## **CONFIGURATION GUIDE**





## **SAS Switch**



of SAS in direct-attached storage (DAS) environments by allowing multiple servers to connect to one or more independent storage systems. Additionally, with its built-in zoning capabilities, the SAS6160 allows customers to securely share only selected storage resources. The SAS6160 is designed to provide customers with a low-cost and easy to use storage networking option for rack-mount server and storage installations in cloud computing, data center and small- to medium-sized business (SMB) environments.

The LSI SAS6160 Switch is a ½ wide, 16-port switch that fits into the 1U form factor. The switch extends the capabilities

#### **KEY FEATURES:**

- · Provides a new level of functionality for DAS
- Cluster-able direct-attach solution
- Efficiently connect multiple servers to multiple storage resources
- "Start small, grow big" scalability
- Lowers acquisition cost without sacrificing expansion capabilities
- Supports SAS and SATA connectivity to nearly 1,000 devices
- · Low cost, higher performance storage interconnect
- SAS wide bus aggregate bandwidth over 4 lanes
- Each connection can run at 2400MB/s
- Higher bandwidth, lower latency and improved fairness in switched topologies
- Tiered storage solution with SAS and SATA drives
- Efficiently connect multiple servers to multiple storage
- Reduce complexity with simpler management software

Model # / Name		Ports
LSI SAS6160 SAS Switch	1U ½ Wide	16 x4 SFF8088 6GB/s SAS ports (24Gb/s per port) (2 powered Mini-SAS connectors provide active copper cable support)

## **Target Markets**

#### Hosting

- Shareable DAS
- Cost Efficient
- Performance
- Security

#### **Data Center**

- Tiered Storage
- Shareable DAS
- Performance

### Virtualization

- Max Utilization
- Cluster-able
- Shareable DAS

### Cloud

- Max Utilization
- Cluster-able
- Shareable DAS

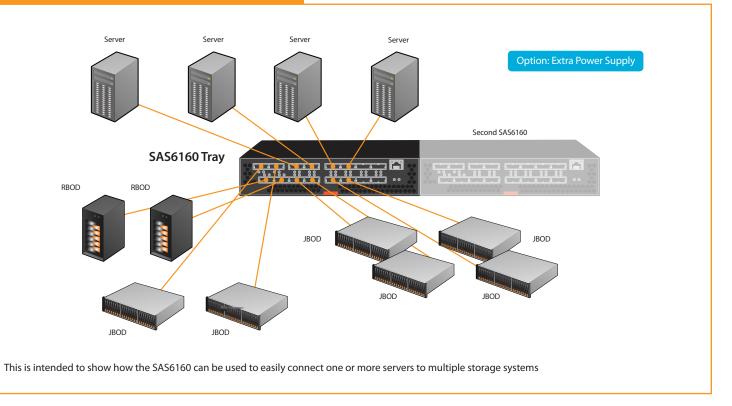


# LSI SAS6160 Options and Spares

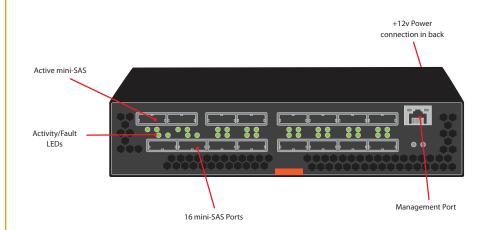
Product	Description
SAS6160 SAS Switch	16 port, 6Gb/s SAS Switch, ½ W
SAS6160 1U Mounting Tray	1U Mounting Tray
SAS6160 Replacement Power Supply	SAS Switch Spare Power Supply (FRU)
SAS Active 20m Cable	Optional Active SAS 20m Cable
SAS Active 10m Cable	Optional Active SAS 10m Cable



## SAS6160 Deployment Example



## SAS6160 SAS Switch

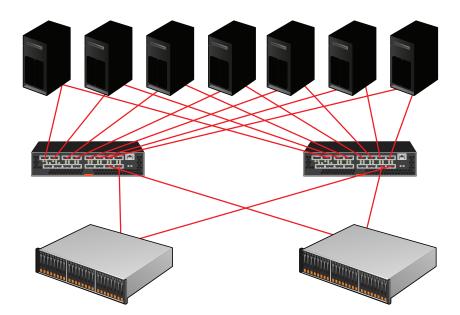


#### **SAS SWITCH**

- 16 x4 SAS 2 ports (24Gb/s per port)
- 16 mini-SAS (SFF8088 connector)
   2 powered Mini-SAS
  - (active copper cable support) connectors
- Activity / Fault LEDs per x4 port
- Fits in 1/2 standard rack width
- Two 16-port switches can fit in a 1 U form factor
- Powerful Embedded Management GUI
- Single external 12 volt Power Supply connector
- Power Supply included

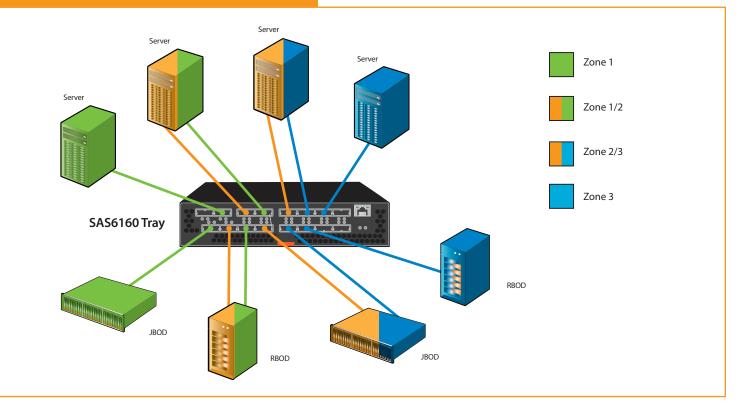
The SAS6160 provides 16 x4 ports to more easily allow one or more servers to seamlessly connect and share multiple storage systems like JBODs and RBODs. Two active ports provide connection distances of up to 25 meters.

# High Availability Deployment Example



Using two (2) SAS6160 switches, I/O paths to each Storage Resource (JBOD or RBOD) should be established for full redundancy and failover protection

# SAS6160 Zoning



🔛 SAS Domain Manager G	UI - 5.0.7.0	_ <b>D X</b>
Eile Server Help		
		LSI 踪
Server: 172.22.93.44 Overlay:		
Domain Specific Information		
Overlay Name	Domain	
Domain Id	1	
Domain Access Point	SAS616x (500062b10000c6ff)	
Root Expander	RIGHTSWITCH	
Number of Expander	7	
Number of End Devices	112	
Active Zone Set	Multipath default config*	
Devices Requiring Attention	RIGHTSWITCH AzTRSideCon AzTRSideCon AzZRCaseCon AzZRCaseCon	
SDM Specific Information		
GUI Version	5.0.7.0	
Server Version	5.0.7.0	
Server Host Name	172.22.93.44	
Login Mode	Administrator	
•	1	•

SAS6160 Integrated Management GUI Summary screen provides current status and open alerts .

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				LSI
rver: 172.22.93.44 Overlay: Domain 💌 Domain Status: 4	Optimal			_
Domain (regend)	Properties	Attached Devices Zone Grou	ID .	
RIGHTSWITCH				
- % 50080e51b6906004	SAS Addres	as 5000c50016929aa5	Company Name	Unknown
- O LSidelBM3	IEEE ID	00 0c 50	Device Type	End Device
- 🔆 R2IBM4 - 🔆 L2IBM4	1.00			
- + L2IBM4 ULhbaSM1	Link Speed	6.0 Gb/s	Vendor Id	SEAGATE
- O URbaSM1	- Product Id	ST9146803SS	Product Revision Level	0005
- \$ 500605b000111119	Device Phys	5 00	Parent SAS Address	50012be0000377bf
\$ 5008056000111001	Dence Fig.		Further and Address	30012000003110
- E Az1RSideCon	Parent Alia:	a Az1RSideCon	Parent Phys	00
<ul> <li>              6000050018929aa5      </li> <li>             6000050017909229         </li> </ul>	Capabilities	SAS Target		
S000c5001692b531				
- (0 5000c500178a2a85				
- 6 5000c500178/5a81				
- O 5000c50017c57c15				
- 🛞 5000c50017c5a8d9				
- (0) 5000c50017909175				
- @ 5000c50005b7f4e5				
- (0) 5000c5001692b905				
- (0) 5000c50017c5c8b5				
- (0) 5000c50017905ef9 - (0) 5000c500179033e5				
<ul> <li></li></ul>				
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- @ 5000c500178f58cd				
© 5000c50017907709				
- @ 5000c500169280b1				
@ 5000c500178e21d1				
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- O 5000c50017909149				
60 5000c500178/58b5     6     7     6     7     6     7				
- @ 5000c50005b82a85				
—				
© 5000:50016929a39 © 5000:5001380efed				

SAS6160 Integrated Management device list Tab provides a detailed list of all connected Host based controllers (SAS Initiators) and End Devices (SAS Targets - Storage resources down to the individual drive level).

SAS Domain Manager GUI - 5.0.7.0						_ O _X
Elle Server Help			_			
						LSI 🌟
						LOI
Server: 172.22.93.44 Overlay: Domain 🔽 Domain Status: 🔘 Optim	nal					
Summary Views Domain Devices						
Domain (recent)		voperties Attached Devices				
BIGHTSWITCH	- i -	roperbes //mached Devices	Zone G	roup		
- 9a 50030e51b6906004		Zone Group Membership				
CSIde EM3						
		Zone Group	Id		End Device	
		IBM2HBA1*	0010	LSidelBM3		
- & URhbaSM1						
- 💠 5006056000111119		Zone Group Permission				
500505b000111001						
<ul> <li>Az1RSideCon</li> </ul>		Zone Group	Id		End Device	
Az3RSideCon		IBM2HBA1*	0010	LSIdeIBM3		
Tambon1		RBOD* Adech1 Diskgroup 04-07*	0021	5000045185905004 5000c500178f5a81		
- (b) 5000c5001a9b57da		Adecut_Designaup_04-07*	0022	5000c50017c57c15		
- (2) 5009c50017c5b7ba				5000c50017c5a5d9		
Ø 5000c5001397495e     Ø		Azlech2_Diskgroup_04-07*	0023	5000c50016928051		
- @ 5009c50017c5b17a				5000c500178e21d1		
- (0) 5000c5001a9b0c16		Attech3 Diskoroup 04-07*	0004	5000c50017c5c7d9 5000c50017909245		
- (2) 5000c50017c5bece		Parents_bisitgroup_04-07-	0024	5000c50017c5a2bd		
- @ 5000c5001a986ae6				5000c50017c5ae0d		
- @ 5000c50017c5all5		Azlech4_Diskgroup_04-07*	0025	5000c500138084d		
- (0) 5000c5001a980da6				5000c5001692c4c1 5000c50017c50e85		
- @ 5009c50017c5ade5				5000c5001692c399		
-		Camdon1_Diskgroup_06-11*	0026	5000c5001a986ae8		
- @ 5000c50017c54156				5000c50017c5a#6		
- @ 5000c5001a98429a				5000c5001a980da5 5000c50017c5ade5		
- (iii) 6009c5001a981162				5000c5001a96tae2		
- (8) 5009c5001a986b2a				5000c50017c54158		
- @ 5000c5001a98670e		Cansdon2_Diskgroup_05-11*	0027	5000c5000d71399a		
- (ii) 5000c5001a9a7922				5000c5000d7142d5 5000c50017c5b5c6		
- (0) 5000c5001a96od06				5000c50017c565c6 5000c5000557b902		
- (B) 5000c5001a99020a				5000c50005b7b992		
- (iii) 6000c5001a9561c2				5000c5000557150e		
- (ii) 5000c5001a981182						
- (D) 6000c5001a95bad5						
- 🛞 5000c5001a95558e						
- (0) 5000c5001a957c8e						
P E Camden2						
- @ 5000c50016928b76						
6000c50005b82dd2	_					

SAS6160 Integrated Management Domain tab provides the tools to name and zone (both manually and automatically) a customer's storage resources.

SAS Domain Manager GUI - 5.0.7.0	_ <b>—</b> X
ile <u>S</u> erver <u>H</u> elp	
Server: 172.22.93.44 Overlay: O Domain V Domain Status: O Warning	
Summary Views Domain Devices	
Alias Management	
<u>Create/modify aliases</u>	
<u>View/delete aliases</u>	
Automatically Configure Zone Groups and Zone Sets	
Initiator isolation wizard	
<u>Connector wizard</u>	
End device wizard	
Manually Configure Zone Groups	
<u>Create Zone Group</u>	
<u>View Zone Group</u>	
<u>Modily Zone Group</u>	
Delete Zone Group	
Manually Configure Zone Sets	
Synchronize zone manager passwords	
<u>Create Zone Set</u>	
<u>View Zone Set</u>	
Modify Zone Set	
<u>Activate/Deadivate Zone Set</u>	
Delete Zone Set	

The SAS6160 Zoning feature enables a customer to zone down to the individual drive level.

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Active Zone Sets, which are copies t Rescan button will refresh and reset	taken at activation, are noted by the pres-	ence of an *(asterisk) app	ended	to th	e nar	me.																						
	the dialog.																							<u> </u>				
elect zone set:																												
lultipath_default_config	Zone Set: Multipath_default_co				_		_	_												_								
lultipath_default_config*	Zone Gro	10	1 2	3	4	5	6 7	8	9	10 1	1 12	13	14	15 1	16 1	7 18	19	20	21	22 :	3 2	4 25	26	27	28 2	(9 30	1 31	32
		IBM1HBA1*: 1					_	X	X	XJ	< X	X	X	_	_	_	-		_	_		_	-		_	_	_	-
		IBM1HBA2*: 2	XX				_	X	х	X )	< X	X							_	_		_	-		_	_	_	-
		IBM2HBA1*: 3 SM3_HBA1*: 4	_	X		x	_			_	_	-	X	х	X	( X	X	х	x						-	_	_	-
		SM3_HBA1*: 4 SM3_HBA2*: 5	_	-		X	-	-	-	-	_	-	X	-	-	-	-		X					$\vdash$	-	-	-	-
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		4 Diskgroup 00-03*: 11			-		-				-	-		-	-	-	-		-	-		-	-		-		-	-
		1_Diskgroup_00-05*: 12					-			-	-	-		-	-	-	-		-	-		-	-	-	-	-	+	-
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	(atech	1_Diskgroup_04-07*: 15	A 10	X		~	-				-	-		-	-	-	-		-	-		-	-		-	-	-	-
		2 Diskgroup 04-07*: 16		X													-		-			-	-		-			
	Aglech	3_Diskgroup_04-07*: 17		X																		-			-	-	-	
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	Campon	2_Diskgroup_18-23*: 32			-		A A		-					_			_		_	_		_	-		_	_		_
	Zone Group	Expand	er																	Phys				_	_	_	_	
	IBM1HBA1*	RIGHTSIMTCH			40	0 41 42	2 4 3																					
	IBM1HBA2*	RIGHTSWITCH			4 45 46																							
	IBM2HBA1*	RIGHTSIMTCH			5 37 38						_					_	_					_						
	SM3 HBA1*	RIGHTSIMTCH			3 49 50																							
	SM3 HBA2*	RIGHTSWITCH	_		2 53 54		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	
	SM4 HBA1*	RIGHTSIMTCH			5 67 68																							
	SM4_HBA2*	RIGHTSIMTCH	_	_		0 6 1 6 2	2 63	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	-	_	_	_	_
	Aztech1 Diskgroup 00-03*	Az1RSideCon			0	123																						

Using the SAS6160 Integrated Management GUI, a customer can easily see a detailed list of all zoned End Devices connected to each Host.

New         • De only special characters mathe unique.         • Oronforgon manies (27 characties mathemit).         • Configure manies (27 characters mathemit).         • Configure mathemits (27 characters mathemit).         • Configure mathemit). </th <th>Modify Zone Group</th> <th>and the second se</th> <th></th>	Modify Zone Group	and the second se	
- The only special characters allowed in the name are (pound). (dash), and _ underscore). - Conference name the unique. - Some programme (12 characters maximum). - Some programme (12 characters			LSI
- The only special characters allowed in the name are (pound). (dash), and _ underscore). - Conference name the unique. - Some programme (12 characters maximum). - Some programme (12 characters	Notes -		
Candon 1_Diskgroup, 00.05         Candon 1_Diskgroup, 00.05           inselected zone group members filter:         Image: Candon 1_Diskgroup, 00.05           Candon 1         Image: Candon 1_Diskgroup, 00.05           Inselected Idembers:         Image: Candon 1_Diskgroup, 00.05           Candon 1: 0 > 5000-5001 r058074         Image: Candon 1: 0 > 5000-5001 r058074           Candon 1: 0 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 0 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 1 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 2 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 2 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 2 > 5000-5001 r058074         Candon 1: 0 > 5000-5001 r058074           Candon 1: 3          Candon 1: 2 > 5000-5001 r058074 <th>The only special characters allowed in the name are # ZoneGroup names must be unique. Zonegroup name (32 characters maximum). Unselected members and Selected Members List box</th> <th>will contain the entries as</th> <th></th>	The only special characters allowed in the name are # ZoneGroup names must be unique. Zonegroup name (32 characters maximum). Unselected members and Selected Members List box	will contain the entries as	
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Apply Close Rescan			

SAS6160 Integrated Management GUI Zone Sets page provides all current Zone and the storage resources in each.

Activate/Deactivate Zone S	iet																				T								<b></b> >	٢
																														_
																												LS	51 羚	
Notes																														
<ul> <li>A zone set must be activated for</li> <li>When no zone set is active, zoning</li> </ul>											e zo	ne s	et ca	in De	activ	/e a	t a un	10.												
- Changes to the active zone set,o											the r	iext	zone	e set	activ	atio	n.													
- A zone set deactivation is not rea																														
<ul> <li>Reactivating the current zone se</li> <li>Depending on the zoning configu</li> </ul>																						4					_			
enabled.	ration	and no	w su	w ac	cess	ses a	don	iain,	a va		one	man	ager	Pas	swor	am	ay no	t aiw	ays b	erec	laneo	to m	ouny	ord	1940	e zo	ning	once	itis	
- Rescan button will refresh and re	eset th	ie dialo	g.																											
Current active zone set : Multipath	_defau	ilt_con	fig*																											•
Select a zone set:																														
<ul> <li>Deactivate all zone sets</li> </ul>																														
Activate a zone set																														
Multipath_default_config									-																					
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Zone Set : Multipath default confid																														
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SM3_HBA1: 4		хх	-			X	х	_			х		-	X	х				x	+	- ^	X	-	-	X	х		X X		
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SAS6160 Integrated Management GUI allows a customer to easily modify zone sets to reallocation resource as needed.

## Summary



The LSI SAS6160 switch provides a new level of functionality for direct attached, SAS-based storage. It allows customers to more easily and cost efficiently share multiple storage resources among one or more servers. The SAS6160 was designed to support:

- · Applications needing shared and pooled storage
- Example: Use fewer, larger storage arrays
- Applications needing increased connectivity
   Example: Use multiple switches in a topology
- Applications needing higher availability
- Example: Building a redundant configuration with two switches
- · Configurations using tiered storage solution with SAS and SATA drives
- Customers wanting to lower storage acquisition cost without sacrificing expansion capabilities
- Customers wanting to efficiently connect multiple servers to multiple storage
- Customers wanting to securely share chosen storage resources with selected servers

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