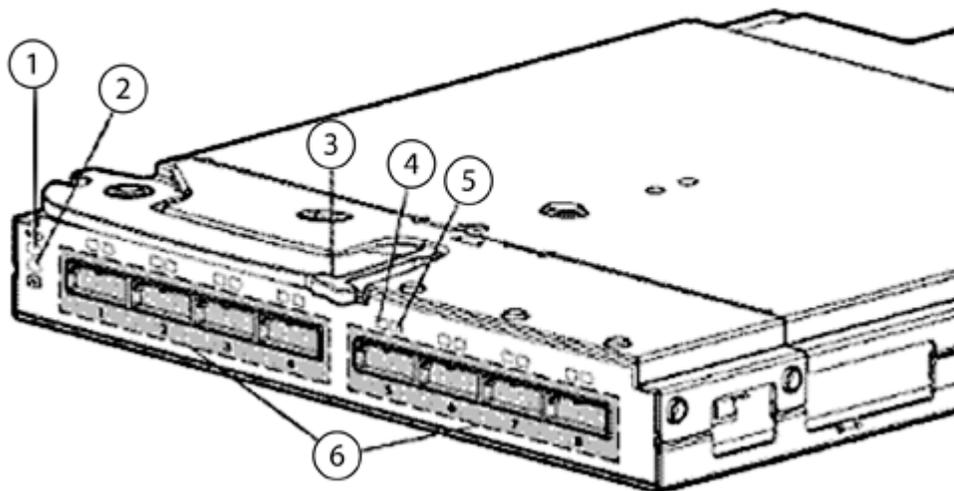## Overview

The HP 3Gb SAS BL Switch for HP BladeSystem c-Class enclosures is an integral part of HP direct connect SAS storage, enabling a straight forward external zoned SAS or shared SAS storage solution. The SAS architecture combines a P700m Smart Array in each server and 3Gb SAS BL switches connected to HP MDS600 enclosures for zoned direct attached SAS storage, or MSA2000sa arrays for shared SAS storage. The HP Storage Works 3Gb SAS BL Switch contains an embedded Virtual SAS Manager (VSM) GUI & CLI interface used to zone, monitor, and update SAS fabric devices.

The 3Gb SAS BL Switch enables two external SAS storage solutions for BladeSystem servers:

- Zoned Direct Attached Storage: Use the Virtual SAS Manager of the 3Gb SAS BL Switch to zone groups of drive bays in the MDS600 and assign them to individual blade server bays. A P700m Smart Array controller installed in the server provides RAID functionality for the group of SAS and SATA drives that have been zoned to that server. The logical drives provided by the P700m will appear as local drives to that individual server. The P700m offers load balancing and fail over anytime dual paths to dual-ported SAS drives are available when using two HP Storage Works 3Gb SAS BL Switches cabled to a MDS600 configured with the HP MDS600 Dual I/O Module Option Kit.
- Shared SAS: The 3Gb SAS BL Switch can also be used to access shared SAS storage provided by the MSA2000sa. A P700m Smart Array controller installed in each server acts as a pass through, with RAID functionality for shared SAS storage provided by the MSA2000sa array. The MSA2000sa creates a shared storage environment where more than one blade server can access a storage logical unit.

For more information on 3Gb/s SAS storage solutions for HP BladeSystem, see: www.hp.com/go/directconnect.

1. Unit ID LED

   - Solid Blue-Being identified.
   - Blinking Blue-Firmware is being updated
   - Off-Normal.

4. Link LED

   - Solid green-A link between switch and storage enclosure is established.
   - Blinking green-There is activity on the established link.
   - Off-There is no link between the server and storage.

Overview

2. Health LED

   - Solid Green-Healthy.
   - Blinking Amber-There is a problem with the switch.
   - Off-Not powered up.

3. Release button for the ejector handle

5. Fault LED

   - Off-Normal.
   - Solid Amber-There is a link error detected by the switch. Service either the Switch, SAS Cable, or attached Device.

6. Mini-SAS ports containing 4x 3G SAS links (attach to external storage enclosures)

At A Glance

- Hot Pluggable 3Gb/s SAS Switch for HP BladeSystem
- Sixteen internal blade bay ports containing 2x 3Gb/s SAS links
- Eight external Mini-SAS ports containing 4x 3Gb/s SAS links
- Use Mini-SAS cables to connect to MDS600 enclosures for zoned direct attach SAS storage or MSA2000sa enclosures for shared SAS storage
- Dual Domain direct attached SAS architecture supported using HP MDS600 Dual I/O Module Option Kit and dual-ported SAS drives.
- Supports higher performance between the 3G SAS Switch and MDS600 drawer by attaching 2 SAS cables from any quad of 3G SAS Switch external Mini-SAS ports to the 2 Mini-SAS ports on the MDS600 IO module to create an 8x wide SAS connection capable of 2.4GByte/s peak bandwidth. Note: Both SAS cables used for the 8x connection must attach to the same quad of external ports on the HP 3Gb SAS BL Switch (ports 1-4 or ports 5-8).
  NOTE: MDS600 SATA support for 8x connection to the 3Gb BL SAS switch requires all the drive bays of a drawer be populated.
- Use the embedded Virtual SAS Manager GUI or CLI interface to zone switch ports or drive bays to server bays.
- Supported by c3000 and c7000 BladeSystem enclosures
- Supports SAS tape devices for optional backup

For detailed deployment information, see the HP direct connect external SAS storage for HP BladeSystem deployment guide:
http://h20000.www2.hp.com/bizsupport/TechSupport/DocumentIndex.jsp?contentType=SupportManual&lang=en&cc=us&docIndexId=64180&taskId=101&prodTypeId=3709945&prodSeriesId=3832737

Models

3Gb SAS Switch	HP 3Gb SAS BL Switch - Single Pack	AJ864A
	HP 3Gb SAS BL Switch - Dual Pack	AJ865A

Solutions Components

Configuration Rules: 3Gb/s SAS Switch:

- The SAS Switch is supported only in the HP c-Class Enclosures (c7000 & c3000)
- Support installation of the 3Gb SAS BL Switch in up to 6 interconnect bays in the c7000 and up to 3 interconnect bays in the c3000.
- (2) SAS Switches are required in the same c-Class enclosure interconnect bay row for redundancy. Single switch configurations are supported as non-redundant.
- Only drive bays attached to switch ports 1-4 can be zoned to server bays 1-8 and drive bays attached to switch ports 5-8 can be zoned to server bays 9-16.

Use the embedded Virtual SAS Manager GUI or CLI interface to zone switch ports or drive bays to server bays. Supported Internet browser versions: Microsoft Internet Explorer 6.0/7.0, Mozilla Firefox 3.

Related Items

HP MDS600

Use the Virtual SAS Manager of the 3Gb SAS BL Switch to zone groups of drive bays in the MDS600 and assign them to individual blade server bays. A P700m Smart Array controller installed in the server provides RAID functionality for the group of SAS and SATA drives that have been zoned to that server. The logical drives provided by the P700m will appear as local drives to that individual server. The P700m offers load balancing and fail over anytime dual paths to dual-ported SAS drives are available when using 2 HP Storage Works 3Gb SAS BL Switches cabled to a MDS600 configured with the HP MDS600 Dual I/O Module Option Kit.For more information on the MDS600, see: www.hp.com/go/mds600

HP MDS600 with two Dual Port I/O Module System	AJ866A

NOTE: Base model for SAS and SATA drives. Includes redundant hot plug power supplies and fans.

Add AP763A when using dual ported SAS drives to create a dual domain environment.

HP Option Kit with two Dual Port I/O Modules for MDS600	AP763A

NOTE: Add AP763A option kit to AJ866A when using dual-ported SAS drives to create a dual domain environment. Includes redundant hot plug power supplies and fans.
NOTE: Configuring the MDS600 with four I/O modules and dual port SAS hard drives creates a dual domain environment for data path redundancy.

HP MDS600 w/(35) 1TB LFF SATA HDD Bundle	AP764A

NOTE: Includes thirty-five 1TB LFF SATA drives, two dual port I/O modules, redundant hot plug power supplies and redundant hot plug fans.

HP MDS600 w/(35) 450GB LFF SAS Bundle	AP765A

NOTE: Includes thirty-five 450GB LFF SAS drives, four dual port I/O modules, redundant hot plug power supplies and redundant hot plug fans.

MSA2000sa

The 3Gb SAS BL Switch can also be used to access to shared SAS storage provided by the MSA2000sa. A P700m Smart Array controller installed in each server acts as a pass through, with RAID functionality for shared SAS storage provided by the MSA2000sa array.

HP 2312sa G2 Dual Controller Modular Smart Array (LFF)	AJ805A
HP 2324sa G2 Dual Controller Modular Smart Array (SFF)	AJ807A

For more information on the MSA2000sa, see: www.hp.com/go/msa2000sa

Solutions Components

P700m	HP Smart Array P700m Controller/256	507925-B21
	HP Smart Array P700m Controller/512	508226-B21
	Battery Kit for P700m Controller/512	452348-B21
	For more information on the P700m, see: www.hp.com/go/p700m	
SAS cable	2M Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 4x SAS Cable	407339-B21
	NOTE: Use this cable to connect HP MDS600 and MSA2000sa	
Tape Drives	**LTO Ultrium Tape Drives**	
	HP LTO-2 Ultrium 448 SAS Internal Tape Drive	DW085A
	HP LTO-3 Ultrium 920 SAS Internal Tape Drive	EH847A
	HP 1U SAS Rack-Mount Kit with one LTO-4 Ultrium 1760	EH946A
	HP LTO-4 Ultrium 1840 SAS Internal Tape Drive	EH860A
	Rack-mount Tape Drive Enclosures	
	HP 1U SAS Rack-Mount Kit	AE459A
	HP 3U SAS Rack-mount Kit	AG576A
	Tape Autoloaders	
	HP 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
	HP 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A
	Tape Libraries	
	HP MSL2024 1 LTO-4 Ultrium 1760 SAS Drive Library	AK378A
	HP MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP MSL4048 2 LTO-4 Ultrium 1760 SAS Drive Library	AK380A
	HP MSL4048 1 LTO-3 Ultrium 920 SAS Drive Library	AH560A
	HP MSL8096 2 LTO-4 Ultrium 1760 SAS Drive Library	AH382A
	NOTE: HP recommends a maximum of 2 tape drives per 3Gb SAS BL Switch and 64K transfer sizes. Attaching a library with 4 tape drives requires purchasing a second tape library SAS cable (AN975A or AN976A) and attaching 2 drives to the redundant 3Gb SAS BL Switch. Attaching more than 2 tape drives per switch and transfer sizes greater than 64K could result in a failed backup or restore. A future release of firmware on the tape library drives will allow more than 2 tape drives to be attached to a switch.	
SAS cables for tape drives	2M External Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 1x SAS Cable	AE470A
	NOTE: Use this cable to connect HP SAS external tape devices	
	4M External Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 1x SAS Cable	AE465A
	NOTE: Use this cable to connect HP SAS external tape devices	
	2M External Mini-SAS (SFF8088) 1x to Mini-SAS (SFF8088) 4x fanout SAS Cable	AN975A
	NOTE: Use this cable to connect HP MSL SAS Tape Libraries	
	4M External Mini-SAS (SFF8088) 1x to Mini-SAS (SFF8088) 4x fanout SAS Cable	AN976A
	NOTE: Use this cable to connect HP MSL SAS Tape Libraries	
	For more information on tape products, see: www.hp.com/go/tape	

Solutions Components

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements.

NOTE: Server Blade Interconnect Limited Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support. Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

HP services provide total care and support expertise with committed response designed to meet your IT and business needs.

Service and Support and Warranty Information

HP Care Pack Services

Scalable, Flexible, Dependable. Like your storage.
Your storage is evolving. Get scalable support that evolves with it. HP Care Pack Services is an easy-to-buy, easy-to-use portfolio of packaged services covering your lifecycle needs. You can rely on our highly skilled, HP certified professionals to offer a breadth of expertise across leading storage technologies, and work side by side with you for optimal results. Push services beyond expecations and choose support that meets the changing needs of your business with the same reliability, scalability and flexibility you demand of your storage.

Protect your business beyond the warranty
Standard warranty protects against product defects and some causes of downtime. HP Care Pack Services helps you proactively guard against unplanned downtime which can reduce your productivity and profitability. By using a standard approach to warranty uplifts, such as HP Care Pack Services, customers can be more sure of consistency of operations for both mission-critical and standard business computing.

Extending warranties with HP Care Pack Services
The key to normalizing the warranty of combined solutions-is making service uplift simple: HP Care Pack Services. This portfolio of predefined packages, extending across the entire IT lifecycle, offering consulting, education, technical support, optimization, risk assessment, and more. It's entirely flexible allowing customers to extend the cover to the precise level of support required. Customer's standard hardware warranty, for example, can be upgraded to next-business-day response, to same-day coverage, or even to a committed six-hour call-to-repair service available 24 hours every day of the week.

- Provide consistent, predictable levels of support across your entire department or business
- Give you direct access to proven technical and problem-solving expertise
- Offer a choice of response-time and repair-time commitments
- Are available whenever and wherever you do business

For many products, post-warranty HP Care Pack Services are available when your original warranty has expired. Choose the support levels that meet your business requirements, from basic to mission-critical. http://www.hp.com/services/storage

NOTE: Care Pack Services availability may vary by product and country.

Recommended Services	HP Care Pack Services recommended for optimal satisfaction of all deployments of your product.
3-Year HP Support Plus 24	24x7x365 hardware and software services - plus cost-saving software updates and more HP Support Plus 24 helps you increase performance and availability with comprehensive, consistent hardware and software services. Working with your IT team, HP Services engineers deliver onsite hardware support and over-the-phone software support around-the-clock 365 days per year. Service coverage encompasses HP products and selected multivendor hardware and software. In addition, this convenient HP Care Pack packaged service makes software updates available to you at substantial savings. Choose Support Plus 24 when you need to: Improve uptime with responsive hardware and software services available

Service and Support and Warranty Information

anytime
Cost-effectively obtain expert 24x7 multivendor hardware and software support
Enjoy consistent service coverage across geographically dispersed sites
Update HP and selected third-party software at a predictable cost
Take advantage of subscription savings on software updates

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure (OS + ICE)	HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure (OS + ICE)

Product Number	Product Name	Service Name	Care Pack Services Product # and Band	Alternate Care Pack Services Product #
AJ864A	HP 3Gb SAS BL Switch (CTO Only)	3-Year HP Support Plus 24	HA110A3-9LZ	-
-	-	HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure	HA114A1-5N9	UF817E
AJ865A	HP 3Gb SAS BL Switch - Dual Pack	3-Year HP Support Plus 24	HA110A3-4CS	-
-	-	HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure	HA114A1-5N9	UF817E

Related Services	**Services that will enhance the user experience in many product deployments.**
HP SAN Solution Service	Get your SAN implementation right - right from the start. Storage has become essential to the growth and agility of your business. That's why choosing an HP SAN as your data management solution is a smart business decision. But your SAN can deliver the results you need only if it is implemented correctly and integrated with your business. SAN installation, startup, and integration call for specialized expertise in planning and design, hardware configuration, network software installation, and operability verification. Your SAN needs to be configured for high performance and availability. And it needs to be integrated with your applications, management environment, and business processes.
HP Data Migration Service	Minimize the risks involved in transferring data to your HP SAN. You need to move your critical enterprise data to your new HP SAN platform. And you need to accomplish that without losing data. And without interrupting your ongoing business operations. HP Data Migration Service helps you lessen the risk of data loss, minimize threats to data integrity, and avoid productivity-sapping performance slowdowns during data transport. A highly experienced HP Services storage specialist works with you to rapidly and securely migrate mission-critical

Service and Support and Warranty Information

		business information across your data center or around the globe - regardless of the complexity of your environment.
HP Proactive BladeSystem Service		HP Proactive BladeSystem Service helps you improve the ongoing management and utilization of your HP blade technology and tools in order to provide the reliability and the cost-effective performance your business expects. It covers HP blade servers, storage, network and SAN devices, as well as the HP blade management software suite included in the HP blade enclosure. This proactive service leverages HP's global delivery organization with its experienced technical experts who help IT organizations manage and maintain their IT infrastructures to be more cost-effective and change-ready.

Product Number	Product Name	Service Name	Care Pack Services Product # and Band	Alternate Care Pack Services Product #
-	-	HP SAN Solution Service	Contact your HP sales rep or Channel Partner for assistance	Contact your HP sales rep or Channel Partner for assistance
-	-	HP Data Migration Service	Contact your HP sales rep or Channel Partner for assistance	Contact your HP sales rep or Channel Partner for assistance
-	-	HP Proactive BladeSystem Service	HE805A1	Contact your HP sales rep or Channel Partner for assistance

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit http://www.hp.com/support

Remote Support Technology (RST)-HP Remote Support Pack
Taking a more proactive approach to IT support, the HP Remote Support pack plug-in module easily integrates with HP Systems Insight Manager to provide a powerful, unified "single pane of glass" solution for onsite and remote management.

Service and Support and Warranty Information

HP Remote Support Pack enhances HP Systems Insight Manager with intelligent event diagnosis plus the automatic submission of hardware event notifications securely to HP support, including acknowledgment and status returns. It adds remote configuration collections to allow the delivery of assessment and proactive services for your SAN storage and HP-UX environments.

Customer Technical Training

Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. http://www.hp.com/learn/storage

HP Services Awards

HP Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction. For a list of all our awards, please visit http://h20129.ww2.hp.com/services/cache/77318-0-0-225-121.html.

Additional Services Information

For more information about HP Care Pack Services for Storage, please visit: http://www.hp.com/services/storage

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com

Technical Specifications

General Specifications	**Communications Processor**	SSH, Telnet, HTTP, RS232 using OA CLI.	
	Data path	3Gb/s SAS x2 to Server Blade 3Gb/s SAS x4 to external storage enclosures	
	Dimensions (L xW)	Single-wide 1.1" tall, 7.584" wide, and 10.548" deep	
	Weight	5.2 lbs	
Power and Environmental Specifications	**Operating**	Temperature	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305m (1.8°F per every 1000ft) above sea level to a maximum of 3050m (10,000ft), no direct sustained sunlight. Maximum rate of change is 10°C/Hr (18°F/Hr). The upper limit may be limited by the type and number of options installed.
		Humidity (non-condensing)	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
	Power requirement	40Watts (Max), 3Watts (Min)	
	Emissions Classifications		