To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 18 September 2007
Subject: 07-305r3 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.

Revision 3 (18 September 2007) Incorporated comments from September 2007 SAS protocol WG.

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
- <u>c)</u> shall have a default value,

for each the following settings:

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

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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.

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
		ZERO			yes
no	N/A<u>yes or</u> no	DISABLED		no	no
		All others			yes
yes		ZERO			yes
	no	DISABLED	yes	no	no
		All others		yes	yes
		ZERO			yes
	yes	DISABLED		yes	no
		All others			yes

Table 1 — Zoning expander device zoning configuration after power on

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<u>current</u> and shadow zone permission tables that supports 128 or 256 zone groups (see 4.9.3.3);
- c) contain activecurrent 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 2.:

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	<u>N/A_</u> ª		
REQUESTED INSIDE ZPSDS bit	Used to establish the boundary of the ZPSDS	<u>0</u>		
INSIDE ZPSDS PERSISTENT bit	Used to determine the value of the INSIDE ZPSDS bit after a link reset sequence	<u>0</u>		
ZONE GROUP PERSISTENT bitUsed to determine the zone group of the phy after a link reset sequence when the INSIDE ZPSDS bit is set to zero0		<u>0</u>		
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.

Field	Transmitted in IDENTIFY address frame a	Indicated in DISCOVER function and DISCOVER LIST function	Attached value indicated in DISCOVER function ^c	Programmable with the CONFIGURE ZONE PHY INFORMATION function ^d	Changeable by the expander device after a link reset sequence ^e
INSIDE ZPSDS bit	<u>No</u>	Yes	No	<u>No</u>	<u>Yes</u>
REQUESTED INSIDE ZPSDS bit	<u>Yes</u>	Yes	Yes	<u>Yes</u>	Yes
INSIDE ZPSDS PERSISTENT bit	Yes	Yes	Yes	Yes	<u>No</u>
ZONE GROUP PERSISTENT bit	No	Yes	No	Yes	No
ZONE GROUP field	No	Yes	No	Yes	<u>Yes</u>
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 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					

Table 5 — Lone pity information usage thew table	Table 3 — Zone ph	v information usage	[new table]
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programmable 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 <u>there is no power</u> loss and no expander device reduced functionality (see 4.6.8). may or may not preserve the zone phyinformation through power loss (see 4.9.1).

If the zoning expander device preserves that_zoning is enabled and does not preserve the zone phyinformation, 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).

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

The INSIDE ZPSDS PERSISTENT bit indicates the methodis 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 <u>specifies</u> 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 <u>401h</u>. 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 <u>current</u> 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.

REQUESTED INSIDE ZPSDS bit		INSIDE 2 PERSIST	ZPSDS ENT 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
1	0			ZPSDS bit to zero.
		0	0	If the SAS address received in the IDENTIFY
		0	1	address frame during the identification sequence is different from the SAS address
1	1	1	0	 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. 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 one one one of the completion of the link reset sequence.
		1	1	 The zoning expander device shall: a) set the INSIDE ZPSDS bit to one; and b) set the ZONE GROUP field to <u>one01h</u>.

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

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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., zero<u>00h</u>) if there is no saved value).

Table 34 — Events that cause the ZONE GROUP field to be set to its default value<u>reset</u> 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: 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: a) A subsequent link reset sequence completes and: 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.

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 <u>TABLE</u>	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 inp	ut 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 i	nput 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	sed SMP input functions	.1
30h - 3Fh	Reserved for SMP input function	ons	
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 — SWF functions (Fonction field) (part 1 of 2)	Table 35 — SMP functions	(FUNCTION field) (part 1 of 2)
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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 of	output functions		
A0h - BFh	Reserved for SMP output functions			
C0h - FFh	Vendor specific			

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

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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
I	05h	BUSY	ZONE UNLOCK, ENABLE DISABLE ZONING, CONFIGURE ZONE MANAGER PASSWORD, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE	For ZONE UNLOCK, the The locked zoning expander device is processing the activate step. For the other functions, the management device server is currently saving zoning values.
1	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	 For ZONE LOCK, any of the following are true: 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. For REPORT ZONE MANAGER PASSWORD, see 10.4.3.7. For CONFIGURE ZONE MANAGER PASSWORD, see 10.4.3.24.
	22h	UNKNOWN ENABLE DISABLE ZONING VALUE	ENABLE DISABLE ZONING	See 10.4.3.19

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.
<u>27h</u>	<u>SAVING NOT</u> 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	1	

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

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)	 INVALID REQUEST FRAME LENGTH; ZONE LOCK VIOLATION; UNKNOWN ENABLE DISABLE ZONING VALUE; INVALID EXPANDER CHANGE COUNT; <u>SAVING NOT SUPPORTED;</u> SMP FUNCTION FAILED; and SMP FUNCTION ACCEPTED

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

Table 37 — Function result priority (part 2 01 2)

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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)
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Byte\Bit	7	6	5	4	3	2	1	0			
0				SMP I	RAME TYPE (4	41h)					
1				F	JNCTION (00h))					
2				FU	NCTION RESUL	T					
3				RESPC	ONSE LENGTH ((10h)					
4	(MSB)										
5											
6	(MSB)										
7			EXPANDER ROUTE INDEXES								
8					Reserved						
9				NL	IMBER OF PHY	S					
10	TABLE TO TABLE SUPPORTED		Reserved CONFIGURES OTHERS CONFIGURING								
11		Reserved									
12											
19			ENCLOSURE LOGICAL IDENTIFIER								
20			Decenced								
29					Reserved						
30	(MSB)										
31								(LSB)			
32	(MSB)	_	ç								
33								(LSB)			
34	(MSB)	_				SS TIME					
35								(LSB)			
36	NUMBER OF Z GROUPS	ONE	Reserved	ZONE LOCKED	PHYSICAL PRESENCE SUPPORTED	PHYSICAL PRESENCE ASSERTED	ZONING SUPPORTED	ZONING ENABLED			
37					Reserved	•					
<u>37</u>	<u>Re</u> :	<u>served</u>		<u>SAVING</u>	SAVING ZONE MANAGER PASSWORD SUPPORTED	SAVING ZONE PHY INFORMATION SUPPORTED	SAVING ZONE PERMISSION TABLE SUPPORTED	<u>SAVING ZONING</u> <u>ENABLED</u> <u>SUPPORTED</u>			

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Byte\Bit	7	6	5	4	3	2	1	0			
38	(MSB)		ΜΑΥΙΜΙ								
39			WAANVIG		R OF ROUTED	DAS ADDRESS	20	(LSB)			
40			٨٢								
47			AC		I MANAGER SA	S ADDRESS					
48	(MSB)	_			Κ ΙΝΑΩΤΙΛΙΤΥ Τ						
49				(LSB)							
50											
51											
52					Reserved						
53			FIRST E	ENCLOSUR	E CONNECTOR	ELEMENT IND	EX				
54		NUMBER OF ENCLOSURE CONNECTOR ELEMENT INDEXES									
55		Reserved									
56	REDUCED FUNCTIONALITY										
57											
58			INIT	IAL TIME T	O REDUCED FU	NCTIONALITY					
59			MAX		UCED FUNCTIO	DNALITY TIME					
60	(MSB)		I AST SELE-	CONFIGUR	ATION STATUS	DESCRIPTOR					
61								(LSB)			
62	(MSB)	M	AXIMUM NUN	IBER OF S	TORED SELF-CO	ONFIGURATIO	N STATUS				
63					DESCRIPTORS			(LSB)			
64	(MSB)		LAST PH	Y EVENT IN	IFORMATION DI	ESCRIPTOR IN	DEX				
65								(LSB)			
66	(MSB)		MAXIMUM N	UMBER OF	STORED PHY		IATION				
67					DESCRIPTORS			(LSB)			
68	(MSB)				CRC						
71								(LSB)			

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

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<u>A SAVING bit set to one indicates that the management device server is currently saving zoning values to</u> <u>non-volatile storage and may return a function result of BUSY for zone management functions that access</u>

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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.

<u>A SAVING ZONE MANAGER PASSWORD SUPPORTED bit set to one indicates that saving the zone manager</u> 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.

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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				SMP FRAME	түре (40h)								
1				FUNCTIO	on (04h)								
2		Reserved											
3		REQUEST LENGTH (01h)											
4		Reserved Reserved/REPORT Reserved SHADOW REPORT TYPE											
5				Rese	erved								
6			STA	RTING SOUR	CE ZONE GR	OUP							
7		MAX	KIMUM NUME	BER OF ZONE	PERMISSION	N DESCRIPT	ORS						
8	(MSB)				C								
11				CR	0			(LSB)					

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

The FUNCTION field shall be set to 04h.

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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 permissiontable active values. A REPORT SHADOW bit set to one specifies that the management device server shall returnzone permission table shadow values.

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

Code	Description
<u>00b</u>	Current
<u>01b</u>	<u>Shadow</u>
<u>10b</u>	<u>Saved</u>
<u>11b</u>	<u>Default</u>

Table 320 — REPORT TYPE field

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 respo

Byte\Bit	7	6	6 5 4 3 2 1 0									
0		·	S	MP FRAME T	YPE (41h)							
1				FUNCTION	ı (04h)							
2				FUNCTION	RESULT							
3		RESPONSE LENGTH ((n - 7) / 4)										
4	(MSB)	(MSB)										
5		EXPANDER CHANGE COUNT (LSB)										
6	ZONE LOCKED	ZONE Reserved Reserved Reserved/REPOR										
7	NUMBER OF 2	NUMBER OF ZONE GROUPS Reserved										
8												
13												
14			START	ING SOURC	E ZONE GR	OUP						
15		Ν	IUMBER OF	ZONE PERM	ISSION DES	CRIPTORS						
		2	Zone perm	ission desc	riptor list							
16		Zone perm	nission des	criptor (firs	t)(see table	328 in 10	4364)					
31		20110 0011				020 11 10						
n - 20		Zone perm	nission des	criptor (las	t)(soo table	328 in 10	4364)					
n - 4			1331011 063	onptor (ias		, 520 111 10	. .					
n - 3	(MSB)			00/	`							
n		-		CRU	, ,			(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.

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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.

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		Description											
7		-		Rese	iveu								
8				Reserved				IGNORE ZONE GROUP					
9				PHY IDE	NTIFIER								
10				Rese	rved								
11		-		Rese	iveu								
12	(MSB)			CP	C								
15		-		CN	0			(LSB)					

Table 337 — DISCOVER request

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

The FUNCTION field shall be set to 10h.

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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.

Byte\Bit	7	6	5	4	3	2	1	0				
0				SMP FRAM	IE TYPE (41h)			<u>.</u>				
1				FUNCT	ion (10h)							
2		FUNCTION RESULT										
3		RESPONSE LENGTH (<mark>17h1Ah</mark>)										
4	(MSB)	(MSB) EXPANDER CHANGE COUNT										
5	(LSB)											
6	Reserved											
8												
9	PHY IDENTIFIER											
10	Reserved											
11												
12	Reserved ATTACHED DEVICE TYPE ATTACHED REASON											
13		Res	erved		NE	GOTIATED LC	GICAL LINK R	ATE				
14		Res	erved		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 AF	DRESS							
23				6,10 AL								
24					AS ADDRESS							
31												

Table 338 — DISCOVER response (part 1 of 3)

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Table 338 — DISCOVER response (part 2 of 3)

Byte\Bit	7	6	5	4	3	2	1	0			
32				ATTACHED PH	IY IDENTIFIER						
33		ATTACHED BREAK_REPLY CAPABLE									
34				Rese	erved						
39											
40	PROGRA				HARDW						
41	PROGRAMMED MAXIMUM PHYSICAL LINK RATE HARDWARE MAXIMUM PHYSICAL LINK RATE										
42		PHY CHANGE COUNT									
43	VIRTUAL PHY	VIRTUAL Reserved PARTIAL PATHWAY TIMEOUT VALUE									
44		Res	erved			ROUTING	ATTRIBUTE				
45	Reserved			С	ONNECTOR T	/PE					
46				CONNECTOR	ELEMENT IND	EX					
47	CONNECTOR PHYSICAL LINK										
48	Reserved										
49											
50	Vendor specific										
51											
52				ATTACHED D	EVICE NAME						
59		[[I				
60	Reserve d	REQUESTED INSIDE ZPSDS CHANGED BY EXPANDER	INSIDE ZPSDS PERSISTENT	REQUESTED INSIDE ZPSDS	Reserved	ZONE GROUP PERSISTENT	INSIDE ZPSDS	ZONING ENABLED			
<u>61</u>				Re	served						
62				Re	served						
63				ZONE	GROUP						
64			:	SELF-CONFIG	URATION STA	TUS					
65			SELF-C	CONFIGURATIO	ON LEVELS CO	MPLETED					
66				Rese	erved						
67				1,050							
68			SFI F	-CONFIGURAT		RESS					
75			0LLI								

Byte\Bit	7	6	5	4	3	2	1	0					
76				Pos	arved								
91				Rest	erveu								
92		Perenved											
93	Keserved												
94		REASON NEGOTIATED PHYSICAL LINK RATE											
95	Reserved HARDWAF												
<u>96</u>	DEFAULT DEFAULT DEFAULT INSIDE REQUESTED ZONE ZPSDS INSIDE GROUP PERSISTENT ZPSDS PERSISTENT					Reserved	<u>DEFAULT</u> ZONING ENABLED						
<u>97</u>	<u>Reserved</u>												
<u>98</u>				Re	<u>served</u>								
<u>99</u>				DEFAULT	ZONE GROUP								
<u>100</u>	Res	<u>erved</u>	<u>SAVED</u> <u>INSIDE</u> <u>ZPSDS</u> <u>PERSISTENT</u>	SAVED REQUESTED INSIDE ZPSDS	<u>Reserved</u>	SAVED ZONE GROUP PERSISTENT	<u>Reserved</u>	<u>SAVED</u> ZONING ENABLED					
<u>101</u>			•	Re	served								
<u>102</u>				<u>Re</u> :	<u>served</u>								
<u>103</u>			•	SAVED Z	ONE GROUP								
<u>104</u>	<u>Res</u>	erved	<u>SHADOW</u> <u>INSIDE</u> <u>ZPSDS</u> <u>PERSISTENT</u>	SHADOW REQUESTED INSIDE ZPSDS	<u>Reserved</u>	<u>SHADOW</u> <u>ZONE</u> <u>GROUP</u> <u>PERSISTENT</u>	<u>Reserved</u>						
<u>105</u>				Re	served								
<u>106</u>				Re	served								
<u>107</u>				SHADOW	ZONE GROUP								
96<u>108</u>	(MSB)			0	-								
99<u>111</u>				Cr	τυ			(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 <u>17h1Ah</u>. 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.

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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

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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).

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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.

|--|

Byte\Bit	7	6	5	4	3	2	1	0			
0		SMP FRAME TYPE (40h)									
1		FUNCTION (81h)									
2				Res	served						
3				REQUEST L	ENGTH (02h)					
4	(MSB)										
5		-	EXPEC		JER CHANGE	COUNT		(LSB)			
6	Reserved							erved <u>\VE</u>			
7				Res	served						
8		Reserved ENABLE DISABLE ZONING									
9				Res	erved						
11		-		1(03	cived						
12	(MSB)			C	PC						
15		-						(LSB)			

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).

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

The ENABLE DISABLE ZONING field is defined in table 341.

Table 341 — ENABLE DISABLE ZONING fi	eld
--------------------------------------	-----

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.

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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.

Byte\Bit	7	6	5	4	3	2	1	0				
0		SMP FRAME TYPE (40h)										
1		FUNCTION (87h)										
2				Res	served							
3		REQUEST LENGTH (01h)										
4	(MSB)											
5		-	EXPECTED EXPANDER CHANGE COUNT -									
6				Bos	onvod							
7				Ne5	eiveu							
8	(MSB)				PC							
11				C				(LSB)				

Table 342 — ZONE ACTIVATE request

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				FUNCTIC	N (87h)					
2		FUNCTION RESULT								
3		RESPONSE LENGTH (00h)								
4	(MSB)	(MSB)								
7		-		CK	0			(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 <u>(see 4.9.6.5)</u>. 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.

Byte\Bit	7	6	5	4	3	2	1	0			
0		SMP FRAME TYPE (40h)									
1		FUNCTION (88h)									
2				Res	served						
3		REQUEST LENGTH (01h)									
4				Post	rictod						
5				Resi	Incleu						
6		Reserved									
7		Reserved									
8	(MSB)				PC						
11								(LSB)			

Table 344 — ZONE UNLOCK request

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				FUNCTIC	N (88h)						
2		FUNCTION RESULT									
3		RESPONSE LENGTH (00h)									
4	(MSB)										
7		-		CK	0			(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.

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Table 346 defines the request format.

Byte\Bit	7	6	5	4	3	2	1	0			
0		SMP FRAME TYPE (40h)									
1		FUNCTION (89h)									
2				Res	served						
3				REQUEST	ENGTH (11h))					
4	(MSB)		EXDEC			COUNT					
5			EXFEC		JER CHANGE	COONT		(LSB)			
6		Reserved Reserved SAVE									
7		Reserved									
8						D					
39			2	ONE MANAG	ER PASSWUR	D					
40											
71			NEW ZONE MANAGER PASSWORD								
72	(MSB)			0	DC.						
75					NU			(LSB)			

Table 346 — CONFIGURE ZONE MANAGER PASSWORD request

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

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.

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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.

Byte\Bit	7	6 5 4 3 2 1						0
0		SMP FRAME TYPE (40h)						
1				FUNCT	on (8Ah)			
2				Re	served			
3			R	EQUEST LEN	GTH ((n - 7)	/ 4)		
4	(MSB)							
5		EXPECTED EXPANDER CHANGE COUNT (LSE					(LSB)	
6	Reserved Reserved SAVE						erved <u>VE</u>	
7		NUMBER OF ZONE PHY CONFIGURATION DESCRIPTORS						
	Zone phy configuration descriptor list							
8		Zono phy configuration descriptor (first)(see table 350 in $10.4.2.25.2$)						
11								
n - 7		Zone phy c	onfiguration	n descriptor	(last)(see ta	oble 350 in 1(1 4 3 25 3)	
n - 4			orniguration	ruescriptor			5.4.0.20.0)	
n - 3	(MSB)			<u></u>	PC			
n		CRC (LS					(LSB)	

Table 348 — CONFIGURE ZONE PHY INFORMATION request

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

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)	CPC							
7		-	CRC (LSB)						

Table 351 — CONFIGURE ZONE PHY INFORMATION response

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				Reserv	ved			
3			REQ	UEST LENGT	H ((n - 7) / 4	4)		
4	(MSB)		EVDECT					
5		-	EXPECTED EXPANDER CHANGE COUNT (LSB)					
6		STARTING SOURCE ZONE GROUP						
7		NUMBER OF ZONE PERMISSION CONFIGURATION DESCRIPTORS						
8	NUMBER OF 2	NUMBER OF ZONE GROUPS Reserved Reserved SAVE SAVE						erved <u>\VE</u>
9		Percented						
15								
	Zone permission configuration descriptor list							
16		Zone permission configuration descriptor (first)(see table 393 in						
31		10.4.3.26.3)						
n - 20		Zone perm	nission con	figuration de	escriptor (la	ast)(see tab	le 393 in	
n - 4				10.4.3.	26.3)			
n - 3	(MSB)				<u> </u>			
n		(LSB)						

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.

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

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

Table 353 —	NUMBER	OF ZONE	GROUPS	field
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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>	Values updated	Return function result of SAVING NOT SUPPORTED if saving is not supported			
<u>00b</u>	Current	<u>no</u>			
<u>01b</u>	Saved ^a	<u>yes</u>			
<u>10b</u>	Saved ^a , if saving is supported, and current.	<u>no</u>			
<u>11b</u>	Saved ^a and current.	<u>yes</u>			
 ^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.