

To: T10 Technical Committee
 From: Tim Symons, PMC-Sierra (Tim_Symons@pmc-sierra.com)
 Date: 9 Aug 2006
 Subject: 06-286r4 SAS-2 SMP ZONE LOCK.

Revision Information

- Revision 0: First Revision
- Revision 1: Text revisions per discussion.
- Revision 2: Removed time-out references as these belong in the time-out proposal (06-326). Added definition for configuring zoning expanders that are not zone enabled.
- Revision 3: Added EXPANDER CHANGE COUNT and ZONE LOCKED bit to the request and response frames to indicate zoning expander lock status.
- Revision 4: Changed function name. Bits added to REPORT GENERAL to indicate whether persistence bits are supported. The CONFIGURING bit is used to resolve cases where subgroups of zoning expanders are locked.

Referenced Documents

sas2r05a Serial Attached SCSI – 2 (SAS-2) revision 5a
 06-358r1 SAS-2 Zone Configuration model (Tim Symons, PMC-Sierra)

Overview

A zone manager uses the SMP ZONE LOCK function to lock a zoning expander device, by setting the ZONE LOCKED bit to one. When a zoning expander device has the ZONE LOCKED bit set to one, it may accept SMP zone configuration function requests to change zone configuration values.

[Suggested addition to SAS-2 existing text (included in black), new additional text (included in blue) and changes between revisions shown in red]

10.4.3.1 SMP function request frame format

Table 196 – SMP functions (FUNCTION field)

Code	SMP function	Description	Reference
86h	ZONE LOCK	Locks a zoning expander device for zone configuration.	10.4.3.xx

Editors Note: Suggestion: 85h-8Fh could be assigned to zoning functions:
 85h: ZONE BROADCAST (already defined)
 86h: SMP ZONE LOCK
 87h: SMP ZONE ACTIVATE
 88h: SMP ZONE UNLOCK
 89h: Reserved for zoning SMP functions
 8Ah: CONFIGURE PHY ZONE
 8Bh: CONFIGURE ZONE PERMISSION
 8Ch – 8Fh: Reserved for zoning SMP functions

10.4.3.2 SMP function response frame format

Table 198 – FUNCTION RESULT field

Code	Name	SMP function(s)	Description
...			
21h	ZONE LOCK VIOLATION	... ZONE LOCK	A zoning expander device that is zone locked, receives an SMP zone locked request function from a source that is not the active zone management application client, or when the zoning expander device is not locked.
...			

...

Table xx - Function result priority per SMP Function

SMP Function (per table 197)	SMP Function Result Priority
...	
ZONE LOCK	1) INVALID REQUEST FRAME LENGTH 2) ZONE LOCK VIOLATION 3) SMP FUNCTION FAILED 4) SMP FUNCTION ACCEPTED
...	

...

10.4.3.3 REPORT GENERAL function

Table 199 defines the response format.

Table 199 - REPORT GENERAL response

Byte\ Bit	7	6	5	4	3	2	1	0	
...	...								
3	RESPONSE LENGTH (0bh)								
...	...								
10	TABLE TO TABLE SUPPORTED	Reserved	ZONE GROUP PERSISTENT SUPPORTED	INSIDE ZPSDS PERSISTENT SUPPORTED	ADDRESS RESOLVED SUPPORTED	CONFIG-URES OTHERS	CONFIG-URING	EXTERNALLY CONFIGURABLE ROUTE TABLE	
...	...								
36	Reserved			ZONE LOCKED	PHYSICAL PRESENCE SUPPORTED	PHYSICAL PRESENCE ASSERTED	ZONING SUPPORTED	ZONING ENABLED	
...	...								
40	ZONE LOCKED SAS ADDRESS								
47	---								
48	(MSB)	CRC						---	
51								(LSB)	

...

The REQUEST LENGTH field shall be set to (0bh).

...

A ZONE GROUP PERSISTENT SUPPORTED bit set to one indicates that zone group persistent operation is supported by the expander device. A ZONE GROUP PERSISTENT SUPPORTED bit set to zero indicates that zone group persistent operation is not supported by the expander device (see 4.9.4).

An INSIDE ZPSDS PERSISTENT SUPPORTED bit set to one indicates that inside ZPSDS persistent operation is supported by the expander device. An INSIDE ZPSDS PERSISTENT SUPPORTED bit set to zero indicates that inside ZPSDS persistent operation is not supported by the expander device (see 4.9.4).

An ADDRESS RESOLVED SUPPORTED bit set to one indicates that the zoning expander device supports address resolved ports. A ZONE GROUP PERSISTENT SUPPORTED bit set to zero indicates that the zoning expander device does not support address resolved ports (see 4.9.3.1).

...

A CONFIGURING bit set to one indicates that the management device server is in a self-configuring expander device, the self-configuring expander device's management application client is currently performing the discover process (see 4.7), and it has identified at least one change to its expander routing table, or the zoning expander device is locked and the zone permission table, or phy zone information has been changed. A CONFIGURING bit set to zero indicates that the management device server is not in a self-configuring expander device currently performing the discover process and changing its expander routing table. Changes in this bit from one to zero result in a Broadcast (Change) being originated (see 7.11). Management device servers in self-configuring expander devices shall support this bit. Management device servers in externally configurable expander devices and in other device types shall set the CONFIGURING bit to zero.

...

A ZONE LOCKED bit set to one indicates that the ZPSDS is locked by a zone manager. A ZONE LOCKED bit set to zero indicates that the ZPSDS is not locked by a zone manager.

The PHYSICAL PRESENCE SUPPORTED bit is defined in 10.4.3.3

The PHYSICAL PRESENCE ASSERTED bit is defined in 10.4.3.3

The ZONING SUPPORTED bit is defined in 10.4.3.3

The ZONING ENABLED bit is defined in 10.4.3.3

...

The ZONE LOCKED SAS ADDRESS field indicates the SAS address of the zone manager that last locked the zoning expander device. If the request is successful this field indicates the SAS address of the originator of the request. If the request is unsuccessful then this field indicates the SAS address of the zone manager that previously or currently has the zoning expander device locked.

...

Start of new definitions. Changes between revisions are shown in red

10.4.3.x ZONE LOCK function

All zoning expander devices and zone management application clients shall support this function. A zone manager originates a ZONE LOCK request to lock a group of one or more zoning expander devices.

A ZONE LOCK request should be successful when the zoning expander device has:

- a) the ZONING ENABLED bit set to one and the ZONE LOCKED bit is set to zero; or
- b) the ZONING ENABLED bit set to zero and the PHYSICAL PRESENCE ASSERTED bit set to one.

If the ZONE LOCK request is successful then the ZONE LOCKED SAS ADDRESS field shall be set to the SMP port address of the zone management application client device and the ZONE LOCKED bit shall be set to one. If the zoning expander device is configured by a vendor unique out-of-band method then the ZONE LOCKED SAS ADDRESS field shall be set to zero. This field shall be set to zero at power on.

Each zoning expander device in a ZPSDS should be locked by the same zone manager, and when locked shall only accept SMP zone configuration function requests originated by the active zone manager.

If more than one zone manager attempts to lock a group of zoning expanders, the following rules ensure that any concurrent requests are always resolved:

- 1) If a zone manager receives a ZONE LOCK response with the FUNCTION RESULT field set to ZONE LOCK VIOLATION for the first ZONE LOCK request it originates then the group of zoning expanders is locked by another zone manager and no further requests should be originated until a Broadcast (change) event is received;
- 2) If at least one ZONE LOCK request is successful and at least one response has the FUNCTION RESULT field set to ZONE LOCK VIOLATION and the CONFIGURING bit is set to one, then the group of zoning expanders is locked by another zone manager and no further requests should be originated until a Broadcast (change) event is received; or
- 3) If at least one ZONE LOCK request is successful and at least one response has the FUNCTION RESULT field set to ZONE LOCK VIOLATION and the CONFIGURING bit is set to zero, then another zone manager has locked at least one zoning expander device in the group of expander devices and the zone manager shall evaluate the ZONE LOCKED SAS ADDRESS field from the ZONE LOCK response;
 - A. if the returned ZONE LOCKED SAS ADDRESS field has a higher numeric value than the SMP port SAS address of the zone manager, then the zone manager with the lower numeric value SAS address shall originate an ZONE UNLOCK request to all zoning expander devices that it locked; or
 - B. if the returned SAS address has a lower numeric value than the SMP port SAS address of the zone manager, then the zone manager with the higher numeric value SAS address shall originate an ZONE LOCK request to all zoning expander devices that it has not already locked.

When a zoning expander device changes the ZONE LOCKED bit from zero to one, the shadow registers shall load the values of the active zone registers.

If an expander device receives an ZONE LOCK request when it is already locked then:

- a) if the request originates from the active zone manager then the function result should be SMP FUNCTION ACCEPTED (see10.4.3.1).
- b) if the request does not originate from the active zone manager then the function result should be ZONE LOCK VIOLATION (see10.4.3.1).

Editors Note: The zone-locked timer should be restarted if a ZONE LOCK request is received from the active zone manager

 Editors Note: The following definition does not appear to serve any useful purpose. Validate this again with the working group or remove it.

“When a zoning expander device has the ZONE LOCK bit set to one then any received Broadcast (change), Broadcast (Reserved Change 0) and Broadcast (Reserved Change 1) shall not be forwarded.”

Table 1 defines the ZONE LOCK request format.

Table 1 – ZONE LOCK request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (84h)							
2	Reserved							
3	REQUEST LENGTH (01h)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5								
6		Reserved						
7								
8	(MSB)	CRC						(LSB)
11								

The SMP FRAME TYPE field shall be set to 40h.

The FUNCTION field shall be set to 84h.

The REQUEST LENGTH field shall be set to (01h).

The EXPECTED EXPANDER CHANGE COUNT field is defined in 10.4.3.3

The CRC field is defined in 10.4.3.1.

The ZONE LOCK response format is defined in Table 2.

Table 2 – ZONE LOCK response

Byte\Bit	7	6	5	4	3	2	1	0	
0	SMP FRAME TYPE (41h)								
1	FUNCTION (84h)								
2	FUNCTION RESULT								
3	RESPONSE LENGTH (02h)								
4	Reserved							CONFIGURING	
5	Reserved								
7	Reserved								
8	ZONE LOCKED SAS ADDRESS								
15	ZONE LOCKED SAS ADDRESS								
16	(MSB)	CRC							
19							(LSB)		

The SMP FRAME TYPE field shall be set to 41h.

The FUNCTION field shall be set to 84h.

The FUNCTION RESULT field is defined in 10.4.3.2

The RESPONSE LENGTH field shall be set to 02h.

The CONFIGURING bit is defined in 10.4.3.3

The ZONE LOCKED SAS ADDRESS field is defined in 10.4.3.3

 Editors Note: The ZONE LOCKED SAS ADDRESS field definition is in the changes to REPORT GENERAL at the beginning of this document

The CRC field is defined in 10.4.3.1.