

# T10/06-201r3 SAS-2 SMP CONFIGURE PHY ZONE function.

To: T10 Technical Committee  
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Subject: 06-201r3 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.

## Referenced Documents

sas2r04a Serial Attached SCSI – 2 (SAS-2) revision 4a  
06-019r5 SAS-2 Zoning (Tim Symons, PMC-Sierra)  
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 the active zone management client to change the **zone attributes of phys in a zoning expander device**. **When a zoning expander device is zone locked then a CONFIGURE PHY ZONE request shall only be accepted if it originates from the active zone management client (see 06-286)**. If a zoning expander device is not locked then a zoning expander device shall accept the CONFIGURE PHY ZONE request from any zone management client device.

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[Suggested addition to SAS-2 existing text (included in black), new additional text (included in blue) and changes between revisions shown in red]  
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### 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 <b>CONFIGURE PHY ZONE</b>	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 <b>CONFIGURE PHY ZONE, CONFIGURE ZONE PERMISSION, ZONE LOCK</b>	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	<b>CONFIGURE PHY ZONE, CONFIGURE ZONE PERMISSION, ZONE LOCK</b>	A zoning expander device that is zone locked, receives an SMP request function from a source that is not the <b>active zone management client</b> .
...			

...

Table xx - Function result priority per SMP Function

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

...

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).

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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	Reserved							
7	NUMBER OF ZONE PHY CONFIGURATION DESCRIPTORS							
<b>Phy zone configuration descriptor list</b>								
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								(LSB)

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

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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	Ignored	ZONE PARTICIPATING PERSISTENT	Ignored	Ignored	ZONE ADDRESS RESOLVED	ZONE GROUP PERSISTENT	ZONE PARTICIPATING	Ignored
2	Reserved							
3	ZONE GROUP							

[Editors Note: The phy zone configuration description should align with Table 205 ref: 06-210 Zone participating capability reporting (Kevin Marks)]

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						(LSB)	
7									

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

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The RESPONSE LENGTH field shall be set to 00h.

The CRC field is defined in 10.4.3.2.