In/Out: Not used.
Power Dissipation	20W max.

1.5.9   Drive Carrier Module Specification

Please contact your supplier for details of approved drives.

Important   **Operating the Altos S205F / S200F Storage System subsystem with non-approved drives may invalidate the warranty.**

Module Dimensions	Height 29.1mm Width 106.55mm Depth 251 mm
Weight	0.98kg (1.0" 36Gb drive)
Transition card	Provides dual path emulation to Serial ATA drives.
Operating Temperature	5° C to 40° C (with dual Power Supply/Cooling Modules)
Power Dissipation	17 Watts maximum

1.5.10   SCSI Enclosure Services (SES) Support

The enclosure has a sophisticated self-monitoring and reporting function which conforms to ANSI SES specifications.This reports on such topics as:

- Enclosure temperature
- Fan speed
- Drive condition
- Operator panel status

Chapter 2

Getting Started

2.1 Introduction

In this chapter, you are shown how to install your Altos S205F / S200F Storage System enclosure and plug-in modules into an industry standard 19 inch rack cabinet.

Caution   *When connecting up the Altos S205F / S200F Storage System , use only the power cords supplied or cords which match the specification quoted in section 1.5.5.*

2.2 Planning Your Installation

Before you begin installation you should become familiar with the configuration requirements of your Altos S205F / S200F Storage System. The correct positions of each of the optional plug-in modules are shown in Figure 2–1 and Figure 2–2 . Please refer to sections 2.5 - 2.7 for details of I/O module configurations and installation.

Table 2–1   Altos S205F Storage System Configuration

Module	Location
Drive Bays	*ALL* drive bays must be fitted with either a drive carrier module or a dummy carrier, no bays should be left completely empty. All drive carrier modules provide SES Management Services.
Power Supply/Cooling Modules	Two Power Supply/Cooling modules must be fitted. Full power and cooling redundancy is provided while a faulty module is replaced. Install the Power Supply/Cooling modules in rear Bays 1 & 5. **Note:** Rear bays are numbered from 1 to 5 commencing from the right hand side)
RAID I/O Module	Install in rear Bays 3 and 4. (If only 1 controller is fitted it must be installed in bay 4).

Table 2–1   Altos S205F Storage System Configuration

Module	Location
Blank I/O Module	If only one RAID I/O moudle is installed a blank module must be fitted in the unused bay. No bays should be left completely empty.
Ops Panel	(integral part of chassis assembly) Installed in rear Bay 2

Table 2–2   Altos S200F Storage System Configuration

Module	Location
Drive Bays	*ALL* drive bays must be fitted with either a drive carrier module or a dummy carrier, no bays should be left completely empty. All drive carrier modules provide SES Management Services.
Power Supply/Cooling Modules	Two Power Supply/Cooling modules must be fitted. Full power and cooling redundancy is provided while a faulty module is replaced. Install the Power Supply/Cooling modules in rear Bays 1 & 5. **Note:** Rear bays are numbered from 1 to 5 commencing from the right hand side)
JBOD I/O Module	Two JBOD I/O modules should be Installed in rear bays 3 and 4. If only one module is fitted. Install in rear Bay 4
Blank I/O Module	If only one JBOD I/O moudle is installed a blank module must be fitted in the unused bay. No bays should be left completely empty.
Ops Panel	(integral part of chassis assembly) Installed in rear Bay 2

Caution   *Dummy Carriers and Blank Modules MUST be fitted to ALL unused bays, there will be inadequate drive cooling if any are left open.*

Figure 2–1   Altos S205F Module locations   * SES Drives (there must be a drive present in Bay 1/ 1 or 4/4 to enable SES communications to operates).

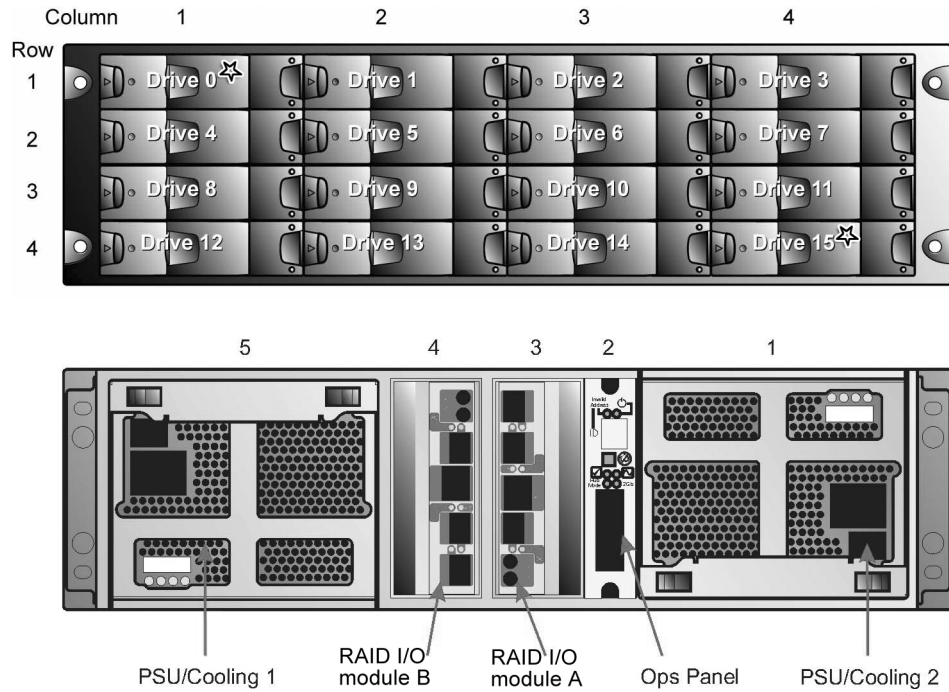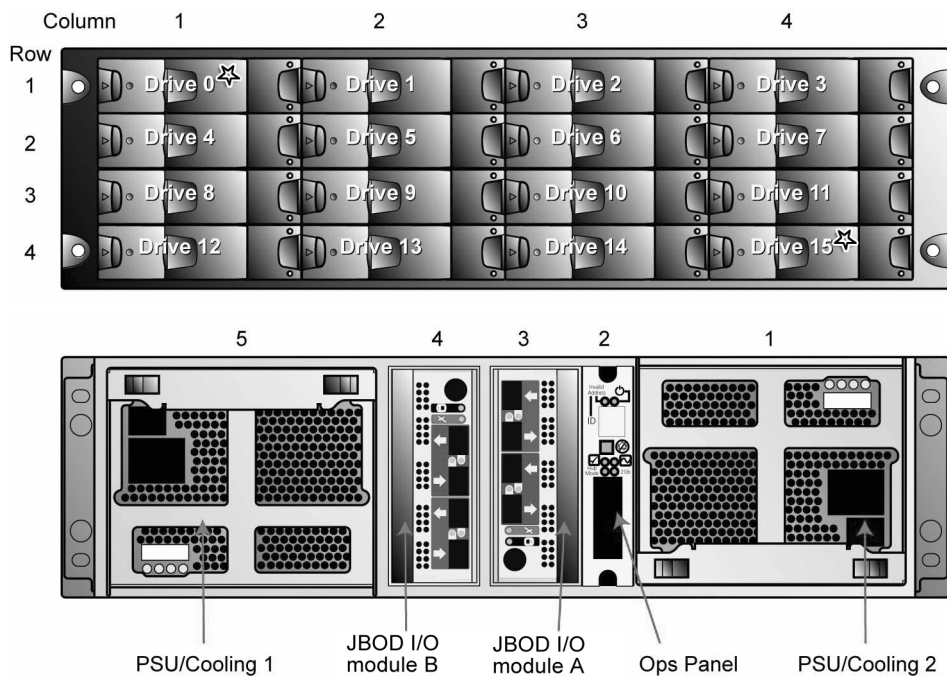**Figure 2–2**   Altos S200F Module locations   * SES Drives (there must be a drive present in Bay 1/ 1 or   4/4 to enable SES communications to operates).

2.2.1   Enclosure Bay Numbering Convention

The enclosure bay numbering convention is shown in Figure 2–1. A Bay is defined as the space required to house a single 1.0" high 3.5 inch disk drive in its carrier module. e.g. a 1 x 4 bay module would take the space of 1 drive width by 4 drive bays high (in the rack mount configuration).

The Altos S205F / S200F subsystem is housed in a 4 x 4 enclosure, i.e. 4 bays wide by 4 bays high. The front bays are numbered 1 to 4 from left to right, viewed from the front. Bays are numbered from 1 (top row) to 4 (bottom row). Drive Carrier Module locations are identified from a matrix of the top and side numbers. The rear bays are numbered 1 to 5 from right to left, viewed from the rear.

Important   **Drive carrier module must always be fitted in locations 1/1 (Top Left) and 4/4 (Bottom Right). This is the minimum configuration required for the system to operate and provide SES Management Services.**

2.3   Enclosure Installation Procedures

Caution   *The Altos S205F / S200F Storage System enclosure with all its component parts installed is too heavy for easy installation into a Rack cabinet. The following procedures describe the installation of the Altos S205F / S200F Storage System enclosure and highlights any critical co-requisite requirements and good handling practices which we encourage you to follow so as to ensure that a successful installation is achieved in the easiest manner.*

Warning   **Ensure that you have fitted and checked a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling Altos S205F / S200F Storage System modules and components. Avoid contact with Backplane components and module connectors, etc.**

2.3.1   Pre-Requisites

The Altos S205F / S200F Storage System enclosure is designed for installation into an industry standard 19 inch cabinet capable of holding the unit.

- Minimum depth 531 mm from front flange to rear metalwork (excludes rear cabling).

- Weight: up to 37kg dependent upon configuration per enclosure.

- A minimum gap of 25mm (1inch) clearance between the rack cover and front of drawer; and 50mm (2 inches) rear clearance between rear of drawer and rear of rack is recommended in order to maintain the correct air flow around the enclosure.

- The rack should present a maximum back pressure of 5 pascals (0.5mm water gauge).

2.3.2   Rack Mounting Rail Kit

A set of mounting rails is available for use in 19 inch rack cabinets. These rails have been designed and tested to handle the maximum enclosure weight and to ensure that multiple Altos S205F / S200F enclosures may be installed without loss of space within the rack. Use of other mounting hardware may cause some loss of rack space.

The rack mounting rail kit also incorporates a rear hold down mechanism to ensure shock and vibration immunity.

2.3.2.1 Parts Check List

- Rack Mounting Rail Kit.

2.3.2.2 Installation Procedure

Please see detail drawings supplied with the rack mounting rail kit for assembly details.
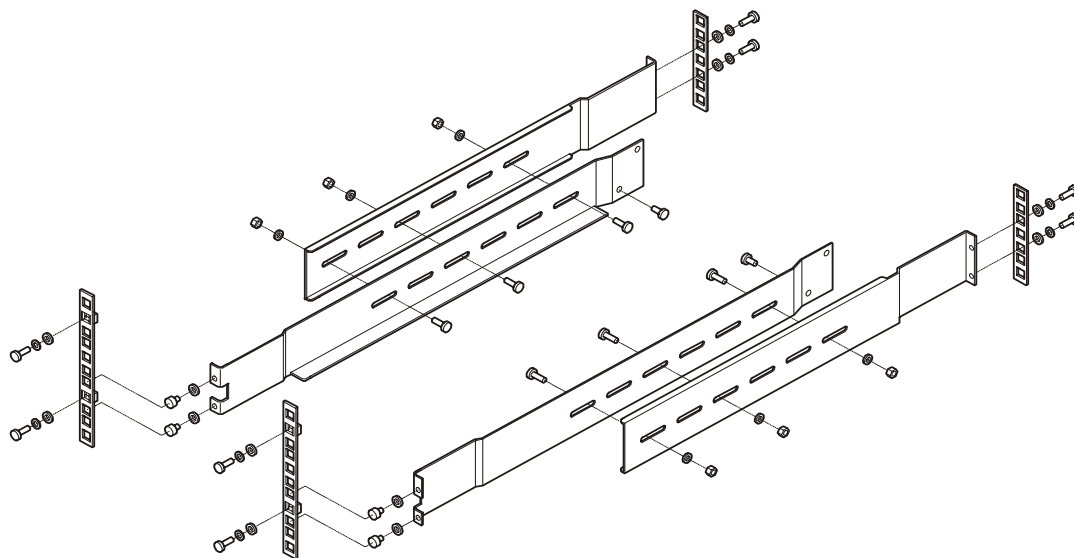

Figure 2–3 Rack Mounting Rail Kit

2.3.3 Chassis Installation

2.3.3.1 Parts Check List

- Chassis (complete with Backplane and Ops Panel installed but excluding all plug-in modules).

- Rack mount front flange mounting screws (4 off).

2.3.3.2 Procedure

1 Check for damage.

2 Slide the chassis assembly onto the rack rails until the front flanges engage on the rack. Ensure the chassis is centrally located.

3 If in doubt about correct orientation, the drive bays (at front) should have their black drive connectors toward the bottom of each bay.

4 Screw the 4 front rack mount screws through the flanges and tighten.

5 Fit and tighten the rear hold down screws ensuring the enclosure is in tight contact to both the side and top of the chassis to avoid any movement of the chassis in the rack.

2.4 Power Supply/Cooling Module Installation

Install in the rear of the enclosure in positions 1 and 5.

Warning **Do not remove covers from the Power Supply/Cooling (PSU) module. Danger of electric shock inside. Return the PSU to your supplier for repair.**

2.4.1 Parts Check List

Power Supply/Cooling Modules of the following type:
- AC' 450W PSU

2.4.2 AC Power Supply/Cooling Module Procedure

Important **If the cable strain relief wire tab is upside down it must be inverted by squeezing together the two sides of the tab removing them from their mountings, inverting and then replacing them, as shown in Figure 2–4.**

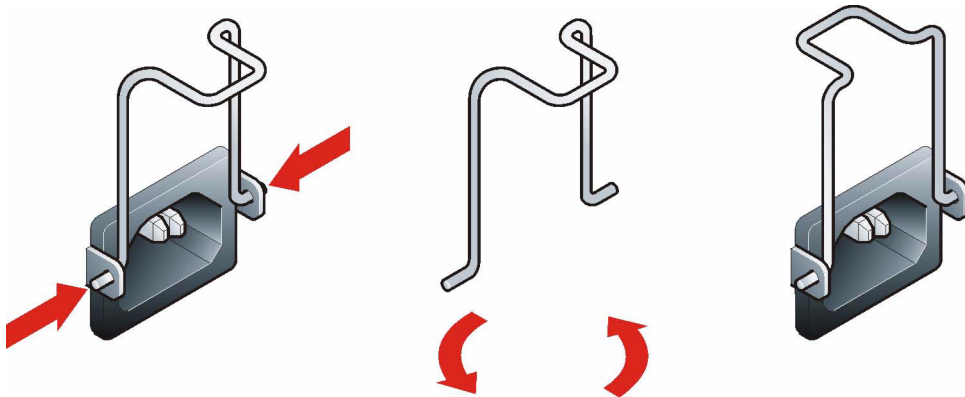**Figure 2–4**   Inverting the Cable Strain Relief

1 Check for damage, especially to the rear connector on the supply.

Caution *Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.*

2   With the PSU handle in the open position (Figure 2–5), slide the module into the enclosure (Figure 2–6).

Important **install the Power Supply/Cooling module in the right hand bay (Rear Bay 1) of the enclosure in an "upside down* orientation.**

3 Cam the module home by manually closing the PSU handle (Figure 2–7). A click should be heard as the handle latches engage.

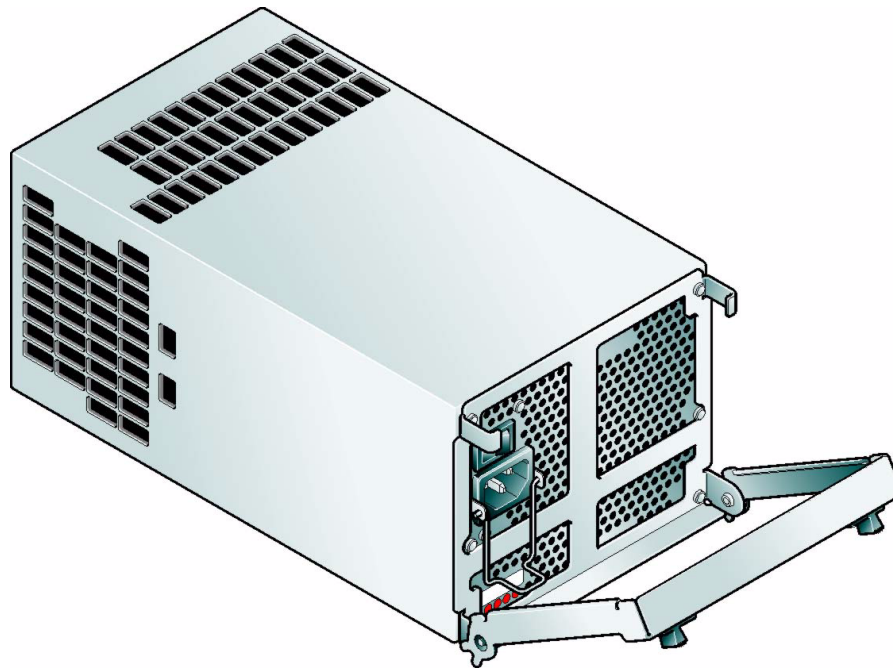**4** Connect the power supply cord to the power source and switch the power supply ON.

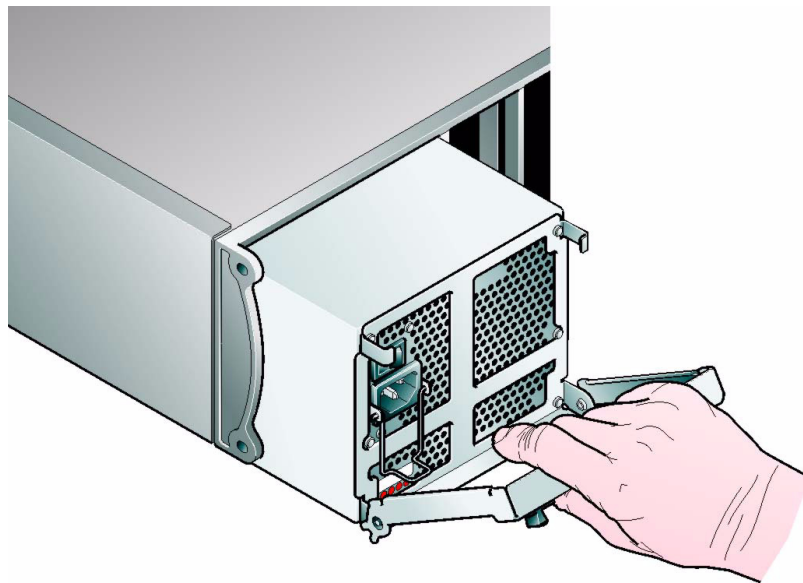**Figure 2–5**   AC Power Supply/Cooling Module - Handle in Open Position

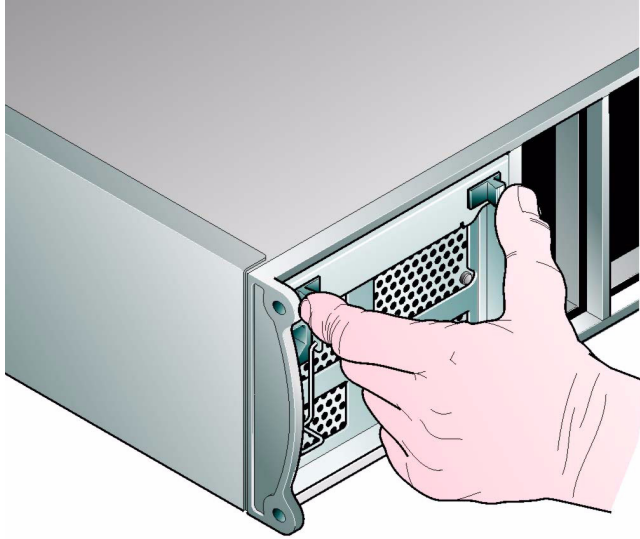**Figure 2–6**   Installing an AC Power Supply Cooling Module (1)

Figure 2–7   Installing an AC Power Supply Cooling Module (2)

2.5 RAID and JBOD I/O Module Configurations

Important   **Please refer to section 2.10 for information on SATA drive configurations.**

2.5.1 Internal Loop Structures

The Altos S205F / S200F Storage System enclosure is configured with two internal loop of 16 drives per enclosure.

2.6 FC-AL Interface

The I/O module provides dual FC-AL SFP interface connections.

The I/O module provides bi-directional conversion between the Fibre Channel host side interface and the SATA drives.The drives will not be presented to the Host until they are configured and mapped by the controller.

When Logical Arrays are configured and mapped, each drive array appears as a single Fibre Channel drive in a single loop.

Note   There are no external terminators required with Fibre Channel architecture and any drive may be hot plugged during operation.

2.6.1 Connecting Multiple Enclosures

Altos S205F Storage System enclosure expansion is achieved by connecting additional Altos S200F JBOD enclosures to the expansion port of the Altos S205F Storage System RAID controllers.

Important   **Optical modules must be UL (or other North American NRTL) RECOGNISED COMPONENT and the laser in the module must comply with Laser Class 1, US 21 CFR (J) and EN 60825-1.**

If passive copper cables are connected, the cable must not have a connection to the 3.3V supply (pins 15 and 16).

Expansion enclosures are Altos S200F Storage System.

Note   A maximum of 6 Altos S200Fs can be attached to an Altos S205F Storage System enclosure and a typical expansion configuration is shown in Figure 2–8,Figure 2–9 .
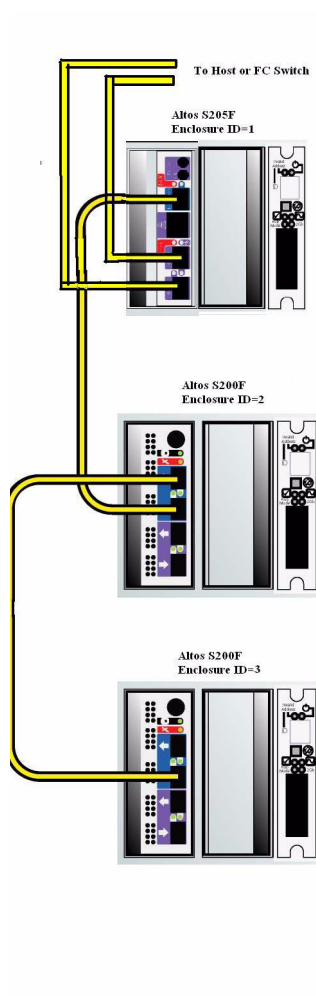

Figure 2–8   Single loop conection

Each connection can see all the drives in the enclosure. J7 jumper of Altos S200F is open.
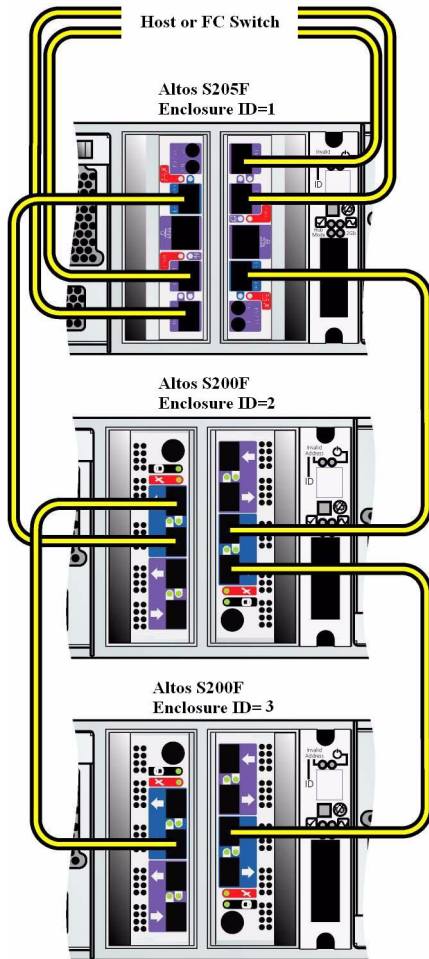
Figure 2–9   Dual loops connection
Each connection can see all the drives in the enclosure. J7 jumper of Altos S200F is open.
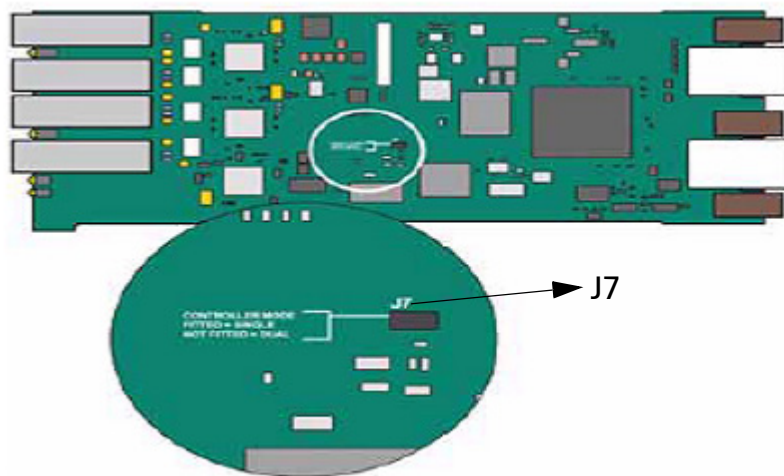
Figure 2–10   Jumper setting for JBOD I/O module: set jumper J7 open. Each connection can see all drives in the enclosure.

2.7   I/O Module Installation

Warning   Operation of the Enclosure with *ANY* modules missing will disrupt the airflow and the drives will not receive sufficient cooling. It is *ESSENTIAL* that all apertures are filled before operating the unit. Dummy Carriers and/or Blank modules are available for this purpose.

2.7.1   Parts Check List

Important   The enclosure may be configured with either one or two I/O modules. If only one I/O module is fitted it must be installed in rear bay 4 and a Blank I/O module fitted in the unused bay.

- Two RAID I/O Modules ,or one RAID I/O Module with one Blank I/O module for Altos S205F
- Two JBOD I/O Modules ,or one JBOD I/O Module with one Blank I/O module for Altos S200F

2.7.2 Procedure

Check for damage especially to the interface connector, do not install if any pins are bent.
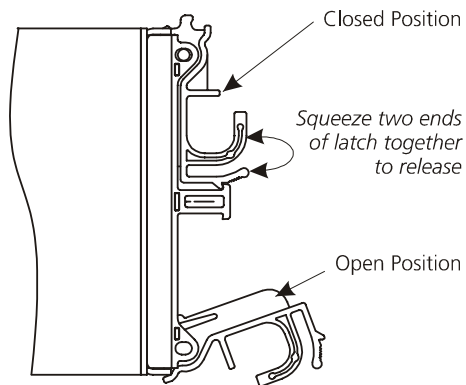
Figure 2–11   Controller Module Latch Operation

1   The modules should be installed in rear bays 3 and 4 of the Enclosure (Figure 2–1, Figure 2–2).

2   With the latch in the open position (see Figure 2–11), slide the Controller module into the enclosure until the latch engages automatically.

3   Cam the module home by manually closing the latches (see Figure 2–12).

4   A click should be heard as the latch engages.
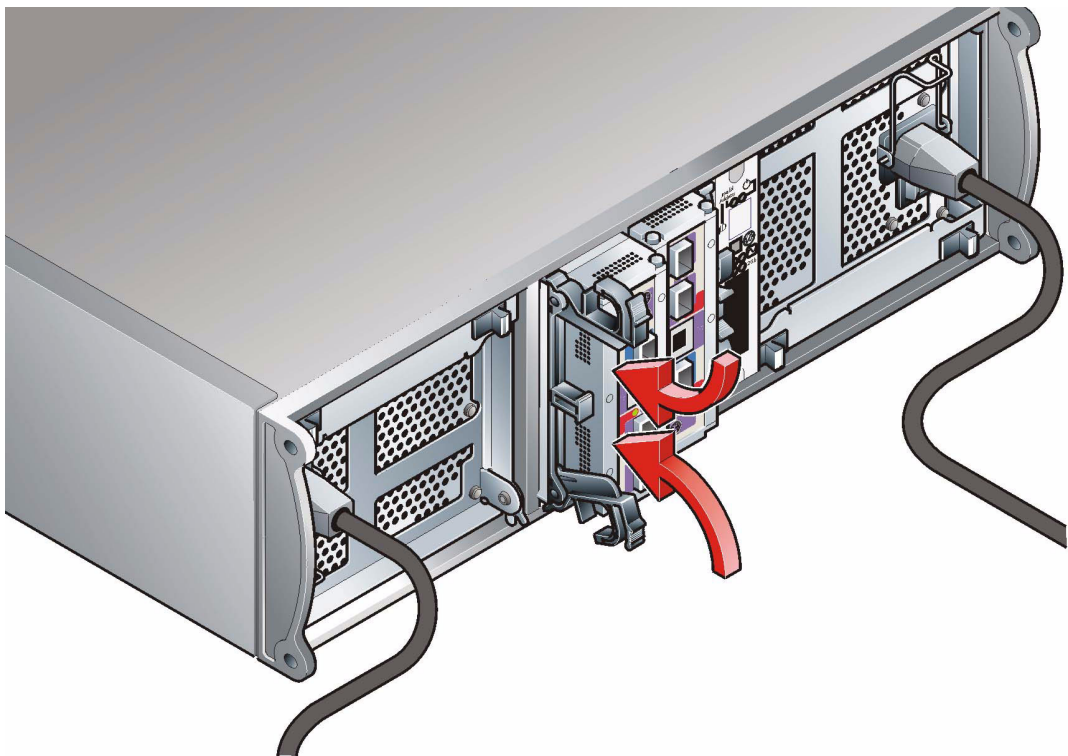
Figure 2–12   Installing an I/O Module

2.8 Altos S205F Drive Enclosure Device Addressing

Each enclosure has 16 drives. The SEL_ID of each drive is determined by the device slot (0-15) in which it is installed and the address range setting, which is set by means of the Enclosure ID switch.

The Mode selection is also set on the Ops Panel (shown in Figure 1–8 on page 6) at the rear of the enclosure. The switch settings are as follows:

Mode	Switch 9	Switch 10
0	ON	ON

Notes		
	1	**ON** = switch to the *Left*, **OFF** = switch to the *Right*.
	2	Switch 3 for hub.
	3	Switch 5 and 6 for host port speed.
	4	Modes 1, 2 and 3 are *Not Used.*

**Warning**   Switches 9 and 10 should not be turned Off together, damage may occur as a result.

Table 2–3   Mode 0 Drive Enclosure Device Settings

Device Slot SEL_ID	Mode 0															
0	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
3	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
4	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
5	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
6	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
7	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
8	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
9	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
10	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
11	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
12	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
13	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
14	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
15	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115

Notes **1** Drives are numbered row/column.

2 With only one active PSU the enclosure will take approximately 96 seconds to start all drives from Power On.

Table 2–4 Drive Slot Arrangement: Enclosure Front View

Column / row	1/#	2/#	3/#	4/#
#/1	Drive 0*****	Drive 1	Drive 2	Drive 3
#/2	Drive 4	Drive 5	Drive 6	Drive 7
#/3	Drive 8	Drive 9	Drive 10	Drive 11
#/4	Drive 12	Drive 13	Drive 14	Drive 15*****

Important **SES drives: Drive bay set for immediate start, all other bays are delayed spin start (12 seconds x Module 8 of the SEL_ID) unless there are two active PSUs when they all start immediately.**

2.9 Altos S200F Drive Enclosure Device Addressing

Each enclosure has 16 drive bays. The SEL_ID of each drive is determined by the device slot (0-15) in which it is installed and the address range setting, which is set by means of the Enclosure ID switch on the Ops Panel (shown in) at the rear of the enclosure. The switch settings are shown in

Table 2–5 Ops Panel Switch Functions

Switch Number	Function	Recommended Setting		Definition
1	Not Used	Off		
2	Not Used	Off		
3	Not Used	Off		
4	Not Used	Off		
5 & 6	Not Used	Off		
7 & 8	Drive Loop Speed Select	Sw 7	Sw 8	
		On	Off	Force 2Gb/s
		Off	Off	Force 1Gb/s
9 & 10	Drive Addressing Mode Selection	Sw 9	Sw 10	
		On	On	Mode 0 (recommended)
		Off	On	Mode 1 (not recommended)

Table 2–5   Ops Panel Switch Functions

Switch Number	Function	Recommended Setting		Definition
		On	Off	*Mode 2 *(not supported*
		Off	Off	*Mode 3 *(not supported)*
11	SOFT SELECT	On		Selects functions using the hardware switches
12	Not Used	Off		

Notes   **1** ON = switch to the Right, OFF = switch to the Left.

Table 2–6   Mode 0 Drive Addressing

Thumb Wheel Switch	Device Slot SEL_ID Mode 0
1	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
2	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
3	36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51
4	52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67
5	68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
6	84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99
7	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
8	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
9	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
10	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
11	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
12	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
13	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
14	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
15	100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115

Table 2–7   Drive Slot Arrangement: Enclosure Front View

Row/Column	1/#	2/#	3/#	4/#
#/1	Drive 0*	Drive 1	Drive 2	Drive 3
#/2	Drive 4	Drive 5	Drive 6	Drive 7

Table 2–7 Drive Slot Arrangement: Enclosure Front View

Row/Column	1/#	2/#	3/#	4/#
#/3	Drive 8	Drive 9	Drive 10	Drive 11
#/4	Drive 12	Drive 13	Drive 14	Drive 15*

Notes 1 Drives are numbered row/column.

With only one active PSU the enclosure will take approximately 96 seconds to start all drives from Power On.

2.10   Drive Carrier Configuration

2.10.1   Planning and Configuring Your Installation

2.10.1.1   System Configuration

Important Before you begin installation you should become familiar with the configuration requirements of your Altos S205F / S200F Storage System system. Please refer to Section 2.2 for information on your overall system configurations.

There must be a drive present in Bay 1/1 or 4/4 to enable SES Communications to operate. Installing drives in both of these bays will provide redundant SES communication paths.

When planning your system configuration, please remember that:
- All Altos S205F / S200F Storage System enclosure drive bays must be filled with either a drive carrier or front dummy carrier module, no bays should be left completely empty.

Warning Operation of the Enclosure with *ANY* modules missing will disrupt the airflow and the drives will not receive sufficient cooling. It is *ESSENTIAL* that all apertures are filled before operating the unit. Dummy Carriers and/or Blank modules are available for this purpose.

2.10.1.2   Drive Configuration

Important After you have installed the drive carrier modules in your Altos S205F / S200F Storage System enclosure, please refer to Section 2.5 for configuration information relevant to the I/O module you are installing.

2.11 Drive Carrier Installation

2.11.1 Parts Check List
- Drive Carrier module, or
- Dummy Carrier module

2.11.2   Procedure

1   Release the carrier handle, by pressing the latch in the handle towards the right and insert the carrier into the enclosure (Figure 2–13).

Important   **For a Rack Mounted System: Ensure that the carrier is orientated so that the drive is uppermost and the handle opens from the left.**

For a Tower System: Ensure that the carrier is orientated so that the carrier lock position is uppermost and the handle opens from the top

2   Slide the carrier, gently, all the way into the enclosure until it is stopped by the camming lever on the right of the carrier (Figure 2–14)

3   Cam the carrier home - the camming foot on the base of the carrier will engage into a slot in the enclosure. Continue to push firmly until the handle fully engages. A click should be heard as the latch engages and holds the handle closed (Figure 2–15).

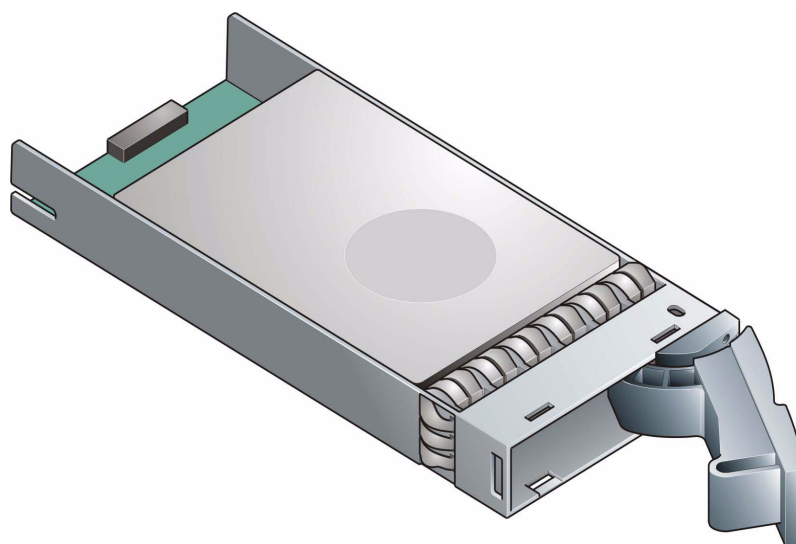**Note**   Ensure that the Handle always opens from the left.

Figure 2–13   Installing a SATA Drive Carrier Module (1)

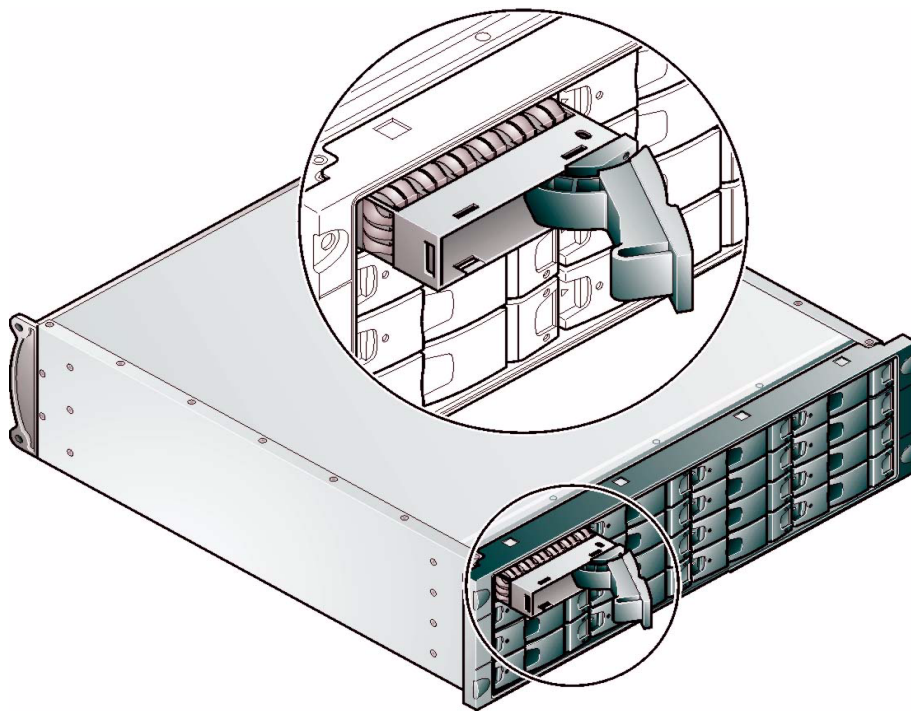**Note**   Removal is the reverse of this procedure (press on the latch to release the handle).

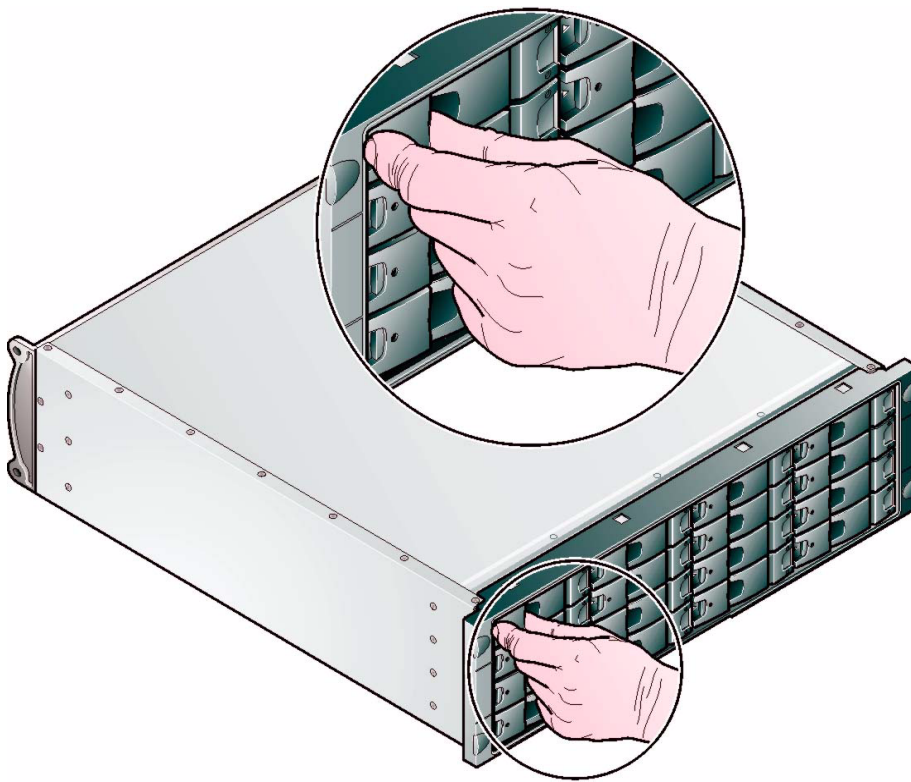**Figure 2–14**   Installing a SATA Drive Carrier Module (2)

Figure 2–15   Installing an SATA Drive Carrier Module (3)

2.11.3 Dummy Carrier Modules

Any unused drive bays must be fitted with a dummy carrier module.

2.11.4 Engaging the Anti-tamper Locks

The anti-tamper locks are fitted in the drive carrier handles and are accessed through the small cutout in the latch section of the handle.

Drives are supplied with the locks set in the locked position.

2.11.4.1 Activating the Locks

1 Carefully insert the lock key provided into the cutout in the handle.

2 Locate the key into its socket.

3 Rotate the key in a clockwise direction until the indicator is visible in the aperture beside the key.
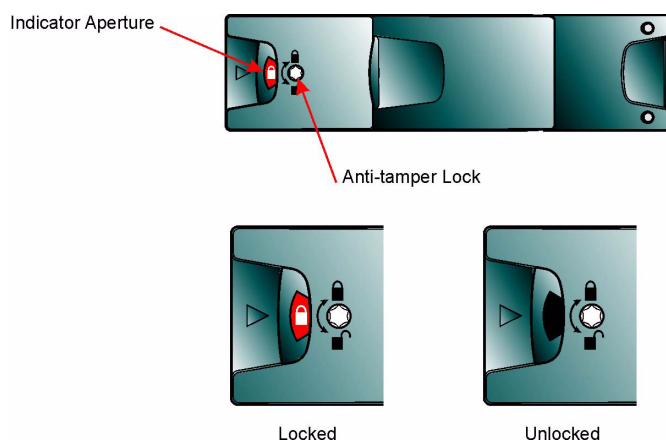

Figure 2–16   Activating the Anti-tamper Lock

4 Remove the key.

De-activation is the reverse of this procedure, that is:

• Rotate the key in a anti-clockwise direction until the indicator is no longer visible in the aperture beside the key.

Note A drive carrier cannot be installed if its anti-tamper lock is activated outside the Enclosure.

2.12 Power Cord Connection

2.12.1 Parts Check List

• Power cord to requisite local standards

2.12.2   Procedure

1   Attach the power cord to the Power Supply/Cooling Modules,

2   Attach the power cord to the in-line IEC connector in this cord.

Caution   *These power splitting cables are provided so that the system is operated from a SINGLE power source thus providing a single point of disconnect.*

3   Switch on each Power Supply/Cooling Module.

4   A POWER LED on the Ops Panel indicates whether AC power is present.

Caution   *The power connections must always be disconnected prior to removal of the Power Supply/Cooling module from the enclosure.*

2.13   Grounding Checks

Perform these checks to ensure that a safe grounding system is provided.

- If a rack distribution system is being used.

  – Ensure power is removed from the rack.
  – Connect the Altos S205F / S200F Storage System power cord to the rack distribution and the enclosure.

- If a direct connection is made with the Altos S205F / S200F Storage System power cord, ensure that it is connected to the enclosure.

Warning   **Some electrical circuits could be damaged if external signal cables or power control cables are present during the grounding checks.**

- Check for continuity between the earth pin of the IEC 320 connector on one of the Power Supply/Cooling modules and any exposed metal surface of the Altos S205F / S200F Storage System enclosure.

Chapter 3

Operation

3.1 Before You Begin

Before powering up the enclosure please ensure that all the modules are firmly seated in their correct bays.

3.2 Power On

Caution   *Do not operate the subsystem until the ambient temperature is within the specified operating range. If the drives have been recently installed ensure they have had time to acclimatize before operating them.*

Note   Please refer to Section 3.3 for details of the Ops Panel LEDs and related fault conditions.

Follow the procedure below to Power On the enclosure.

1   Apply AC power to the enclosure. Turn the Power Supply modules to ON.

2   On the Ops Panel, the Audible Alarm beeps once, all LEDs flash for 7 seconds then the Alarm double beeps.

3   All LEDs on the Ops Panel should be lit (Green) when the enclosure power is activated (and the disk drive motors should start).

Note   All LEDs on the Ops Panel should be lit Green at power up to indicate that the system is functioning correctly. If any show Amber then a problem exists and please contact certificated supplier.

Important   **If AC power is lost for any reason, on restoration of power the enclosure will re-start automatically.**

3.2.1 Power Supply/Cooling Module LEDs

The Power Supply/Cooling module incorporates 4 LEDs, located below the On/Off switch and shown in Table 3–1.
- Under Normal conditions the LEDs should all be illuminated constant GREEN
- If a problem is detected the color of the relevant LED will change to AMBER.

Table 3–1 PSU LEDs

AC PSU	
PSU Good	**Green**
AC input Fail	**Amber**
Fan Fault	**Amber**
DC Output Fail	**Amber**

3.3 Ops Panel LEDs

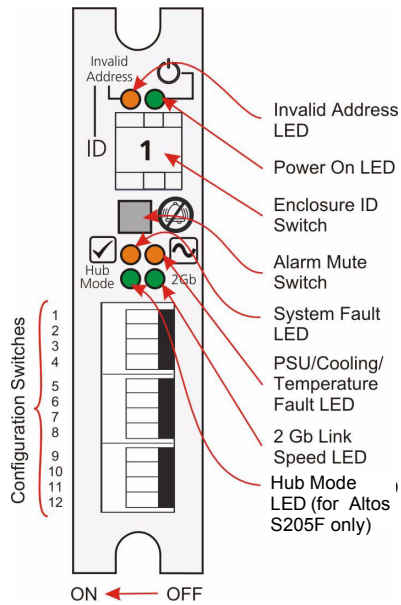The Ops Panel LEDs fault and status conditions are defined in Table 3–2 and shown in Figure 3–1.

Figure 3–1   Ops Panel LEDs and Switches

Table 3–2   Ops Panel LED States

LED	Definition	Color	Normal Status	Fault Status
Power On	Enclosure Powered On	Green	On	Off
System Fault	System/ESI Fault	Amber	Off	On

Table 3–2   Ops Panel LED States

LED	Definition	Color	Normal Status	Fault Status
PSU Fault	PSU Fault/ Cooling Temperature Fault	Amber	Off	On
2Gb Link Speed	Indicates link speed	Green	On = 2Gb	-
			Off = 1Gb	-
Hub Mode	for Altos S205F only		-	-
Invalid Address	Not Used		-	-

3.4 Starting the Drives

Unless otherwise selected during installation, all drives in the enclosure should automatically start their motors. If this has not occurred one of the following conditions may exist:

- There may be a power problem (an alarm and power fault indication would normally be active).

- if there is only one Power Supply/Cooling Module present, the drive motors will spin up in a delayed sequence.

3.4.1 Disk Drives LEDs

Each drive carrier incorporates two indicators, an upper (GREEN) and lower (AMBER).

- In normal operation the Green LED will be ON and will flicker as the drive operates.

- The Amber LED will be OFF In normal operation. It will only be ON if there is a drive fault

3.5 Power Down

To power the Enclosure down,
    either
- Switch off the Power Supply/Cooling modules installed in the Enclosure.
    or
- Remove AC at the power source

Glossary

In glossary definitions, *italics* are used for items defined elsewhere in the glossary and **bold** is used for the items shown in brackets after the main heading of the entry.

ASCII   American Standard Code for Information Interchange. A 7-bit binary code (0's, 1's) used to represent letters, numbers, and special characters such as $,!, and /. Supported by almost every computer and terminal manufacturer.

ATA   (Advance Technology Attachment)   A disk drive interface standard based on a 16-bit bus and dealing with the power and data signal interfaces between the motherboard and the integrated disk controller and drive. The ATA "bus" only supports two devices - master and slave.

Attribute   Setting that controls access to a specific file. Often used to protect important files (such as the Registry files) from accidental change or deletion. Set using the ATTRIB command in MS-DOS.

Backplane   A printed circuit board incorporated in the chassis assembly to provide logic level signal, and low voltage power distribution paths.

Bay   The slot that a unit or media device fits into.

Byte   A group of binary digits stored and operated upon as a unit. A byte may have a coded value equal to a character in the ASCII code (letters, numbers), or have some other value meaningful to the computer. In user documentation, the term usually refers to 8-bit units or characters.
1 kilobyte (K) is equal to 1,024 bytes or characters; 64K indicates 65,536 bytes or characters.

Cable   Throughout this Altos S205F / S200F User's Manual this term is used in accordance with the preferred US context of: "an insulated flexible electric wire used for the transmission of data signals between computer equipment."
Note: Cable is UK preferred terminology for either a power cord or a data cable:

Character   A representation, coded in binary digits, of a letter, number, or other symbol.

Characters Per Second   A data transfer rate generally estimated from the bit rate and the character length. For example, at 2400 bps, 8-bit characters with Start and Stop bits (for a total of ten bits per character) will be transmitted at a rate of approximately 240 characters per second (cps).

Chassis   A sheet metal enclosure incorporating a Backplane PCB and module runner system. The chassis contains a number of 'Bays', each of which can accommodate a plug in module. There are sixteen *drive* carrier bays at the front and five bays at the rear which house two *power supply/ cooling modules,* two *I/O modules* and also the *Ops Panel.*

Configure   To set up a hardware device and its accompanying software.

I/O module (Serial ATA RAID or JBOD I/O module)   A plug-in module providing FC-AL channel external cable interface with 16 *SATA drives*.

Data Communications   A type of communications in which computers and terminals are able to exchange data over an electronic medium.

Disk (drive, carrier, module)   A SATA disk **drive** mounted in a **carrier**. You can have up to sixteen disk drive carrier **modules** in each Altos S205F / S200F Storage System enclosure.

Enclosure   The chassis assembly which houses the plug-in modules that make up the Altos S205F / S200F Storage System.

ESI/Ops module   A unit used to monitor and control all elements of the Enclosure. The **ESI/ Operators (Ops)** panel is supplied as an integral part of the Altos S205F / S200F Storage System Enclosure core product.

Hot plugging   A device with the capability of being connected to a subsystem without interrupting the power supplies to that subsystem.

Hot swap   Hot swapping is the term used for manually swapping a failed disk unit with a replacement while the Altos S205F / S200F Storage System is in normal use.

Hz (Hertz)   A frequency measurement unit used internationally to indicate cycles per second.

Initialize   To prepare a hardware device for use.

LED   Light Emitting Diode. A small light displayed on the cabinet, disk units and power supply units.

Module (power supply, drive, I/O)   A module is a power supply, disk drive or electronics unit held in a carrier that plugs into a bay inside the enclosure. An Altos S205F / S200F Storage System enclosure can contain sixteen **drive** modules, two **power supply/cooling modules** and two **I/O** modules.

Operating system   The software running the host computer. For example, on PCs it is often Windows® 2000 or Windows® NT.

Power Cord   Throughout this Altos S205F / S200F Storage System user's manual this term is used in accordance with the preferred US context of: "an insulated flexible electric wire fitted with connectors at each end and used for the transmission of electrical power to computer equipment.

Protocol   A system of rules and procedures governing communications between two or more devices. Protocols vary, but communicating devices must follow the same protocol in order to exchange data. The format of the data, readiness to receive or send, error detection and error correction are some of the operations that may be defined in protocols.

Redundant   Not essential.

SATA   Serial *ATA* drive interface standard based on serial signaling technology, faster and using much smaller connectors and cables, improving performance and air circulation efficiency.

Serial Transmission   The transfer of data characters one bit at a time, sequentially, using a single electrical path.

Index

V