

To: T10 Technical Committee
 From: Rob Elliott, HP (elliott@hp.com)
 Date: 11 August 2007
 Subject: 07-305r2 SAS-2 Zone phy information clarifications

Revision history

Revision 0 (3 July 2007) First revision

Revision 1 (7 August 2007) Incorporated comments from July 2007 SAS protocol WG. Include a SAVE bit in each zone configuration function to specify if the saved or current values are being configured.

Revision 2 (11 August 2007) Incorporated comments from 8 August 2007 SAS protocol WG teleconference - include shadow values in the model, report default/saved/shadow/current in DISCOVER, report saved supported for each set in REPORT GENERAL, let REPORT ZONE PERMISSION TABLE retrieve any of the four types, add SAVING bit to REPORT GENERAL.

Related documents

sas2r10 - Serial Attached SCSI - 2 (SAS-2) revision 10

Overview

In a SAS-2 editor's meeting, a question was raised about a NOTE in the zone phy information field descriptions explaining that the the REQUESTED INSIDE ZPSDS bit may be changed by the expander device after a link reset sequence. That bit is special in that the expander device overrides the programmed setting in certain situations. Two other zone phy information fields - the ZONE GROUP field and the INSIDE ZPSDS bit - can also be changed based on the link reset sequence, but are not singled out with notes.

A new table is proposed to introduce all the fields indicating which ones are accessible via IDENTIFY, DISCOVER, DISCOVER LIST, and CONFIGURE ZONE PHY INFORMATION, and indicating which fields may be automatically changed by a link reset sequence.

Zoning enabled, zone phy information, zone permission table, and the zone manager password may or may not be saved in non-volatile storage. If an expander changes a value because of the link reset sequence, the saved value is not supposed to change - just the volatile value. The terms current, saved, and default are defined to help clarify this.

The saved values need to be reported separately from the current values in the DISCOVER response so the zone manager can predict the expander's behavior after a link reset sequence (even if power is cycled).

Suggested changes

4.9.1 Zoning overview

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~~A zoning expander device may or may not preserve the following settings during power loss:~~

- ~~a) zoning enabled;~~
- ~~b) the zone permission table;~~
- ~~c) zone phy information; and/or~~
- ~~d) the zone manager password.~~

The expander device:

- a) shall maintain a current value;
- a) shall maintain a shadow value;
- b) may maintain a saved value; and
- c) shall have a default value.

for each the following settings:

- a) zoning enabled;
- b) the zone permission table;
- c) zone phy information; and/or
- d) the zone manager password.

Support or lack of support for saved values for one setting does not imply support or lack of support for saved values for any other setting (e.g., the expander device may maintain a saved value for zoning enabled but not for the zone permission table).

For each setting, after power on or expander reduced functionality, the expander device shall set the current value to the saved value, if any, or the default value, if there is no saved value.

Table 1 describes the reasons for which a zoning expander device accepts the SMP ZONE LOCK function after power on.

Table 1 — Zoning expander device zoning configuration after power on

Value after power on			Reason(s) that the SMP ZONE LOCK function is accepted				
Zoning enabled	Zone permission table saved	Zone manager password	Physical presence asserted	SMP initiator port has access to zone group 2	ZONE MANAGER PASSWORD field in the ZONE LOCK request set to the zone manager password		
no	N/A yes or no	ZERO	yes	no	yes		
		DISABLED			no		
		All others			yes		
yes	no	ZERO		no	no	yes	
		DISABLED				no	
		All others				yes	
	yes	yes		ZERO	yes	yes	yes
				DISABLED			no
				All others			yes

4.9.2 Zoning expander device requirements

In addition to the requirements for expander devices described in 4.6, a zoning expander device shall:

- a) contain a zoning expander route table (see 4.9.3.4);
- b) contain ~~active~~current and shadow zone permission tables that supports 128 or 256 zone groups (see 4.9.3.3);
- c) contain ~~active~~current and shadow zone phy information for each phy;
- d) if zoning is enabled, allow or deny connection requests based on the active zone permission table (see 4.9.3.5);
- e) set the ZONING SUPPORTED bit to one in its SMP REPORT GENERAL response (see 10.4.3.3);
- f) support the ZONING ENABLED bit in the SMP REPORT GENERAL response;
- g) support the zone lock inactivity timer;
- h) be self-configuring;
- i) contain an SMP initiator port (see 4.6.1); and
- j) support zoning-related SMP functions.

Editor’s Note 1: Global: Change “active” to “current” when referring to zone phy information and zone permission table values. “Current” is used for mode page values in a very similar manner to this usage, so using the same term seems appropriate.

A zoning expander device may include physical presence detection to allow locking (see 4.9.6.2). The definition of physical presence detection is vendor-specific.

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4.9.3 Zone operation

4.9.3.1 Zone phy information

Each phy of a zoning expander device shall support the following zone phy information fields defined in table 3.:

- a) ~~INSIDE ZPSDS bit;~~
- b) ~~REQUESTED INSIDE ZPSDS bit;~~
- c) ~~INSIDE ZPSDS PERSISTENT bit;~~
- d) ~~ZONE GROUP PERSISTENT bit; and~~
- e) ~~ZONE GROUP field.~~

Table 2 — Zone phy information [new table]

Field	Description	Recommended default
INSIDE ZPSDS bit	Indicates if the phy is inside or on the boundary of a ZPSDS	N/A ^a
REQUESTED INSIDE ZPSDS bit	Used to establish the boundary of the ZPSDS	0
INSIDE ZPSDS PERSISTENT bit	Used to determine the value of the INSIDE ZPSDS bit after a link reset sequence	0
ZONE GROUP PERSISTENT bit	Used to determine the zone group of the phy after a link reset sequence when the INSIDE ZPSDS bit is set to zero	0
ZONE GROUP field	The zone group to which the phy belongs	00h
^a The INSIDE ZPSDS bit is determined from the values exchanged during the link reset sequence.		

[Table 3 lists the usage of the current values of the zone phy information fields.](#)

Table 3 — Zone phy information usage [new table]

Field	Transmitted in IDENTIFY address frame ^a	Indicated in DISCOVER function and DISCOVER LIST function ^b	Attached value indicated in DISCOVER function ^c	Programmed with the CONFIGURE ZONE PHY INFORMATION function ^d	Changeable by the expander device after a link reset sequence ^e
INSIDE ZPSDS bit	No	Yes	No	No	Yes
REQUESTED INSIDE ZPSDS bit	Yes	Yes	Yes	Yes	Yes
INSIDE ZPSDS PERSISTENT bit	Yes	Yes	Yes	Yes	No
ZONE GROUP PERSISTENT bit	No	Yes	No	Yes	No
ZONE GROUP field	No	Yes	No	Yes	Yes
^a Defined in the IDENTIFY address frame (see 7.8.2). ^b Defined in the DISCOVER response (see 10.4.3.8) and the DISCOVER LIST response SHORT FORMAT descriptor (see 10.4.3.14.4). ^c Defined in the DISCOVER response (see 10.4.3.8). ^d Defined in the zone phy configuration descriptor (see 10.4.3.23.3). The saved values are also programmed with this function. ^e See table 33 in 4.9.4.					

All phys in an expander port shall have the same zone phy information (see 4.9.3.1). [\[new paragraph\]](#)

The expander device shall preserve the zone phy information while zoning is disabled and [there is no power loss and no expander device reduced functionality \(see 4.6.8\)](#). ~~may or may not preserve the zone phy information through power loss (see 4.9.1).~~

~~If the zoning expander device preserves that zoning is enabled and does not preserve the zone phy information, it shall set the zone phy information as follows:~~

- ~~a) INSIDE ZPSDS bit set to zero;~~
- ~~b) REQUESTED INSIDE ZPSDS bit set to zero;~~
- ~~c) INSIDE ZPSDS PERSISTENT bit set to zero;~~
- ~~d) ZONE GROUP PERSISTENT bit set to zero; and~~
- ~~e) ZONE GROUP field set to 00h.~~

The INSIDE ZPSDS bit indicates if the phy is inside or on the boundary of a ZPSDS. An INSIDE ZPSDS bit set to zero indicates that the phy is attached to an end device, an expander device that does not support zoning, or a zoning expander device with zoning disabled, or a zoning expander device with zoning enabled that is outside the ZPSDS (i.e., is in another ZPSDS). An INSIDE ZPSDS bit set to one indicates that the phy is attached to a zoning expander device with zoning enabled and is thus inside a ZPSDS. The INSIDE ZPSDS bit only changes following a link reset sequence (see 4.9.4), based on:

- a) the REQUESTED INSIDE ZPSDS bit;
- b) the REQUESTED INSIDE ZPSDS bit received in the incoming IDENTIFY address frame (see 7.8.2);
- c) the INSIDE ZPSDS PERSISTENT bit; and
- d) the INSIDE ZPSDS PERSISTENT bit received in the incoming IDENTIFY address frame.

The REQUESTED INSIDE ZPSDS bit is used to establish the boundary of the ZPSDS. The REQUESTED INSIDE ZPSDS bit ~~is transmitted in the IDENTIFY address frame (see 7.8.2) to the attached phy and~~ is used to determine the values of other zone phy information fields after a link reset sequence (see 4.9.4).

~~NOTE 1—The value of the REQUESTED INSIDE ZPSDS bit may be changed by the zoning expander device following a link reset sequence (see 4.9.4).~~

The INSIDE ZPSDS PERSISTENT bit ~~indicates the method~~is used to determine the value of the INSIDE ZPSDS bit after a link reset sequence (see 4.9.4). ~~The INSIDE ZPSDS PERSISTENT bit is transmitted in the IDENTIFY address frame (see 7.8.2).~~

The ZONE GROUP field ~~specifies~~contains the zone group to which the phy belongs. The zone group of the SMP initiator port and SMP target port in a zoning expander device shall be ~~401h~~01h. 4.9.3.2 defines more about zone groups.

The ZONE GROUP PERSISTENT bit ~~specifies the method of determining~~is used to determine the zone group of the phy after a link reset sequence when the INSIDE ZPSDS bit is set to zero (see 4.9.4).

4.9.4 Zone phy information and link reset sequences

At the completion of a link reset sequence (see 4.4), if a SATA device is attached to an expander phy, the zoning expander device with zoning enabled shall set the INSIDE ZPSDS bit to zero for that expander phy.

At the completion of a link reset sequence, if a SATA device is not attached to an expander phy, the zoning expander device with zoning enabled shall update the current zone phy information fields as defined in table 33 based on:

- a) the REQUESTED INSIDE ZPSDS bit and the INSIDE ZPSDS PERSISTENT bit in the zone phy information (i.e., the bits transmitted in the outgoing IDENTIFY address frame (see 7.8.2)); and
- b) the REQUESTED INSIDE ZPSDS bit and INSIDE ZPSDS PERSISTENT bit received in the incoming IDENTIFY address frame.

Table 33 — Zone phy information fields after a link reset sequence

REQUESTED INSIDE ZPSDS bit		INSIDE ZPSDS PERSISTENT bit		Zone phy information field changes
Transmitted	Received	Transmitted	Received	
0	0 or 1	0 or 1	0 or 1	The zoning expander device shall set the INSIDE ZPSDS bit to zero.
1	0			
1	1	0	0	If the SAS address received in the IDENTIFY address frame during the identification sequence is different from the SAS address prior to the completion of the link reset sequence, then the zoning expander device shall: a) set the REQUESTED INSIDE ZPSDS bit to zero; and b) set the INSIDE ZPSDS bit to zero.
		0	1	
		1	0	If the SAS address received in the IDENTIFY address frame during the identification sequence is the same as the SAS address prior to the completion of the link reset sequence, then the zoning expander device shall: a) set the INSIDE ZPSDS bit to one; and b) set the ZONE GROUP field to one <u>01h</u> .
		1	1	The zoning expander device shall: a) set the INSIDE ZPSDS bit to one; and b) set the ZONE GROUP field to one <u>01h</u> .

If the ZONE GROUP PERSISTENT bit is set to one, then a link reset sequence (see 4.4) shall not cause the zone group of an expander phy to change unless the INSIDE ZPSDS bit changes from zero to one as specified in table 33. If the ZONE GROUP PERSISTENT bit is set to zero, then table 34 specifies events based on the initial condition of an expander phy that shall cause a zoning expander device with zoning enabled to change the ZONE GROUP field of the expander phy to its [reset value \(i.e., the saved value, if any, or its default value \(e.g., zero00h\) if there is no saved value\)](#).

Table 34 — Events that cause the ZONE GROUP field to be ~~set to its default value~~ reset when the ZONE GROUP PERSISTENT bit set to zero

Initial condition	Event after the initial condition is established
Completed link reset sequence with a SAS device attached	A subsequent link reset sequence completes and: <ol style="list-style-type: none"> a) the SAS address received in the IDENTIFY address frame (see 7.8.2) during the identification sequence is different from the SAS address prior to the completion of the link reset sequence; or b) a SATA device is attached.
Completed link reset sequence with a SATA device attached	Either: <ol style="list-style-type: none"> a) A subsequent link reset sequence completes and: <ol style="list-style-type: none"> A) a hot-plug timeout (see 6.7.5) occurred between the time of the initial condition and the time the link reset sequence completed; B) the zoning expander device has detected the possibility that a new SATA device has been inserted. The method of detection is outside the scope of this standard (e.g., an enclosure services process reports a change in the ELEMENT STATUS CODE field in the Device or Array Device element (see SES-2), or a change in the WORLD WIDE NAME field in the attached SATA device's IDENTIFY DEVICE or IDENTIFY PACKET DEVICE data (see ATA8-ACS)); or C) a SAS phy or expander phy is attached; or b) The expander phy is disabled with the SMP PHY CONTROL function (see 10.4.3.28) DISABLE phy operation.

4.9.6 Zone configuration

4.9.6.4 Activate step

The activate step copies the zoning expander shadow register values to the zoning expander active values. The active zone manager issues one of the following:

- a) a Broadcast (Zone Activate) (see 4.1.13); or
- b) an SMP ZONE ACTIVATE request (see 10.4.3.22) to all locked zoning expander devices.

After a locked zoning expander device receives a Broadcast (Zone Activate) or processes an SMP ZONE ACTIVATE request, then the zoning expander device ~~sets~~[shall set](#) the zoning expander active values equal to the zoning expander shadow values.

If the active zone manager receives an SMP ZONE ACTIVATE response with the FUNCTION RESULT field set to ZONE LOCK VIOLATION (see 10.4.3.2), then it should unlock all locked zoning expander devices.

The activate step may be skipped when a locked zoning expander device is unlocked:

- a) by a zone manager with a higher SAS address during the lock step (see 4.9.6.2); or
- b) because the zone lock inactivity timer expires.

10.4.3 SMP functions

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The FUNCTION field specifies which SMP function is being requested and is defined in table 35. If the value in the FUNCTION field is not supported by the management device server, it shall return a function result of UNKNOWN SMP FUNCTION as described in table 36.

Table 35 — SMP functions (FUNCTION field) (part 1 of 2)

Code	SMP function	Description	Reference
00h	REPORT GENERAL	Return general information about the device	10.4.3.3
01h	REPORT MANUFACTURER INFORMATION	Return vendor and product identification	10.4.3.4
02h	READ GPIO REGISTER	See SFF-8485	
03h	REPORT SELF-CONFIGURATION STATUS	Return status of the discover process in a self-configuring expander device	10.4.3.5
04h	REPORT ZONE PERMISSION TABLE	Return zone permission table active or shadow values	10.4.3.6
05h	REPORT ZONE MANAGER PASSWORD	Return the zone manager password	10.4.3.7
06h	REPORT BROADCAST	Return information about originated Broadcasts	10.4.3.8
07h - 0Fh	Reserved for general SMP input functions		
10h	DISCOVER	Return information about the specified phy	10.4.3.8
11h	REPORT PHY ERROR LOG	Return error logging information about the specified phy	10.4.3.10
12h	REPORT PHY SATA	Return information about a phy currently attached to a SATA phy	10.4.3.11
13h	REPORT ROUTE INFORMATION	Return phy-based expander route table information	10.4.3.12
14h	REPORT PHY EVENT INFORMATION	Return phy event information for the specified phy	10.4.3.13
15h	REPORT PHY BROADCAST COUNTS	Return information about Broadcasts received from attached end devices	10.4.3.14
16h - 1Fh	Reserved for phy-based SMP input functions		
20h	DISCOVER LIST	Return information about the specified phys	10.4.3.15
21h	REPORT PHY EVENT INFORMATION LIST	Return phy event information	10.4.3.16
22h	REPORT EXPANDER ROUTE TABLE LIST	Return contents of the expander-based expander route table	10.4.3.17
23h - 2Fh	Reserved for descriptor list-based SMP input functions		
30h - 3Fh	Reserved for SMP input functions		
40h - 7Fh	Vendor specific		
80h	CONFIGURE GENERAL	Configure the device	10.4.3.18
81h	ENABLE DISABLE ZONING	Enable or disable zoning	10.4.3.19
82h	WRITE GPIO REGISTER	See SFF-8485	

Table 35 — SMP functions (FUNCTION field) (part 2 of 2)

Code	SMP function	Description	Reference
83h - 84h	Reserved for general SMP output functions		
85h	ZONED BROADCAST	Transmit the specified Broadcast on the expander ports in the specified zone group(s)	10.4.3.20
86h	ZONE LOCK	Lock a zoning expander device	10.4.3.21
87h	ZONE ACTIVATE	Set the zoning expander active values equal to the zoning expander shadow values	10.4.3.22
88h	ZONE UNLOCK	Unlock a zoning expander device	10.4.3.23
89h	CONFIGURE ZONE MANAGER PASSWORD	Configure the zone manager password	10.4.3.24
8Ah	CONFIGURE ZONE PHY INFORMATION	Configure zone phy information	10.4.3.25
8Bh	CONFIGURE ZONE PERMISSION TABLE	Configure the zone permission table	10.4.3.26
8Ch - 8Fh	Reserved for general SMP output functions		
90h	CONFIGURE ROUTE INFORMATION	Change phy-based expander route table information	10.4.3.27
91h	PHY CONTROL	Request actions by the specified phy	10.4.3.28
92h	PHY TEST FUNCTION	Request a test function by the specified phy	10.4.3.29
93h	CONFIGURE PHY EVENT INFORMATION	Configure phy event information for the specified phy	10.4.3.30
94h - 9Fh	Reserved for phy-based SMP output functions		
A0h - BFh	Reserved for SMP output functions		
C0h - FFh	Vendor specific		

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The FUNCTION RESULT field is defined in table 36.

Table 36 — FUNCTION RESULT field (part 1 of 2)

Code	Name	SMP function(s)	Description
...
05h	BUSY	ZONE UNLOCK, ENABLE DISABLE ZONING, CONFIGURE ZONE MANAGER PASSWORD, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE	<p>For ZONE UNLOCK, the The locked zoning expander device is processing the activate step.</p> <p>For the other functions, the management device server is currently saving zoning values.</p>
20h	SMP ZONE VIOLATION	CONFIGURE GENERAL, ZONED BROADCAST, PHY CONTROL, PHY TEST FUNCTION, CONFIGURE PHY EVENT INFORMATION	Zoning is enabled and the SMP initiator port does not have access to a necessary zone group according to the zone permission table (see 4.9.3.2).
21h	NO MANAGEMENT ACCESS RIGHTS	REPORT ZONE MANAGER PASSWORD, ZONE LOCK, CONFIGURE ZONE MANAGER PASSWORD	<p>For ZONE LOCK, any of the following are true:</p> <ul style="list-style-type: none"> a) zoning is enabled, the ZONE LOCK bit is set to zero, the PHYSICAL PRESENCE bit is set to zero, the ZONE MANAGER PASSWORD field is not set to the current zone manager password, and the zone manager does not have access to zone group 2; b) zoning is enabled, the ZONE LOCK bit is set to one, and the request did not originate from the active zone manager; or c) zoning is disabled, the PHYSICAL PRESENCE bit is set to zero, the ZONE MANAGER PASSWORD field is not set to the current zone manager password. <p>For REPORT ZONE MANAGER PASSWORD, see 10.4.3.7. For CONFIGURE ZONE MANAGER PASSWORD, see 10.4.3.24.</p>
22h	UNKNOWN ENABLE DISABLE ZONING VALUE	ENABLE DISABLE ZONING	See 10.4.3.19

Table 36 — FUNCTION RESULT field (part 2 of 2)

Code	Name	SMP function(s)	Description
23h	ZONE LOCK VIOLATION	ENABLE DISABLE ZONING, ZONE LOCK, ZONE ACTIVATE, ZONE UNLOCK, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE	Zoning is enabled and: a) an unlocked zoning expander device receives an SMP zone configuration function request, a ZONE ACTIVATE request, or a ZONE UNLOCK request from an SMP initiator port that is not the active zone manager; or b) a locked zoning expander device receives an SMP ZONE LOCK request, an SMP zone configuration function request, a ZONE ACTIVATE request, or a ZONE UNLOCK request from an SMP initiator port that is not the active zone manager.
24h	NOT ACTIVATED	ZONE UNLOCK	The ACTIVATE REQUIRED bit in the request is set to one but the locked zoning expander device has not processed the activate step.
25h	ZONE GROUP OUT OF RANGE	CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE	The ZONE GROUP field or NUMBER OF ZONE GROUPS field contains a value that is not supported.
26h	NO PHYSICAL PRESENCE	CONFIGURE ZONE MANAGER PASSWORD	The new ZONE MANAGER PASSWORD field is set to DISABLED (see table 26 in 4.9.1) but physical presence is not asserted.
27h	SAVING NOT SUPPORTED	ENABLE DISABLE ZONING, CONFIGURE ZONE MANAGER PASSWORD, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE	The SAVE field is set to 01b or 11b and the management device server does not support saved values for the specified information.
All others	Reserved		

Table 37 defines the priority of the SMP function results defined in table 36.

Table 37 — Function result priority (part 1 of 2)

SMP function	SMP function result priority
...	...
ENABLE DISABLE ZONING (see 10.4.3.19)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) UNKNOWN ENABLE DISABLE ZONING VALUE; 4) INVALID EXPANDER CHANGE COUNT; 5) SAVING NOT SUPPORTED ; 6) SMP FUNCTION FAILED; and 7) SMP FUNCTION ACCEPTED

Table 37 — Function result priority (part 2 of 2)

SMP function	SMP function result priority
ZONE LOCK (see 10.4.3.21)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) NO MANAGEMENT ACCESS RIGHTS; 4) INVALID EXPANDER CHANGE COUNT; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
ZONE ACTIVATE (see 10.4.3.22)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) INVALID EXPANDER CHANGE COUNT; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
ZONE UNLOCK (see 10.4.3.23)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) NOT ACTIVATED; 4) BUSY; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
CONFIGURE ZONE MANAGER PASSWORD (see 10.4.3.24)	1) INVALID REQUEST FRAME LENGTH; 2) INVALID EXPANDER CHANGE COUNT; 3) NO MANAGEMENT ACCESS RIGHTS; 4) NO PHYSICAL PRESENCE; 5) SAVING NOT SUPPORTED ; 6) SMP FUNCTION FAILED; and 7) SMP FUNCTION ACCEPTED
CONFIGURE ZONE PHY INFORMATION (see 10.4.3.25)	1) INVALID REQUEST FRAME LENGTH; 2) INCOMPLETE DESCRIPTOR LIST; 3) PHY DOES NOT EXIST; 4) PHY VACANT; 5) ZONE LOCK VIOLATION; 6) INVALID EXPANDER CHANGE COUNT; 7) SAVING NOT SUPPORTED ; 8) ZONE GROUP OUT OF RANGE; 9) SMP FUNCTION FAILED; and 10) SMP FUNCTION ACCEPTED
CONFIGURE ZONE PERMISSION TABLE (see 10.4.3.26)	1) INVALID REQUEST FRAME LENGTH; 2) INCOMPLETE DESCRIPTOR LIST; 3) ZONE LOCK VIOLATION; 4) INVALID EXPANDER CHANGE COUNT; 5) SAVING NOT SUPPORTED ; 6) ZONE GROUP OUT OF RANGE; 7) SMP FUNCTION FAILED; and 8) SMP FUNCTION ACCEPTED

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10.4.3.3 REPORT GENERAL function

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Table 318 defines the response format.

Table 318 — REPORT GENERAL response (part 1 of 2)

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (00h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (10h)							
4	(MSB)	EXPANDER CHANGE COUNT						(LSB)
5								
6	(MSB)	EXPANDER ROUTE INDEXES						(LSB)
7								
8	Reserved							
9	NUMBER OF PHYS							
10	TABLE TO TABLE SUPPORTED	Reserved			CONFIGURES OTHERS	CONFIGURING	EXTERNALLY CONFIGURABLE ROUTE TABLE	
11	Reserved							
12	ENCLOSURE LOGICAL IDENTIFIER							
19								
20	Reserved							
29								
30	(MSB)	STP BUS INACTIVITY TIME LIMIT						(LSB)
31								
32	(MSB)	STP MAXIMUM CONNECT TIME LIMIT						(LSB)
33								
34	(MSB)	STP SMP I_T NEXUS LOSS TIME						(LSB)
35								
36	NUMBER OF ZONE GROUPS	Reserved	ZONE LOCKED	PHYSICAL PRESENCE SUPPORTED	PHYSICAL PRESENCE ASSERTED	ZONING SUPPORTED	ZONING ENABLED	
37	Reserved							
<u>37</u>	<u>Reserved</u>		<u>SAVING</u>	<u>SAVING ZONE MANAGER PASSWORD SUPPORTED</u>	<u>SAVING ZONE PHY INFORMATION SUPPORTED</u>	<u>SAVING ZONE PERMISSION TABLE SUPPORTED</u>	<u>SAVING ZONING ENABLED SUPPORTED</u>	

Table 318 — REPORT GENERAL response (part 2 of 2)

Byte\Bit	7	6	5	4	3	2	1	0	
38	(MSB)	MAXIMUM NUMBER OF ROUTED SAS ADDRESSES							
39								(LSB)	
40		ACTIVE ZONE MANAGER SAS ADDRESS							
47									
48	(MSB)	ZONE LOCK INACTIVITY TIME LIMIT							
49								(LSB)	
50		Reserved							
51									
52		Reserved							
53		FIRST ENCLOSURE CONNECTOR ELEMENT INDEX							
54		NUMBER OF ENCLOSURE CONNECTOR ELEMENT INDEXES							
55		Reserved							
56	REDUCED FUNCTIONALITY	Reserved							
57		TIME TO REDUCED FUNCTIONALITY							
58		INITIAL TIME TO REDUCED FUNCTIONALITY							
59		MAXIMUM REDUCED FUNCTIONALITY TIME							
60	(MSB)	LAST SELF-CONFIGURATION STATUS DESCRIPTOR INDEX							
61								(LSB)	
62	(MSB)	MAXIMUM NUMBER OF STORED SELF-CONFIGURATION STATUS DESCRIPTORS							
63								(LSB)	
64	(MSB)	LAST PHY EVENT INFORMATION DESCRIPTOR INDEX							
65								(LSB)	
66	(MSB)	MAXIMUM NUMBER OF STORED PHY EVENT INFORMATION DESCRIPTORS							
67								(LSB)	
68	(MSB)	CRC							
71								(LSB)	

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[A SAVING bit set to one indicates that the management device server is currently saving zoning values to non-volatile storage and may return a function result of BUSY for zone management functions that access](#)

saved zoning values. A SAVING_ZONE_MANAGER_PASSWORD_SUPPORTED bit set to zero indicates that the management device server is not currently saving zoning values to non-volatile storage.

A SAVING_ZONE_MANAGER_PASSWORD_SUPPORTED bit set to one indicates that saving the zone manager password is supported. A SAVING_ZONE_MANAGER_PASSWORD_SUPPORTED bit set to zero indicates that saving the zone manager password is not supported.

A SAVING_ZONE_PHY_INFORMATION_SUPPORTED bit set to one indicates that saving the zone phy information is supported. A SAVING_ZONE_PHY_INFORMATION_SUPPORTED bit set to zero indicates that saving the zone phy information is not supported.

A SAVING_ZONE_PERMISSION_TABLE_SUPPORTED bit set to one indicates that saving the zone permission table is supported. A SAVING_ZONE_PERMISSION_TABLE_SUPPORTED bit set to zero indicates that saving the zone permission table is not supported.

A SAVING_ZONING_ENABLE_SUPPORTED bit set to one indicates that saving the ZONING_ENABLED bit is supported. A SAVING_ZONING_ENABLE_SUPPORTED bit set to zero indicates that saving the ZONING_ENABLED bit is not supported.

...

The CRC field is defined in 10.4.3.2.

10.4.3.6 REPORT_ZONE_PERMISSION_TABLE function

10.4.3.6.1 REPORT_ZONE_PERMISSION_TABLE function overview

The REPORT_ZONE_PERMISSION function returns a set of zone permission table entries. This function shall be supported by all zoning expander devices.

10.4.3.6.2 REPORT_ZONE_PERMISSION_TABLE request

Table 319 defines the request format.

Table 319 — REPORT_ZONE_PERMISSION_TABLE request

Byte/Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (04h)							
2	Reserved							
3	REQUEST LENGTH (01h)							
4	Reserved						Reserved/REPORT-SHADOW REPORT TYPE	
5	Reserved							
6	STARTING SOURCE ZONE GROUP							
7	MAXIMUM NUMBER OF ZONE PERMISSION DESCRIPTORS							
8	(MSB)							
11	CRC (LSB)							

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

The FUNCTION field shall be set to 04h.

The REQUEST LENGTH field shall be set to 01h.

~~A REPORT SHADOW bit set to zero specifies that the management device server shall return zone permission table active values. A REPORT SHADOW bit set to one specifies that the management device server shall return zone permission table shadow values.~~

The REPORT TYPE field specifies the values that the management device server shall return and is defined in table 320.

Table 320 — REPORT TYPE field

Code	Description
00b	Current
01b	Shadow
10b	Saved
11b	Default

The STARTING SOURCE ZONE GROUP field specifies the first source zone group, (i.e., s) returned. If the value in this field exceeds the end of the zone permission table then the management device server shall return a function result of SOURCE INDEX DOES NOT EXIST in the response frame (see table 36 in 10.4.3.2).

The MAXIMUM NUMBER OF ZONE PERMISSION DESCRIPTORS field specifies the maximum number of complete zone permission descriptors that the management device server shall return.

The CRC field is defined in 10.4.3.1.

10.4.3.6.3 REPORT ZONE PERMISSION TABLE response

Table 321 defines the response format.

Table 321 — REPORT ZONE PERMISSION TABLE response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (04h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH ((n - 7) / 4)							
4	(MSB) EXPANDER CHANGE COUNT							
5	(LSB)							
6	ZONE LOCKED	Reserved					Reserved/REPORT-SHADOW REPORT TYPE	
7	NUMBER OF ZONE GROUPS		Reserved					
8	Reserved							
13	Reserved							
14	STARTING SOURCE ZONE GROUP							
15	NUMBER OF ZONE PERMISSION DESCRIPTORS							
Zone permission descriptor list								
16	Zone permission descriptor (first)(see table 328 in 10.4.3.6.4)							
31	Zone permission descriptor (last)(see table 328 in 10.4.3.6.4)							
	...							
n - 20	Zone permission descriptor (last)(see table 328 in 10.4.3.6.4)							
n - 4	Zone permission descriptor (last)(see table 328 in 10.4.3.6.4)							
n - 3	(MSB) CRC							
n	(LSB)							

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

The FUNCTION field shall be set to 04h.

The FUNCTION RESULT field is defined in 10.4.3.2.

The RESPONSE LENGTH field indicates the number of dwords that follow, not including the CRC field.

The EXPANDER CHANGE COUNT field is defined in the SMP REPORT GENERAL response (see 10.4.3.3). If the SMP initiator port detects a change in the value of this field while retrieving multiple response frames, it should start again because the status information returned is incomplete and inconsistent.

The ZONE LOCKED bit is defined in the SMP REPORT GENERAL response.

~~The REPORT SHADOW bit indicates the value of the REPORT SHADOW bit in the request frame.~~

The REPORT TYPE field indicates the value of the REPORT TYPE field in the request frame.

The NUMBER OF ZONE GROUPS field indicates the number of elements in the zone permission descriptor list and is defined in the REPORT GENERAL response (see table 319 in 10.4.3.3).

The STARTING SOURCE ZONE GROUP field indicates the first source zone group (i.e., s) being returned, and is set to the same value as the STARTING SOURCE ZONE GROUP field in the SMP request frame.

The NUMBER OF ZONE PERMISSION DESCRIPTORS field indicates how many zone permission descriptors follow in this SMP response frame.

The zone permission descriptor list contains a zone permission descriptor as defined in 10.4.3.6.4 for each source zone group in ascending order starting with the source zone group specified in the STARTING SOURCE ZONE GROUP field in the request.

The CRC field is defined in 10.4.3.1.

10.4.3.8 DISCOVER function

The DISCOVER function returns information about the specified phy. This SMP function provides information from the IDENTIFY address frame received by the phy and additional phy-specific information. This SMP function shall be implemented by all management device servers.

NOTE 2 - The DISCOVER LIST function (see 10.4.3.14) returns information about one or more phys.

Table 337 defines the request format.

Table 337 — DISCOVER request

Byte/Bit	7	6	5	4	3	2	1	0	
0	SMP FRAME TYPE (40h)								
1	FUNCTION (10h)								
2	Reserved								
3	REQUEST LENGTH (02h)								
4	Reserved								
7	Reserved								
8	Reserved							IGNORE ZONE GROUP	
9	PHY IDENTIFIER								
10	Reserved								
11	Reserved								
12	(MSB)	CRC							
15							(LSB)		

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

The FUNCTION field shall be set to 10h.

The REQUEST LENGTH field shall be set to 02h. For compatibility with previous versions of this standard, a REQUEST LENGTH field set to 00h specifies that there are 2 dwords before the CRC field.

An IGNORE ZONE GROUP bit set to one specifies that the management device server shall return information about the specified phy (i.e., the phy specified by the PHY IDENTIFIER field) regardless of the zone permission table.

An IGNORE ZONE GROUP bit set to zero specifies that the management device server shall:

- a) if the SMP initiator port has access to the specified phy based on the zone permission table, return the requested information; and
- b) if the SMP initiator port does not have access to the specified phy, return a function result of PHY VACANT in the response frame.

If the management device server is not in a zoning expander device with zoning enabled, it shall ignore the IGNORE ZONE GROUP bit.

The PHY IDENTIFIER field specifies the phy (see 4.2.8) for which the information is being requested.

The CRC field is defined in 10.4.3.1.

Table 338 defines the response format.

Table 338 — DISCOVER response (part 1 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (10h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (17h)							
4	(MSB)	EXPANDER CHANGE COUNT						(LSB)
5								
6	Reserved							
8								
9	PHY IDENTIFIER							
10	Reserved							
11								
12	Reserved	ATTACHED DEVICE TYPE			ATTACHED REASON			
13	Reserved			NEGOTIATED LOGICAL LINK RATE				
14	Reserved			ATTACHED SSP INITIATOR	ATTACHED STP INITIATOR	ATTACHED SMP INITIATOR	ATTACHED SATA HOST	
15	ATTACHED SATA PORT SELECTOR	Reserved			ATTACHED SSP TARGET	ATTACHED STP TARGET	ATTACHED SMP TARGET	ATTACHED SATA DEVICE
16	SAS ADDRESS							
23								
24	ATTACHED SAS ADDRESS							
31								

Table 338 — DISCOVER response (part 2 of 3)

Byte\Bit	7	6	5	4	3	2	1	0	
32	ATTACHED PHY IDENTIFIER								
33	Reserved					ATTACHED INSIDE ZPSDS PERSISTENT	ATTACHED REQUESTED INSIDE ZPSDS	ATTACHED BREAK_REPLY CAPABLE	
34	Reserved								
39	Reserved								
40	PROGRAMMED MINIMUM PHYSICAL LINK RATE				HARDWARE MINIMUM PHYSICAL LINK RATE				
41	PROGRAMMED MAXIMUM PHYSICAL LINK RATE				HARDWARE MAXIMUM PHYSICAL LINK RATE				
42	PHY CHANGE COUNT								
43	VIRTUAL PHY	Reserved			PARTIAL PATHWAY TIMEOUT VALUE				
44	Reserved				ROUTING ATTRIBUTE				
45	Reserved	CONNECTOR TYPE							
46	CONNECTOR ELEMENT INDEX								
47	CONNECTOR PHYSICAL LINK								
48	Reserved								
49	Reserved								
50	Vendor specific								
51	Reserved								
52	ATTACHED DEVICE NAME								
59	Reserved								
60	Reserved	REQUESTED INSIDE ZPSDS CHANGED BY EXPANDER	INSIDE ZPSDS PERSISTENT	REQUESTED INSIDE ZPSDS	Reserved	ZONE GROUP PERSISTENT	INSIDE ZPSDS	ZONING ENABLED	
61	Reserved								
62	Reserved								
63	ZONE GROUP								
64	SELF-CONFIGURATION STATUS								
65	SELF-CONFIGURATION LEVELS COMPLETED								
66	Reserved								
67	Reserved								
68	SELF-CONFIGURATION SAS ADDRESS								
75	Reserved								

Table 338 — DISCOVER response (part 3 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
76	Reserved							
91	Reserved							
92	Reserved							
93	Reserved							
94	REASON				NEGOTIATED PHYSICAL LINK RATE			
95	Reserved							HARDWARE MUXING SUPPORTED
96	Reserved	DEFAULT INSIDE ZPSDS PERSISTENT	DEFAULT REQUESTED INSIDE ZPSDS	Reserved	DEFAULT ZONE GROUP PERSISTENT	Reserved	DEFAULT ZONING ENABLED	
97	Reserved							
98	Reserved							
99	DEFAULT ZONE GROUP							
100	Reserved	SAVED INSIDE ZPSDS PERSISTENT	SAVED REQUESTED INSIDE ZPSDS	Reserved	SAVED ZONE GROUP PERSISTENT	Reserved	SAVED ZONING ENABLED	
101	Reserved							
102	Reserved							
103	SAVED ZONE GROUP							
104	Reserved	SHADOW INSIDE ZPSDS PERSISTENT	SHADOW REQUESTED INSIDE ZPSDS	Reserved	SHADOW ZONE GROUP PERSISTENT	Reserved		
105	Reserved							
106	Reserved							
107	SHADOW ZONE GROUP							
96108	(MSB)	CRC						
99111								(LSB)

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

The FUNCTION field shall be set to 10h.

The FUNCTION RESULT field is defined in 10.4.3.2.

The RESPONSE LENGTH field shall be set to 17h. For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h indicates that there are 12 dwords before the CRC field.

...

A REQUESTED INSIDE ZPSDS CHANGED BY EXPANDER bit set to one indicates that the zoning expander device set the REQUESTED INSIDE ZPSDS bit to zero in the zone phy information at the completion of the last link reset

sequence. A REQUESTED INSIDE ZPSDS CHANGED BY EXPANDER bit set to zero indicates that the zoning expander device did not set the REQUESTED INSIDE ZPSDS bit to zero in the zone phy information at the completion of the last link reset sequence.

NOTE 3 - The zone manager may use the REQUESTED INSIDE ZPSDS CHANGED BY EXPANDER bit to determine why the REQUESTED INSIDE ZPSDS bit has changed in the DISCOVER response from the value to which it last set the bit.

The INSIDE ZPSDS PERSISTENT bit contains the value of the INSIDE ZPSDS PERSISTENT bit in the zone phy information (see 4.9.3.1).

The REQUESTED INSIDE ZPSDS bit contains the value of the REQUESTED INSIDE ZPSDS bit in the zone phy information (see 4.9.3.1).

The ZONE GROUP PERSISTENT bit contains the value of the ZONE GROUP PERSISTENT bit in the zone phy information (see 4.9.3.1).

The INSIDE ZPSDS bit contains the value of the INSIDE ZPSDS bit in the zone phy information (see 4.9.3.1).

A ZONING ENABLED bit set to one indicates that zoning is enabled in the expander device. A ZONING ENABLED bit set to zero indicates that zoning is disabled in the expander device.

The ZONE GROUP field contains the value of the ZONE GROUP field in the zone phy information (see 4.9.3.1).

...

[The DEFAULT INSIDE ZPSDS PERSISTENT bit contains the default value of the INSIDE ZPSDS PERSISTENT bit in the zone phy information \(see 4.9.3.1\).](#)

[The DEFAULT REQUESTED INSIDE ZPSDS bit contains the default value of the REQUESTED INSIDE ZPSDS bit in the zone phy information \(see 4.9.3.1\).](#)

[The DEFAULT ZONE GROUP PERSISTENT bit contains the default value of the ZONE GROUP PERSISTENT bit in the zone phy information \(see 4.9.3.1\).](#)

[The DEFAULT ZONING ENABLED bit contains the default value of the ZONING ENABLED bit \(see 4.9.3.1\).](#)

[The DEFAULT ZONE GROUP field contains the default value of the ZONE GROUP field in the zone phy information \(see 4.9.3.1\).](#)

[The SAVED INSIDE ZPSDS PERSISTENT bit contains the saved value of the INSIDE ZPSDS PERSISTENT bit in the zone phy information \(see 4.9.3.1\).](#)

[The SAVED REQUESTED INSIDE ZPSDS bit contains the saved value of the REQUESTED INSIDE ZPSDS bit in the zone phy information \(see 4.9.3.1\).](#)

[The SAVED ZONE GROUP PERSISTENT bit contains the saved value of the ZONE GROUP PERSISTENT bit in the zone phy information \(see 4.9.3.1\).](#)

[The SAVED ZONING ENABLED bit contains the saved value of the ZONING ENABLED bit \(see 4.9.3.1\).](#)

[The SAVED ZONE GROUP field contains the saved value of the ZONE GROUP field in the zone phy information \(see 4.9.3.1\).](#)

[The SHADOW INSIDE ZPSDS PERSISTENT bit contains the shadow value of the INSIDE ZPSDS PERSISTENT bit in the zone phy information \(see 4.9.3.1\).](#)

[The SHADOW REQUESTED INSIDE ZPSDS bit contains the shadow value of the REQUESTED INSIDE ZPSDS bit in the zone phy information \(see 4.9.3.1\).](#)

[The SHADOW ZONE GROUP PERSISTENT bit contains the shadow value of the ZONE GROUP PERSISTENT bit in the zone phy information \(see 4.9.3.1\).](#)

[The SHADOW ZONING ENABLED bit contains the shadow value of the ZONING ENABLED bit \(see 4.9.3.1\).](#)

[The SHADOW ZONE GROUP field contains the shadow value of the ZONE GROUP field in the zone phy information \(see 4.9.3.1\).](#)

The CRC field is defined in 10.4.3.2.

10.4.3.19 ENABLE DISABLE ZONING function

The ENABLE DISABLE ZONING function enables or disables zoning. This SMP function shall be supported by SMP target ports in zoning expander devices (see 4.9). Other SMP target ports shall not support this SMP function.

This function is an SMP zone configuration function (see 4.9.6.3).

Table 339 defines the request format.

Table 339 — ENABLE DISABLE ZONING request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (81h)							
2	Reserved							
3	REQUEST LENGTH (02h)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5								
6	Reserved						Reserved SAVE	
7	Reserved							
8	Reserved						ENABLE DISABLE ZONING	
9	Reserved							
11	Reserved							
12	(MSB)	CRC						(LSB)
15								

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

The FUNCTION field shall be set to 81h.

The REQUEST LENGTH field shall be set to 02h.

The EXPECTED EXPANDER CHANGE COUNT field is defined in the CONFIGURE GENERAL request (see 10.4.3.18).

The SAVE field specifies whether the management device server shall apply the specified changes to the current value and/or the saved value of the zoning enabled setting and is defined in table 340.

Table 340 — SAVE field

<u>Code</u>	<u>Values updated</u>	<u>Return function result of SAVING NOT SUPPORTED if saving is not supported</u>
<u>00b</u>	<u>Current</u>	<u>no</u>
<u>01b</u>	<u>Saved^a</u>	<u>yes</u>
<u>10b</u>	<u>Saved^a, if saving is supported, and current.</u>	<u>no</u>
<u>11b</u>	<u>Saved^a and current.</u>	<u>yes</u>
^a <u>The management device server shall return the function result without waiting for the save to complete, and set the SAVING bit to one in the REPORT GENERAL response until the save is complete.</u>		

The ENABLE DISABLE ZONING field is defined in table 341.

Table 341 — ENABLE DISABLE ZONING field

Code	Description
00b	No change
01b	Enable zoning
10b	Disable zoning
11b	Reserved

If the ENABLE DISABLE ZONING field is set to 11b (i.e., reserved), the management device server shall return a function result of UNKNOWN ENABLE DISABLE ZONING VALUE in the response frame (see table 36 in 10.4.3.2).

The CRC field is defined in 10.4.3.1.

...

10.4.3.22 ZONE ACTIVATE function

The ZONE ACTIVATE function causes the zoning expander device to set the zoning expander active values equal to the zoning expander shadow values (see 4.9.6.4). All zoning expander devices shall support this function. This function is an SMP zone configuration function (see 4.9.6.3).

Table 342 defines the request format.

Table 342 — ZONE ACTIVATE request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (87h)							
2	Reserved							
3	REQUEST LENGTH (01h)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5	Reserved							
6	Reserved							
7	Reserved							
8	(MSB)	CRC						(LSB)
11	(LSB)							

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

The FUNCTION field shall be set to 87h.

The REQUEST LENGTH field shall be set to 01h.

The EXPECTED EXPANDER CHANGE COUNT field is defined in the CONFIGURE GENERAL request (see 10.4.3.16).

The CRC field is defined in 10.4.3.1.

Table 343 defines the response format.

Table 343 — ZONE ACTIVATE response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (87h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (00h)							
4	(MSB)	CRC						(LSB)
7	(LSB)							

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

The FUNCTION field shall be set to 87h.

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.

10.4.3.23 ZONE UNLOCK function

The ZONE UNLOCK function unlocks a zoning expander device ([see 4.9.6.5](#)). All zoning expander devices shall support this function. This function is an SMP zone configuration function (see 4.9.6.3).

If a locked zoning expander device processes a ZONE UNLOCK request from the active zone manager then the management device server shall set the ZONE LOCKED bit to zero in the REPORT GENERAL response (see 10.4.3.3). If the CONFIGURING bit is set to one in the REPORT GENERAL response then the zoning expander device shall set the CONFIGURING bit to zero and originate a Broadcast (Change) from either:

- a) each zone group whose zone permission table entries or zone phy information has changed; or
- b) zone group 1.

Table 344 defines the request format.

Table 344 — ZONE UNLOCK request

Byte\Bit	7	6	5	4	3	2	1	0	
0	SMP FRAME TYPE (40h)								
1	FUNCTION (88h)								
2	Reserved								
3	REQUEST LENGTH (01h)								
4	Restricted								
5									
6	Reserved							ACTIVATE REQUIRED	
7	Reserved								
8	(MSB)								
11	CRC						(LSB)		

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

The FUNCTION field shall be set to 88h.

The REQUEST LENGTH field shall be set to 01h.

An ACTIVATE REQUIRED bit set to one specifies that the management device server shall unlock the zoning expander device only if the activate step has been completed. An ACTIVATE REQUIRED bit set to zero specifies that the management device server shall unlock the zoning expander device regardless of whether the activate step has been completed.

The CRC field is defined in 10.4.3.1.

Table 345 defines the response format.

Table 345 — ZONE UNLOCK response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (88h)							
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 88h.

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.

10.4.3.24 CONFIGURE ZONE MANAGER PASSWORD function

The CONFIGURE ZONE MANAGER PASSWORD function requests actions by the expander device containing the SMP target port. This SMP function shall be supported by SMP target ports in zoning expander devices. Other SMP target ports shall not support this SMP function. This SMP function shall only be processed if:

- a) the request is received from any SMP initiator port and specifies the correct zone manager password;
or
- b) the request is received from any SMP initiator port while physical presence is asserted.

Table 346 defines the request format.

Table 346 — CONFIGURE ZONE MANAGER PASSWORD request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (89h)							
2	Reserved							
3	REQUEST LENGTH (11h)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5								
6	Reserved						Reserved SAVE	
7	Reserved							
8								
39	ZONE MANAGER PASSWORD							
40								
71	NEW ZONE MANAGER PASSWORD							
72	(MSB)	CRC						(LSB)
75								

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

The FUNCTION field shall be set to 89h.

The REQUEST LENGTH field shall be set to 11h.

The EXPECTED EXPANDER CHANGE COUNT field is defined in the CONFIGURE GENERAL request (see 10.4.3.18).

The SAVE field specifies whether the management device server shall apply the specified changes to the current value and/or the saved value of the zone manager password and is defined in table 347.

Table 347 — SAVE field

<u>Code</u>	<u>Values updated</u>	<u>Return function result of SAVING NOT SUPPORTED if saving is not supported</u>
<u>00b</u>	<u>Current</u>	<u>no</u>
<u>01b</u>	<u>Saved^a</u>	<u>yes</u>
<u>10b</u>	<u>Saved^a, if saving is supported, and current.</u>	<u>no</u>
<u>11b</u>	<u>Saved^a and current.</u>	<u>yes</u>
^a <u>The management device server shall return the function result without waiting for the save to complete, and set the SAVING bit to one in the REPORT GENERAL response until the save is complete.</u>		

If physical presence is not asserted and the ZONE MANAGER PASSWORD field does not match the current zone manager password maintained by the management device server, then the management device server shall return a function result of NO MANAGEMENT ACCESS RIGHTS in the response frame (see table 36 in 10.4.3.2).

The NEW ZONE MANAGER PASSWORD field specifies a new value for the zone manager password maintained by the management device server. A NEW ZONE MANAGER PASSWORD field set to zero specifies that the zone manager password is disabled and all zone managers have access. A NEW ZONE MANAGER PASSWORD field set to DISABLED (see table 26 in 4.9.1) specifies that the zone manager password is disabled and shall only be allowed if physical presence is asserted.

The CRC field is defined in 10.4.3.1.

...

10.4.3.25 CONFIGURE ZONE PHY INFORMATION function

10.4.3.25.1 CONFIGURE ZONE PHY INFORMATION function overview

The CONFIGURE ZONE PHY INFORMATION function configures zone phy information for one or more phys in a locked zoning expander device. This function shall be supported by all zoning expander devices. This function is an SMP zone configuration function (see 4.9.6.3).

SMP zone configuration functions change the zoning expander shadow values. These do not become zoning expander active values until the activate step (see 4.9.6.4).

10.4.3.25.2 CONFIGURE ZONE PHY INFORMATION request

Table 348 defines the request format.

Table 348 — CONFIGURE ZONE PHY INFORMATION request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (8Ah)							
2	Reserved							
3	REQUEST LENGTH ((n - 7) / 4)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5								
6	Reserved						Reserved SAVE	
7	NUMBER OF ZONE PHY CONFIGURATION DESCRIPTORS							
Zone phy configuration descriptor list								
8	Zone phy configuration descriptor (first)(see table 350 in 10.4.3.25.3)							
11								
...	...							
n - 7	Zone phy configuration descriptor (last)(see table 350 in 10.4.3.25.3)							
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 8Ah.

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 10.4.3.16).

The `SAVE` field specifies whether the management device server shall apply the specified changes to the current value and/or the saved value of the zone phy information and is defined in table 349.

Table 349 — `SAVE` field

<u>Code</u>	<u>Values updated</u>	<u>Return function result of <code>SAVING NOT SUPPORTED</code> if saving is not supported</u>
00b	Current	no
01b	Saved ^a	yes
10b	Saved ^a, if saving is supported, and current.	no
11b	Saved ^a and current.	yes
^a The management device server shall return the function result without waiting for the save to complete, and set the <code>SAVING</code> bit to one in the <code>REPORT GENERAL</code> response until the save is complete.		

The `NUMBER OF ZONE PHY CONFIGURATION DESCRIPTORS` field specifies the number of zone phy configuration descriptors in the request. If the number of zone phy configuration descriptors exceeds the number of phys of the zoning expander device then the [function management device server](#) shall report `INVALID REQUEST FRAME LENGTH` in the response `FUNCTION RESULT` field.

The zone phy configuration descriptor list contains zone phy configuration descriptors as defined in 10.4.3.25.3.

The `CRC` field is defined in 10.4.3.1.

10.4.3.25.3 Zone phy configuration descriptor

Table 350 defines the zone phy configuration descriptor.

Table 350 — Zone phy configuration descriptor

Byte\Bit	7	6	5	4	3	2	1	0
0	PHY IDENTIFIER							
1	Reserved		INSIDE ZPSDS PERSISTENT	REQUESTED INSIDE ZPSDS	Reserved	ZONE GROUP PERSISTENT		Reserved
2	Reserved							
3	ZONE GROUP							

The `PHY IDENTIFIER` field specifies the phy to which the zone phy configuration descriptor information shall be applied. If the `PHY IDENTIFIER` field specifies a phy that does not exist then the management device server shall report `PHY DOES NOT EXIST` in the response `FUNCTION RESULT` field.

The `INSIDE ZPSDS PERSISTENT` bit specifies the value of the `INSIDE ZPSDS PERSISTENT` bit in the zone phy information (see 4.9.3.1).

The `REQUESTED INSIDE ZPSDS` bit specifies the value of the `REQUESTED INSIDE ZPSDS` bit in the zone phy information (see 4.9.3.1).

The `ZONE GROUP PERSISTENT` bit specifies the value of the `ZONE GROUP PERSISTENT` bit in the zone phy information (see 4.9.3.1).

The `ZONE GROUP` field specifies the value of the `ZONE GROUP` field in the zone phy information (see 4.9.3.1). Zone group values between 128 and 255, inclusive, are reserved.

10.4.3.25.4 CONFIGURE ZONE PHY INFORMATION response

Table 351 defines the response format.

Table 351 — CONFIGURE ZONE PHY INFORMATION response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (8Ah)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (00h)							
4	(MSB)							
7	CRC							
	(LSB)							

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

The FUNCTION field shall be set to 8Ah.

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.

10.4.3.26 CONFIGURE ZONE PERMISSION TABLE function

10.4.3.26.1 CONFIGURE ZONE PERMISSION TABLE function overview

The CONFIGURE ZONE PERMISSION TABLE function configures the zone permission table. This function shall be supported by all zoning expander devices. This function is an SMP zone configuration function (see 4.9.6.3).

SMP zone configuration functions change the zoning expander shadow values and do not become zoning expander active values until the zoning expander device processes the activate step (see 4.9.6.4).

Annex I describes examples of using multiple zone configuration descriptors.

10.4.3.26.2 CONFIGURE ZONE PERMISSION TABLE request

Table 352 defines the request format.

Table 352 — CONFIGURE ZONE PERMISSION TABLE request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (8Bh)							
2	Reserved							
3	REQUEST LENGTH ((n - 7) / 4)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						(LSB)
5								
6	STARTING SOURCE ZONE GROUP							
7	NUMBER OF ZONE PERMISSION CONFIGURATION DESCRIPTORS							
8	NUMBER OF ZONE GROUPS	Reserved				Reserved SAVE		
9	Reserved							
15	Reserved							
Zone permission configuration descriptor list								
16	Zone permission configuration descriptor (first)(see table 393 in							
31	10.4.3.26.3)							
	...							
n - 20	Zone permission configuration descriptor (last)(see table 393 in							
n - 4	10.4.3.26.3)							
n - 3	(MSB)	CRC						(LSB)
n								

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

The FUNCTION field shall be set to 8Bh.

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 10.4.3.18).

The STARTING SOURCE GROUP field specifies the first source zone group (i.e., s) to be written with the first zone permission configuration descriptor.

The NUMBER OF ZONE PERMISSION CONFIGURATION DESCRIPTORS field specifies the number of zone permission configuration descriptors that follow.

The NUMBER OF ZONE GROUPS field specifies the number of elements in each zone permission configuration descriptor and is defined in table 353.

Table 353 — NUMBER OF ZONE GROUPS field

Code	Description
00b	128 zone groups
01b	256 zone groups
All others	Reserved

[The SAVE field specifies whether the management device server shall apply the specified changes to the current value and/or the saved value of the zone permission table and is defined in table 354.](#)

Table 354 — SAVE field

<u>Code</u>	<u>Values updated</u>	<u>Return function result of SAVING NOT SUPPORTED if saving is not supported</u>
00b	Current	no
01b	Saved ^a	yes
10b	Saved ^a, if saving is supported, and current.	no
11b	Saved ^a and current.	yes

^a [The management device server shall return the function result without waiting for the save to complete, and set the SAVING bit to one in the REPORT GENERAL response until the save is complete.](#)

The zone permission configuration descriptor list contains zone permission configuration descriptors as defined in 10.4.3.26.3. The device server shall process the zone permission configuration descriptors in order (i.e., a subsequent zone permission configuration descriptor overrides a previous zone permission configuration descriptor).

The CRC field is defined in 10.4.3.2.