

T10/06-201r4 SAS-2 SMP CONFIGURE PHY ZONE function.

To: T10 Technical Committee
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Subject: 06-201r4 SAS-2 SMP CONFIGURE PHY ZONE functions

Revision Information

- Revision 0: Proposal extracted from 06-019r5 SAS-2 Zoning proposal.
- Revision 1: Clarification of descriptions and added revised the PHY ZONE CONFIGURATION DESCRIPTOR to align with the DISCOVERY fields. Added reference tables for functions.
- Revision 2: Text revisions to include references to the zone management client lock, load activate and unlock procedure defined in 06-286.
- Revision 3: Text revisions and added function response priority table. Further definition for locked and unlocked usage.
- **Revision 4: Revised phy zone configuration descriptor to align with 210r4**

Referenced Documents

sas2r04a Serial Attached SCSI – 2 (SAS-2) revision 4a
06-019r5 SAS-2 Zoning (Tim Symons, PMC-Sierra)
06-210r4 SAS-2: Reporting ZONE PARTICIPATING CAPABLE in the IDENTIFY address frame (Kevin Marks, Dell)
06-281r2 SAS-2 Enable and disable zoning (Rob Elliott, HP)
06-286r1 SAS-2 Zone Management lock. (Tim Symons, PMC-Sierra)
06-304r0 SAS 2.0 SMP Function Result Priority (Zenta Darnell, Vitesse)

Overview

Each phy of a zoning expander device has configurable zone attributes, these include:

- a) zone group;
- b) zone group persistent;
- c) zone participating;
- d) zone participating persistent; and
- e) zone address resolved.

The CONFIGURE PHY ZONE function is used by a zone management client to change the **zone attributes of phys in a zoning expander device. When a zoning expander device has the ZONING ENABLED bit set to one then a CONFIGURE PHY ZONE request shall only be accepted if it originates from the active zone management client (see 06-286).**

[Editors Note: Require selection of one of these definitions for the standard...]

If a zoning expander device has the ZONING ENABLED bit set to zero then:

- a) the zoning expander device shall accept the CONFIGURE PHY ZONE request from any zone management client device;
- b) the zoning expander device shall be locked by a zone lock operation and then only accept the CONFIGURE PHY ZONE request from the active zone management client device;

Option b) requires the following text to be added to 06-286 SAS-2 Zone Management Lock. Section "10.4.3.x ZONE LOCK function" :

“If a zoning expander device has the ZONE ENABLED bit set to zero, then it shall be locked by any zone management client. The lock operates separately on each zoning expander device that has the ZONING ENABLED bit set to zero. “

- c) if the zoning expander device has the PHYSICAL PRESENCE ASSERTED bit set to one then it shall accept the CONFIGURE PHY ZONE request from a zone management client device that also has the PHYSICAL PRESENCE ASSERTED bit set to one;

[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
94h	CONFIGURE PHY ZONE	Change phy entries within a zone route table	10.4.3.16

10.4.3.2 SMP function response frame format

Table 199 – FUNCTION RESULT field

Code	Name	SMP function(s)	Description
10h	PHY DOES NOT EXIST	DISCOVER, DISCOVER LIST, REPORT PHY ERROR LOG, REPORT PHY SATA, REPORT ROUTE INFORMATION, REPORT PHY EVENT INFORMATION, CONFIGURE ROUTE INFORMATION, PHY CONTROL, PHY TEST FUNCTION, CONFIGURE PHY EVENT INFORMATION CONFIGURE PHY ZONE	The phy specified by the PHY IDENTIFIER field in the SMP request frame does not exist (e.g., the value is not within the range of zero to the value of the NUMBER OF PHYS field reported in the REPORT GENERAL function). The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
20h	SMP ZONE VIOLATION	CONFIGURE GENERAL, ZONED BROADCAST, PHY CONTROL, PHY TEST FUNCTION, CONFIGURE PHY EVENT INFORMATION CONFIGURE PHY ZONE, CONFIGURE ZONE PERMISSION, ZONE LOCK	The SMP target port supports the function, but zoning is enabled and the SMP initiator port does not have access to a necessary zone group according to the zone permission table (see 4.8.3.2).
21h	ZONE LOCK VIOLATION	CONFIGURE PHY ZONE, CONFIGURE ZONE PERMISSION, ZONE LOCK	A zoning expander device that is zone locked, receives an SMP request function from a source that is not the active zone management client.

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Table xx - Function result priority per SMP Function

SMP Function (per table 197)	SMP Function Result Priority
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CONFIGURE PHY ZONE	1) INVALID REQUEST FRAME LENGTH 2) PHY DOES NOT EXIST 3) SMP ZONE VIOLATION 4) ZONE LOCK VIOLATION 5) SMP FUNCTION FAILED 6) SMP FUNCTION ACCEPTED ...
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10.4.3.16 CONFIGURE PHY ZONE function

This function shall be supported by all zone management client devices **and all zoning expander devices**. A CONFIGURE PHY ZONE request should only be originated by the active zone management client, and is used to configure the zoning attributes for phys in a zoning expander device. If a zoning expander device receives a CONFIGURE PHY ZONE request **then the following rules apply:**

- a) if the zoning expander is zone locked and the request is originated from a device that is not the active zone management client then the function result shall be ZONE LOCK VIOLATION (see 10.4.3.2); or
- b) if the zoning is not zone locked and the request is originated from a device that does not have access permission for zone group 2 then the function result shall be SMP ZONE VIOLATION (see 10.4.3.2).

If an error condition is reported in the CONFIGURE PHY ZONE FUNCTION RESPONSE field then the zone management client **shall;**

- a) set the ZONE LOCK bit to zero;
- b) ignore the shadow register data; and
- c) originate a BROADCAST (Change) with access to zone group 1.

When a CONFIGURE PHY ZONE request causes a change to an expander phy configuration then;

- a) if the **phy has zone group access permission to zone group 3** then the zoning expander device shall originate a BROADCAST (Change) on each expander port that has access permission to the expander phy before the change, and after the change based on the zone permission table including the phy with that changed; or
- b) if the **phy does not have zone group access permission to zone group 3** then the zoning expander device shall originate a BROADCAST (Change) with access to zone group 1 on all ports.

Table 1 defines the CONFIGURE PHY ZONE request format.

Table 1 – CONFIGURE PHY ZONE request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (94h)							
2	Reserved							
3	REQUEST LENGTH ((n - 7) / 4)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5	Reserved							
6	NUMBER OF ZONE PHY CONFIGURATION DESCRIPTORS							
Phy zone configuration descriptor list								
8	Phy zone configuration descriptor (first) (see Table 2)							
11								
...	...							
n - 7	Phy zone configuration descriptor (last) (see Table 2)							
n - 4								
n - 3	(MSB)	CRC						(LSB)
n								

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

The FUNCTION field shall be set to 94h.

The REQUEST LENGTH field specifies the number of dwords that follow, not including the CRC field.

The EXPECTED EXPANDER CHANGE COUNT field is defined in the SMP CONFIGURE GENERAL request (see 10.4.3.10).

The NUMBER OF ZONE PHY CONFIGURATION DESCRIPTORS field specifies the number of phy zone configuration descriptors in the request. If the number of phy zone descriptors exceeds the number of phys of the zoning expand device then the function shall report INVALID REQUEST FRAME LENGTH in the response FUNCTION RESULT field.

Each phy zone configuration descriptor is 4 bytes long and follows the format in Table 2 .

Table 2 - phy zone configuration descriptor

Byte\Bit	7	6	5	4	3	2	1	0
0	PHY IDENTIFIER							
1	Reserved		ZONE PARTICIPATING PERSISTENT	Ignored	ZONE ADDRESS RESOLVED	ZONE GROUP PERSISTENT	ZONE PARTICIPATING	Ignored
2	Reserved							
3	ZONE GROUP							

The PHY INDEX specifies the phy to which the phy zone configuration descriptor information is applied. If a PHY index does not exist then the function shall report PHY DOES NOT EXIST in the response FUNCTION RESULT field.

The ZONE PARTICIPATING PERSISTENT bit is defined in 10.4.3.5.

The ZONE ADDRESS RESOLVED bit is defined in 10.4.3.5.

The ZONE GROUP PERSISTENT bit is defined in 10.4.3.5.

The ZONE PARTICIPATING bit is defined in 10.4.3.5.

The ZONE GROUP field contains the value of the ZONE GROUP field in the zone phy information (see 4.8.3.1). Zone group values between 128 and 255, inclusive, are reserved.

The CRC field is defined in 10.4.3.2.

Table 3 defines the response format.

Table 3 – CONFIGURE PHY ZONE response

Byte\Bit	7	6	5	4	3	2	1	0	
0	SMP FRAME TYPE (41h)								
1	FUNCTION (94h)								
2	FUNCTION RESULT								
3	RESPONSE LENGTH (00h)								
4	(MSB)	CRC							
7								(LSB)	

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

The FUNCTION field shall be set to 94h.

The FUNCTION RESULT field is defined in 10.4.3.2

The RESPONSE LENGTH field shall be set to 00h.

The CRC field is defined in 10.4.3.2.