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RS-1600-F4-SBD & RS-1602-F4-SBD Quick Installation Guide

Safety

All plug-in modules and blank plates 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.

- An RS-1600/1602-F4-SBD enclosure can weigh up to 37kg (81lb). Do not try to lift it by yourself.
- Do not lift the RS-1600/1602-F4-SBD by the handles on the PSU/Cooling module, they are not designed to support the weight of the populated enclosure.
- The RS-1600/1602-F4-SBD 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.
- If powered by multiple AC sources, disconnect all supply power for complete isolation
- 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 power connection must always be disconnected prior to removal of the PSU/ 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.
- This equipment is intended to operate with two working PSUs.
- A faulty Power Supply/Cooling module must be replaced with a fully operational module within 24 hours.

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

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

Class 1 Laser Product

If fitted with optical modules, the modules must be a UL (or other North American NRTL) RECOGNISED COMPONENT, and must be approved by TUV (or other European Product Safety test house) and the laser in the module must comply with Laser Class 1, US 21 CFR (J) and EN 60825-1.

If optical modules are to be provided and fitted by the end user, lasers must also comply with the standards listed above.

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.
- The rack design should take into consideration the maximum operating ambient temperature for the unit, which is 40°C.
- The 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 should have a safe electrical distribution system. It must provide over-current protection for the unit and must not be overloaded by the total number of units installed in the rack. Consideration of the electrical power consumption rating shown on the nameplate should be used when addressing these concerns.
- The electrical distribution system must provide a reliable earth for each unit in the rack.
- Each power supply in each unit has an earth leakage current of 1.8mA. 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 60950-1 and IEC 60950-1.

ESD Precautions

It is recommended that you fit and check a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling RS-1600/1602-F4-SBD plug-in modules and components. Avoid contact with backplane components and module connectors, etc.

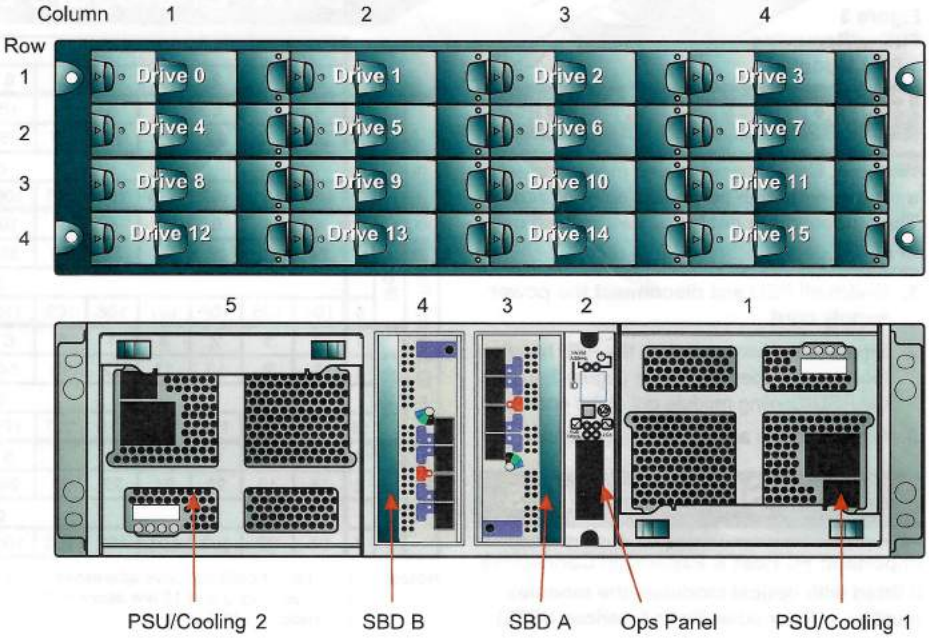
Installation

Fit the modules into the bays defined in Figure 1.

Notes

1. Drives must always be fitted in Locations 1/1 and 4/4; this is the minimum configuration.
2. FC and FC-Nearline/SATA drive types must not be mixed in the same column. When using SATA drives, ensure the correct dongle is used.
3. 10k and 15k drive types must not be mixed in the same column.

Figure 1 Module Locations (Bay numbers are defined by column/row).



Fitting PSU Modules

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

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

1. Check for damage, especially to the rear connector on the PSU/Cooling module.
2. Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

3. With the PSU handle in the open position, slide the module into the enclosure
4. Cam the module home by manually closing the PSU handle (see Figure 3). A click should be heard as the handle latches engage.
5. Connect the power supply cord to the power source and switch the PSU on.

Important: PSU 2 (RH rear bay) must be fitted 'upside down' as shown in Figure 1. 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.

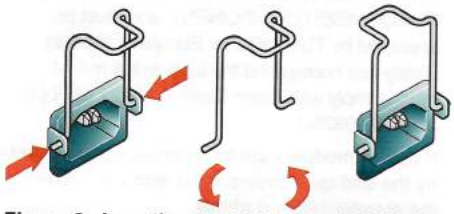
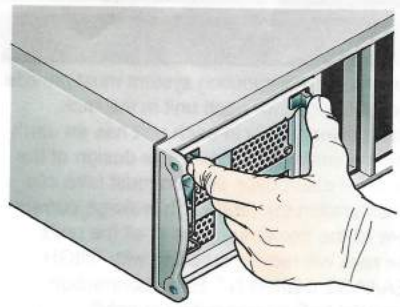


Figure 2 Inverting the Cable Strain Relief



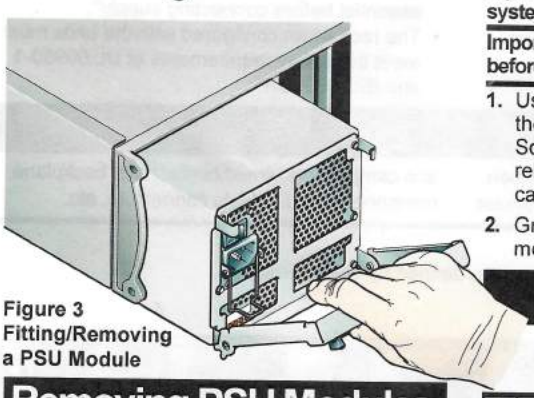


Figure 3 Fitting/Removing a PSU Module

Removing PSU Modules

Warning: Do not remove this module unless a replacement can be immediately added. The system must not be run without all units in place.

1. Switch off PSU and **disconnect the power supply cord.**
2. Squeeze the two latches on the PSU handle together and open the handle (Figure 3) to cam the PSU/Cooling module out of the enclosure.
3. Grip the handle and withdraw the module.

Fitting SBD Modules

Important: FC Host & Expansion Connectors

If fitted with optical modules, the modules must be a UL (or other North American NRTL) RECOGNISED COMPONENT, and must be approved by TUV (or other European Product Safety test house) and the laser in the module must comply with Laser Class 1, US 21 CFR (J) and EN 60825-1.

If optical modules are to be provided and fitted by the end user, lasers must also comply with the standards listed above.

Important: Ensure that CLI cables are detached before hot-plugging an SBD module.

1. With the latch in the open position, slide the module into the enclosure until the latch engages automatically.
2. Cam the module home by manually closing the latches (see Figure 4).
3. A click should be heard as the latch engages

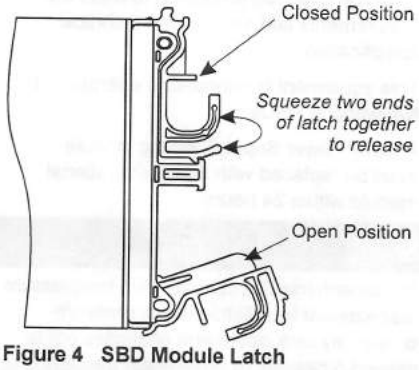


Figure 4 SBD Module Latch

Removing SBD Modules

Warning: Do not remove this module unless a replacement can be immediately added. The system must not be run without all units in place.

Important: Ensure that CLI cables are detached before hot-plugging an SBD module.

1. Using two hands, grasp each latch between the thumb and forefinger of each hand. Squeeze thumb and forefinger together to release the latch. Pull the latches forward to cam the module out of the enclosure.
2. Grip the latch handles and withdraw the module.

Fitting Drives

Warning: All drive bays must be fitted with either drive carrier modules or dummy drive carriers to maintain a balance air flow.

1. Release the carrier handle by pressing the latch in the handle towards the right and insert the carrier into the enclosure.

Important: Ensure that the carrier is orientated so that the drive is uppermost and the handle opens from the left (See Fig. 5).

2. Slide the carrier, gently, all the way into the enclosure.
3. Cam the carrier home - the camming foot on the base of the carrier will engage into the slot in the enclosure.
4. When the carrier is fully home, close the handle - a click should be heard as the latch engages.

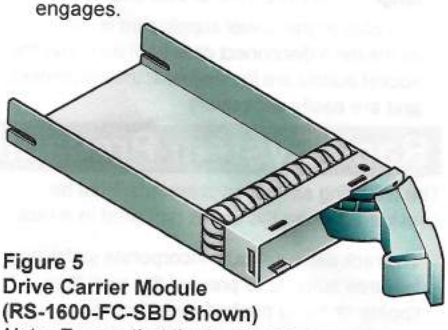
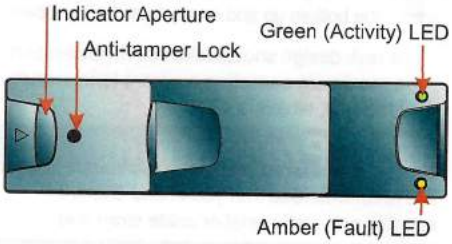


Figure 5 Drive Carrier Module (RS-1600-FC-SBD Shown)

Note: Ensure that the handle always opens from the left.



Drive Enclosure Device Addressing

Enclosure ID Switch Range Setting		Drive Slot 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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
		continued up to...															
	7	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Mode 1	1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
		continued up to...															
	6	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
Mode 2	1	0	1	2	3	4	5	6	7	7	6	5	4	3	2	1	0
	2	8	9	10	11	12	13	14	15	15	14	13	12	11	10	9	8
		continued up to...															
	15	112	113	114	115	116	117	118	119	119	118	117	116	115	114	113	112
Mode 3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
		continued up to...															
	7	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113

Notes:
1. Shaded cells are drive addresses in the second Fibre Channel Arbitrated Loop.
2. Drive bays 0 and 15 are allocated to SES data storage drives.
3. Enclosure ID 0 is invalid.

Operator/Control Panel

Note: Switch settings are only read at Power On.

Setting enclosure for use in 4x4 mode

Ensure the switch settings are set for 1x16 mode. Refer to the table for *Operator/Control Panel Switch Functions for 2x8 and 1x16 Modes*. Any changes to the switch settings should be performed with the enclosure powered down.

Connect RS232 cable P\N 68851-xx to the SBD module.

Start a terminal session using the following Port Settings to view the output of the CLI:

Bits per second:- 9600

Data bits:- 8

Parity:- None

Stop bits:- 1

To set 4x4 mode, use the Hydra command:

hydra zone 4x4 on

Repeat on the other SBD module.

A reboot of the enclosure will be required after activating this mode.

To turn off 4x4 mode, use the Hydra command:

hydra zone 4x4 off

Repeat on the other SBD module.

A reboot of the enclosure will be required after turning off this mode.

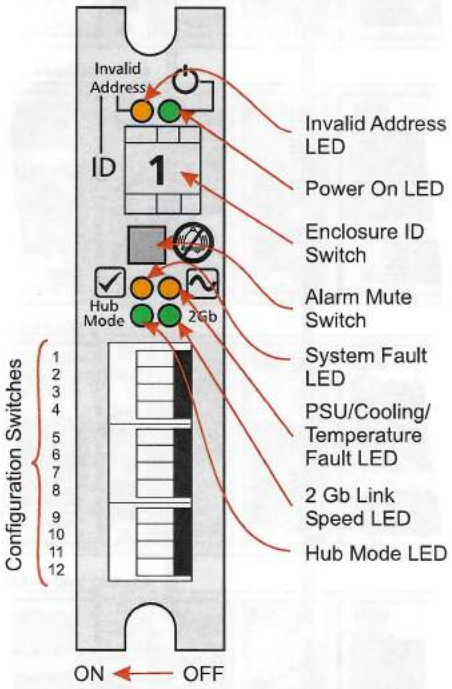


Figure 6 Operator/Control Panel

Operator/Control Panel Switch Functions for 2x8 and 1x16 Modes

Switch Number	Function	Recommended Setting		Definition
1	2x8 or 1x16 mode select	On		1x16 mode
		Off		2x8 mode
2, 3, 4, 5 & 6	Not used	Off		Switch 4 MUST always be turned off
* 7 & 8	Loop speed select	**Sw7**	**Sw8**	
		Off	On	Force 4Gb/s [4G]
		On	Off	Force 2Gb/s [2G]
		Off	Off	Force 1Gb/s [1G]
9 & 10	Drive addressing mode selection	**Sw 9**	**Sw 10**	
		Off	Off	Mode 3
		On	Off	Mode 2 - Selecting this mode will force dual loop selection (see Sw 1 above)
		Off	On	Mode 1
		On	On	Mode 0
11	Not used	Off		
12	Not used	Off		

* Thumbwheel and switch selection should be performed when unit is powered down.

Operator/Control Panel LEDs (16 Bay)

Ops Panel LEDs							
Power On (Green)	PSU/Cooling/ Temp. (Amber)	System Fault (Amber)	Invalid Address (Amber)	2Gb Link Speed (Green)	Hub Mode (Green)	Other Associated LEDs or Alarms	State Description
On	Off	Off	Off	Off	Off	HDD green LEDs OFF	5V Aux present, overall power failed
On	On	On	On	On	On	Single, then double beep	Ops panel power on (5s) test state
On	Off	Off	Off	X	X	HDD green LEDs ON	Power On, all functions good
On	On	Off	X	X	X	PSU LEDs or Fan LEDs	Any PSU fault or fan fault
On	On	Flash	X	X	X		Over or under temperature
On	Off	On	X	X	X	Module Fault LED	ESI processor A failed
On	Off	On	X	X	X	Module Fault LED	ESI processor B failed
On	Off	On	X	X	X	None	Unknown (invalid or mixed) module type installed, or I2C bus failure (Inter ESI processor), or backplane autostart watchdog failed
On	Flash	Flash	X	X	X	PSU removed	PSU removed and system power redundancy check option set. No indication if option not set.
On	Off	Flash	X	X	X	SI alarm	No SES drives fitted
On	Flash	On	X	X	X	Intermittent audible alarm	Ops to ESI communications failed
On	X	X	Flash	X	X		Invalid address mode setting (change thumb wheels to valid range)
On	X	X	X	On	X		2Gb FC drive loop speed selected
On	X	X	X	X	On		RAID ONLY Host side hub mode enabled

X = No bearing on these states

Setting the FC-AL Enclosure ID Range

Set each enclosure in a physical loop to a unique enclosure ID using the rear thumbwheel to establish a different address range for the FC HDDs installed in the enclosure.

If there are not two active PSUs present at power up then drive bay 4-4 is set for immediate start. All other bays are delayed spin start (12 seconds X Module 8 of the SEL_ID).

SBD Module LEDs

LED	State	Description
Host Port 0 Signal Good	Green	When ON this LED denotes that incoming FC signal is GOOD
Host Port 1 Signal Good	Green	When ON this LED denotes that incoming FC signal is GOOD
Host Port 2 Signal Good	Green	When ON this LED denotes that incoming FC signal is GOOD
Host Port 3 Signal Good	Green	When ON this LED denotes that incoming FC signal is GOOD
Loop Status	Blue	All device ports GOOD @ 4Gb/s
	Green	All device ports GOOD @ 2Gb/s
	Off	All device ports GOOD @ 1Gb/s
	Flash-ing	Drives bypassed by mod-ule, see drive LED states
Module Fault	Amber	When ON this LED denotes that the SBD module is FAILED

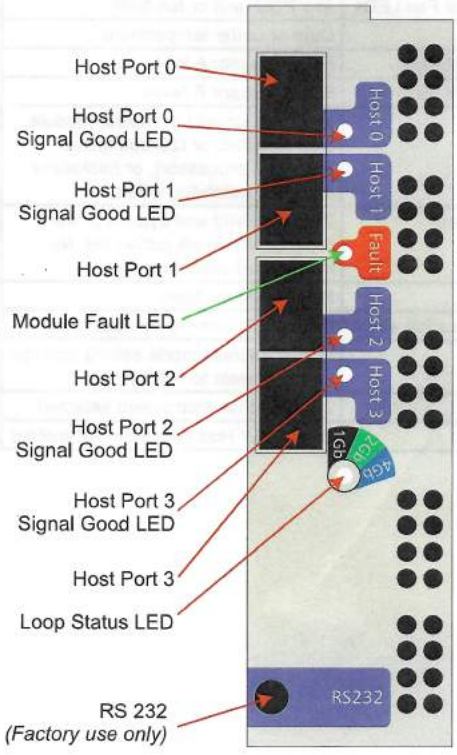


Figure 7 SBD Module Backplate

Connecting Multiple Enclosures

Multiple enclosures are connected together by using SFP to SFP patch cables, up to a maximum of 7 enclosures in all configurations.

Figure 8 shows a typical single interconnect configuration.

Figure 9 shows a supported dual interconnect configuration.

Figure 10 shows the supported JBOD and SBOD intermix configuration. Within this configuration SBOD or JBOD enclosures are supported in any proportion up to a maximum of 7 enclosures.

Note: JBODs should be grouped together and at one end of the loop.

All configurations show the maximum number of Host Bus Adapters (HBAs) supported. Any number up to this maximum can be supported.

Cabling Conventions

Figures 8 & 9 (SBOD Interconnects): All ports should be wired within their trunk set {Host Port 0 : Host Port 1} and {Host Port 2 : Host Port 3} and the directions of the port connections should be the same for Host Port 0 and Host Port 2 and also for Host Port 1 and Host Port 3.

Figure 10 (JBOD and SBOD Intermix): All interconnects should be made using Host Port 2 or Host Port 3.

Incorrect Cabling

The "Host port x signal good LED" will flash at 1sec to identify a faulty connection, in conjunction with the audible alarm and illumination of the "Module Fault LED".

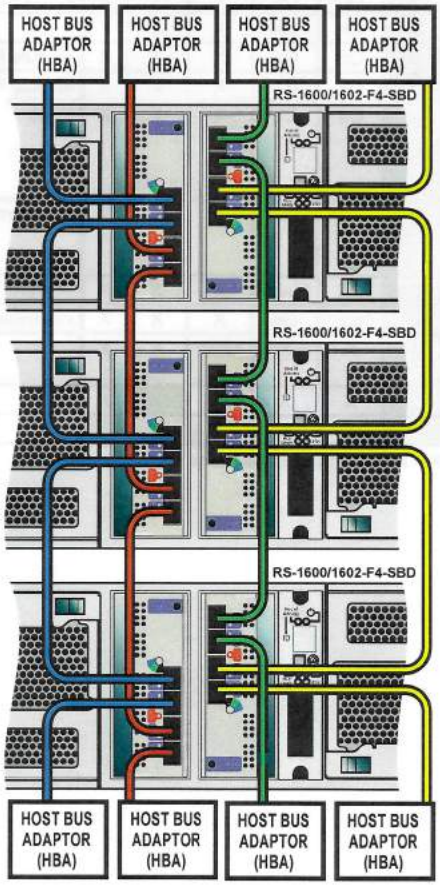


Figure 8 Multiple Enclosures Using Multiple Interconnects per Loop

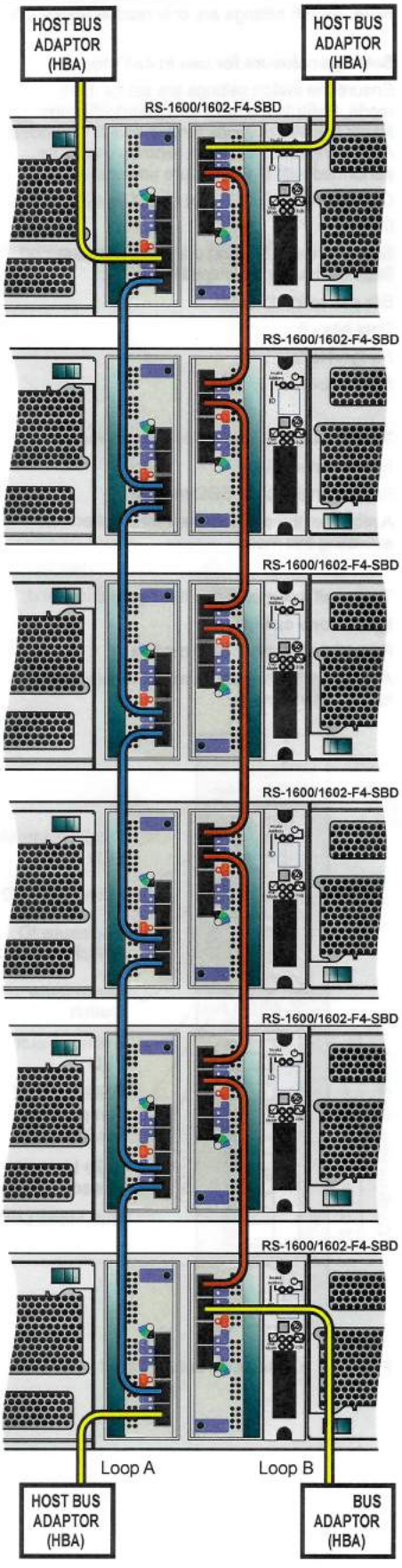


Figure 9 Multiple Enclosures Using a Single Interconnect per Loop

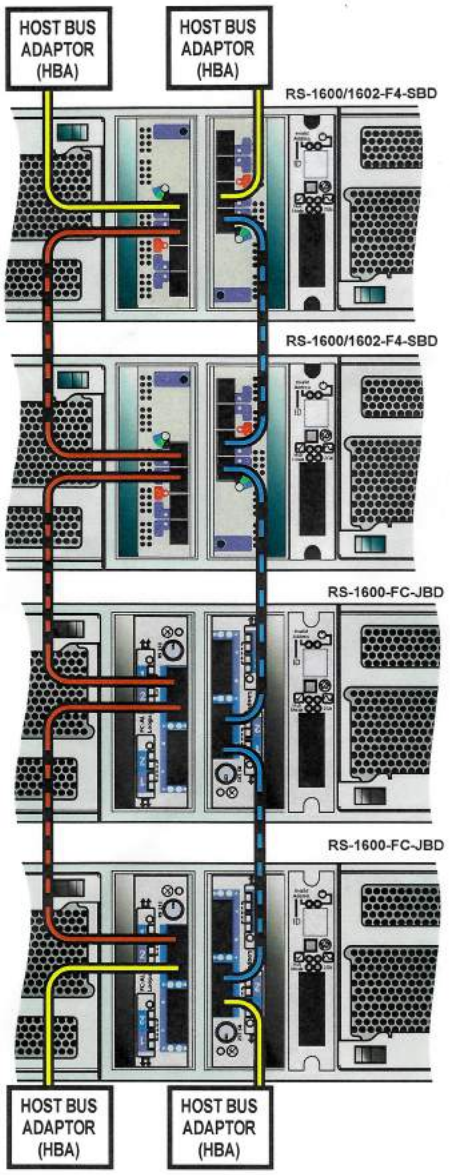


Figure 10 Connecting Single or Multiple SBOD and JBOD Enclosures

Enclosure Population Configurations

Partially Populated Enclosure

If the enclosure is not fully populated, it is recommended to load the drives columns and not rows for maximum performance. See Figure 11 for example.

Mixed FC and FC-Nearline/SATA Configuration

This product can support a mixed configuration of FC, FC-Nearline and SATA drives in the same enclosure. It is essential that only one type of drive is in a column of 4 drives. If different drives are mixed in the same column, the system performance will degrade due to vibration from the higher speed drive. See Figure 12 for examples.



Figure 11

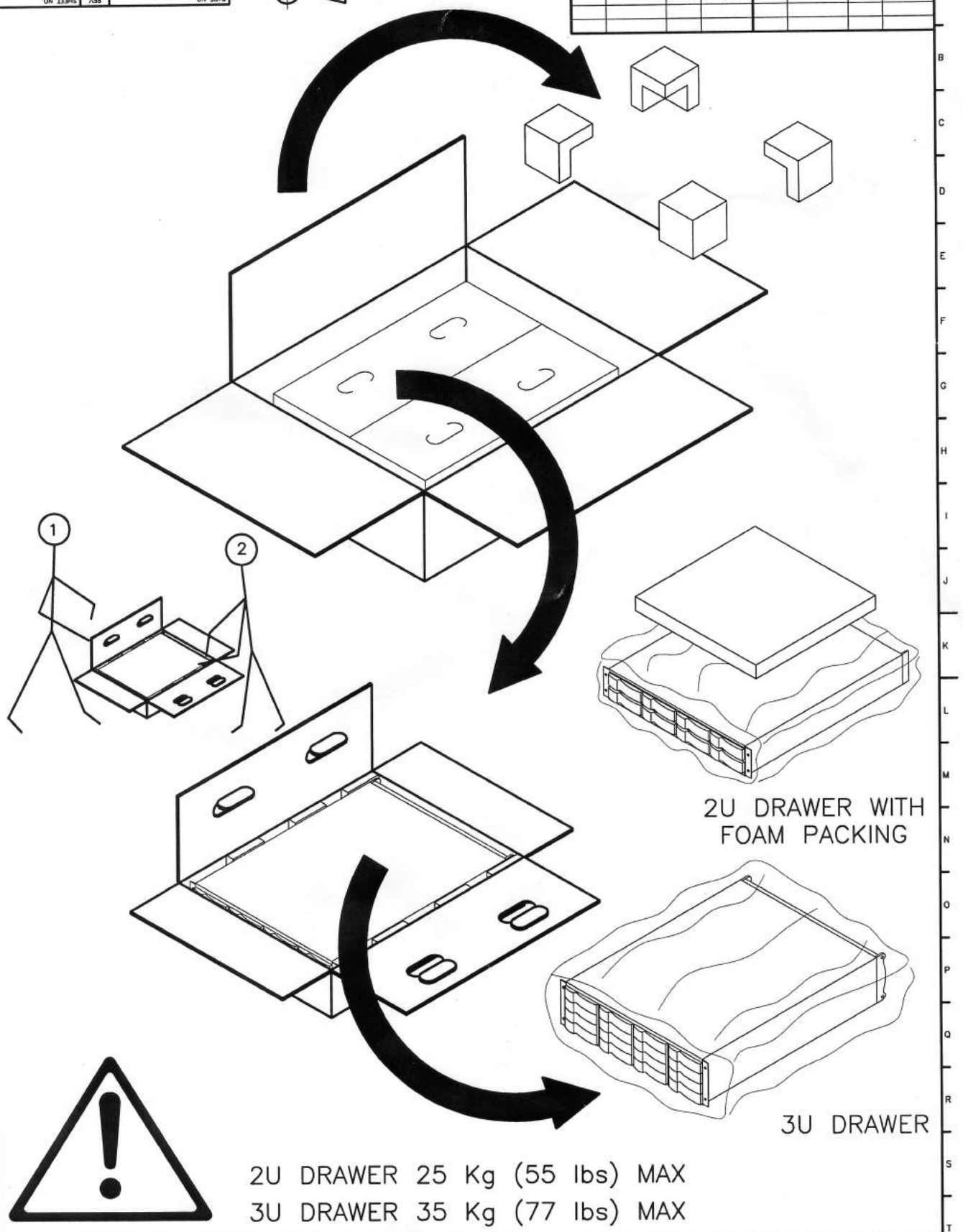


Figure 12

SHEET NO.	REV	PART NO.
1 OF 1	A	42679-01

IF IN DOUBT ASK

REV	DATE	SIG	ECN NO.	REV	DATE	SIG	ECN NO.
01–A	22–05–02	TC	17190				



2U DRAWER 25 Kg (55 lbs) MAX

3U DRAWER 35 Kg (77 lbs) MAX

MATERIAL	TOLERANCES UNLESS STATED	DRAWN	DATE	DRAWING COMPLIES WITH XYRATEX CODE OF DESIGN PRACTICE XYS–95–0001–000			
	0 DECIMAL PLACE : ± 0.5	TC	22–05–02	xyratex	PART NO. 42679–01	REV A	SHEET NO. 1 OF 1
FINISH / SURFACE TEXTURE	1 DECIMAL PLACE : ± 0.2	CHECKED	DATE				
	2 DECIMAL PLACES : ± 0.1	APPROVED	DATE	THIS DOCUMENT IS THE PROPERTY OF XYRATEX TECHNOLOGY LIMITED © AND MUST NOT BE COPIED OR DISCLOSED TO A THIRD PARTY WITHOUT THE PRIOR WRITTEN CONSENT OF THE OWNER	SIZE 4	TITLE PACKAGING RAPTOR UNPACK INSTRUCTIONS	
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	RADII UNLESS STATED :						
	MAX EDGE BREAKS :						

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