T10/07-397 revision 3

Date: January 15, 2008

To: T10 Committee (SCSI)

From: George Penokie

Subject: SAS-2: Indeterminate response length to a SMP REPORT GENERAL function

1 Overview

As a result of proposal 05-306r2 (SAS-2 STP connection time limits and STP/SMP I_T nexus loss) a REQUEST LENGTH field was added to all the SMP function and a RESPONSE LENGTH field was added to all the SMP responses (even though neither of those has anything to do with STP or I_T nexus loss).

This change created a minefield for SAS 1.1 and SAS 2 compatibility by changing the SAS 1.1 SMP requests and responses from fixed structures to variable length structures (to understand the magnitude of this change consider what would happen if we changed any of the existed fixed length SCSI CDBs to a variable length CDB). Also, on SCSI CDBs that have parameters lists that are returned there is an allocation length specified which tells the target the maximum amount of data that can be sent. That is there to allow parameters lists to become longer in future generations of standards without impacting past implementations. There was no allocation length like field added in the SMP functions with the length additions so there will forever be having a problem with response length changes.

The only thing that keeps this from being a total disaster is that for all except two of the SMP functions the new REQUEST LENGTH field had to contain a non-zero value for SAS-2 compliance and all the new RESPONSE LENGTH fields have to contain non-zero values if the SMP request contained a non-zero value in the REQUEST LENGTH field. This works except that there is a good chance that a SAS 1.1 SMP device may fail a SAS 2 SMP function as the a reserved field contains a value. But the SAS-2 device knowing that this could happen would have to adjust to sending SAS 1.1 SMP functions. If it were not for the two SMP functions that have the same response length for both SAS 1.1 and SAS-2 then all this would be manageable (if not pretty).

The two SMP function that have the REQUEST LENGTH field set to zero in both SAS 1.1 and the current version of SAS-2 are the REPORT GENERAL function and the REPORT MANUFACTURER INFORMATION function. Of those REPORT MANUFACTURER INFORMATION function has no difference in the length of the response length so it should work (as long as the SAS 1.1 initiator ignores the value in the new RESPONSE LENGTH field).

The real problem is that the REPORT GENERAL function which has different lengths for SAS 1.1 (i.e., 32 bytes) and SAS-2 (i.e., 72 bytes). The problem occurs when a SAS 1.1 device issues a REPORT GENERAL function to a SAS-2 SMP device. The SAS-2 SMP device is required to deliver 72 bytes. That can cause the SAS 1.1 initiator to choke as it is only expecting 32 bytes.

This proposal addresses this issue by adding an ALLOCATED RESPONSE LENGTH field byte 2 of SMP functions that cause information to be returned in a response to the REPORT GENERAL functions. It also includes a bit in the in the REPORT GENERAL response to specify if the SMP device supports non-zero transfer lengths when a zero is placed in the allocated response length.

The allocated response length allows SAS-2 SMP devices to know the length of the response data. The bit in the REPORT GENERAL response allows a SAS-2 initiator to know if it is talking to an SMP device that support the long or short SMP response.

Of this to work without the possibility of any errors occurring is that a SAS-2 initiator would have to first issue a REPORT GENERAL function with the ALLOCATED RESPONSE LENGTH field set to zero. If the response contains the support long response indication then it can send a REPORT GENERAL function with the ALLOCATED RESPONSE LENGTH field set to the length of the response data. If the response contains the I don't support long indication them it will have to use the SAS 1.1 SMP function formats for all SMP functions to that SMP device.

Revision 1 - Expanded the correction to all SMP functions requests and responses that have different lengths between SAS 1.1 and SAS 2.

Revision 2 - Adds an ALLOCATED RESPONSE LENGTH field to SMP functions that return response data.

Revision 3 - Adds an ALLOCATED RESPONSE LENGTH field to all SMP functions

2 Proposed SAS-2 changes

10.4.3 SMP functions

10.4.3.1 SMP function request frame format

An SMP request frame is sent by a management application client via an SMP initiator port to request an SMP function be performed by a management device server. Table 1 defines the SMP request frame format.

Table 1 — SMP request frame format

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH ((n - 7) / 4)							
4	ADDITIONAL REQUEST BYTES							
m								
	Fill bytes, if needed							
n - 3	(MSB)	CRC						
n								(LSB)

10.4.3.2 Common SMP function request fields

10.4.3.2.1 SMP frame type

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10.4.3.2.2 Function

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10.4.3.2.3 Allocated response length

The ALLOCATED RESPONSE LENGTH field specifies the maximum number of dwords that a management application client has allocated in the Data-In Buffer for the contents of the ADDITIONAL RESPONSE BYTES.

For compatibility with previous versions of this standard, an allocated response length of zero specifies a specific number of dwords are to be transferred as defined in the SMP function description. This condition shall not be considered as an error.

If the LONG RESPONSE bit in the REPORT GENERAL response is set to one, then the application management client may set the ALLOCATED RESPONSE LENGTH field to a non-zero value in all SMP request frames. If the LONG RESPONSE bit in the REPORT GENERAL response is set to zero, then the application management client shall set the ALLOCATED RESPONSE LENGTH field to zero in all SMP request frames.

If the allocated response length is non-zero, then the management device server shall truncate the ADDITIONAL RESPONSE BYTES field to the number of dwords specified by the ALLOCATED RESPONSE LENGTH field.

If the allocation response length is zero, then the management device server shall truncate the ADDITIONAL RESPONSE BYTES field to the number of dwords specified by the SMP function.

The allocated response length is used to limit the maximum amount of variable length data returned to a management application client. If the additional response bytes include fields containing counts of the number of dwords in some or all of the data, then the contents of these fields shall not be altered to reflect the truncation, if any, that results from an insufficient allocated response length value.

10.4.3.2.4 Request Length

The REQUEST LENGTH field specifies the number of dwords that follow, not including the CRC field. ~~For compatibility with previous versions of this standard, a REQUEST LENGTH field set to 00h sometimes specifies a non-zero number of dwords; this is defined in the function description.~~

For compatibility with previous versions of this standard, a request length of zero may specify a non-zero number of dwords are to be transferred as defined in the function description. This condition shall not be considered as an error.

If the LONG RESPONSE bit in the REPORT GENERAL response is set to one, then the application management client may set the REQUEST LENGTH field to a non-zero value in all SMP functions. If the LONG RESPONSE bit in the REPORT GENERAL response is set to zero, then the application management client shall set the REQUEST LENGTH field to zero in all SMP functions.

If the request frame size including the CRC field is less than 8 bytes, or the REQUEST LENGTH field does not match the request frame size, the management device server shall return a function result of INVALID REQUEST FRAME LENGTH. The management device server shall consider any fields not included in the request frame to be set to zero.

10.4.3.2.5 Additional request bytes

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10.4.3.2.6 Fill bytes

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10.4.3.2.7 CRC

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10.4.3.3 SMP function response frame format

An SMP response frame is sent by a management device server via an SMP target port in response to an SMP request frame. Table 2 defines the SMP response frame format.

Table 2 — SMP response frame format

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION							
2	FUNCTION RESULT							
3	RESPONSE LENGTH ((n - 7) / 4)							
4	ADDITIONAL RESPONSE BYTES							
m								
	Fill bytes, if needed							
n - 3	(MSB)	CRC						
n								(LSB)

10.4.3.4 Common SMP function response fields

10.4.3.4.1 SMP frame type

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10.4.3.4.2 Function

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10.4.3.4.3 Function result

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10.4.3.4.4 Response length

The RESPONSE LENGTH field indicates the number of dwords that follow, not including the CRC field. For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h ~~sometimes~~ may indicate~~s~~ a non-zero number of dwords~~; this is~~ as defined in the SMP function description.

10.4.3.4.5 Function result

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10.4.3.4.6 Fill bytes

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10.4.3.4.7 CRC

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10.4.3.3 REPORT GENERAL function

The REPORT GENERAL function returns general information about the SAS device (e.g., a SAS device contained in an expander device). This SMP function shall be implemented by all management device servers.

Table 3 defines the request format.

Table 3 — REPORT GENERAL request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (00h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h)							
4	(MSB)							
	CRC							
7								(LSB)

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

The FUNCTION field shall be set to 00h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the REPORT GENERAL response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 28 bytes of table 4 plus a CRC field

If the allocated response length is not set to zero, then the REPORT GENERAL response shall:

a) have a RESPONSE LENGTH field set to the non-zero value defined table 4; and
b) have the format shown in table 4.

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to the value defined in table 3. A REQUEST LENGTH field set to zero specifies no dwords follow before the CRC field.

~~The REQUEST LENGTH field shall be set to 00h.~~

The CRC field is defined in 10.4.3.1.

Table 4 — 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 (00h or 10h)							
4	(MSB)							
5	EXPANDER CHANGE COUNT							(LSB)
6	(MSB)							
7	EXPANDER ROUTE INDEXES							(LSB)
8	LONG RESPONSE	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)							
31	STP BUS INACTIVITY TIME LIMIT							(LSB)
32	(MSB)							
33	STP MAXIMUM CONNECT TIME LIMIT							(LSB)
34	(MSB)							
35	STP SMP I_T NEXUS LOSS TIME							(LSB)
36	NUMBER OF ZONE GROUPS		Reserved	ZONE LOCKED	PHYSICAL PRESENCE SUPPORTED	PHYSICAL PRESENCE ASSERTED	ZONING SUPPORTED	ZONING ENABLED
37	Reserved							
38	(MSB)							
39	MAXIMUM NUMBER OF ROUTED SAS ADDRESSES							(LSB)

Table 4 — REPORT GENERAL response (part 2 of 2)

Byte\Bit	7	6	5	4	3	2	1	0
40	ACTIVE ZONE MANAGER SAS ADDRESS							
47								
48	(MSB)							
49	ZONE LOCK INACTIVITY TIME LIMIT							(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)							
61	LAST SELF-CONFIGURATION STATUS DESCRIPTOR INDEX							(LSB)
62	(MSB)							
63	MAXIMUM NUMBER OF STORED SELF-CONFIGURATION STATUS DESCRIPTORS							(LSB)
64	(MSB)							
65	LAST PHY EVENT INFORMATION DESCRIPTOR INDEX							(LSB)
66	(MSB)							
67	MAXIMUM NUMBER OF STORED PHY EVENT INFORMATION DESCRIPTORS							(LSB)
68	(MSB)							
71	CRC							(LSB)

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

The FUNCTION field shall be set to 00h.

The FUNCTION RESULT field is defined in 10.4.3.3.

~~The RESPONSE LENGTH field shall be set to 10h. For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h indicates that there are 6 dwords before the CRC field.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to one of the values defined table 4.

The EXPANDER CHANGE COUNT field counts the number of Broadcast (Change)s originated by an expander device (see 7.11). Management device servers in expander devices shall support this field. Management device servers in other device types (e.g., end devices) shall set this field to 0000h. This field shall be set to at least 0001h at power on. If the expander device has originated Broadcast (Change) for any reason described in 7.11 since transmitting a REPORT GENERAL response, it shall increment this field at least once from the value in the previous REPORT GENERAL response. It shall not increment this field when forwarding a Broadcast (Change). This field shall wrap to at least 0001h after the maximum value (i.e., FFFFh) has been reached.

NOTE 1 - Application clients that use the EXPANDER CHANGE COUNT field should read it often enough to ensure that it does not increment a multiple of 65 536 times between reading the field.

NOTE 2 - Management device servers in expander devices compliant with previous versions of this standard may return an EXPANDER CHANGE COUNT field set to 0000h.

NOTE 3 - The originated Broadcast (Change) count is also reported in the REPORT BROADCAST response (see 10.4.3.8).

The EXPANDER ROUTE INDEXES field indicates the maximum number of expander route indexes per phy for the expander device (see 4.6.7.3). Management device servers in externally configurable expander devices containing phy-based expander route tables shall support this field. Management device servers in other device types (e.g., end devices, externally configurable expander devices with expander-based expander route tables, and self-configuring expander devices) shall set the EXPANDER ROUTE INDEXES field to zero. Not all phys in an externally configurable expander device are required to support the maximum number indicated by this field.

The LONG RESPONSE bit shall be set to one indicating that the management device server supports returning non-zero values in the SMP responses RESPONSE LENGTH field when the ALLOCATED RESPONSE LENGTH field is set to an non-zero value.

NOTE 4 - Devices that comply with previous versions of this standard return a LONG RESPONSE bit in the REPORT GENERAL response set to zero and set the RESPONSE LENGTH field to zero in all SMP response frames.

The NUMBER OF PHYS field indicates the number of phys in the device, including any virtual phys and any vacant phys.

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10.4.3.4 REPORT MANUFACTURER INFORMATION function

The REPORT MANUFACTURER INFORMATION function returns vendor and product identification. This SMP function may be implemented by any management device server.

Table 5 defines the request format.

Table 5 — REPORT MANUFACTURER INFORMATION request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (01h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h)							
4	(MSB)			CRC				
7								(LSB)

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

The FUNCTION field shall be set to 01h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the REPORT MANUFACTURER INFORMATION response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 60 bytes of table 6 plus a CRC field

If the allocated response length is not set to zero, then the REPORT MANUFACTURER INFORMATION response shall:

a) have a RESPONSE LENGTH field set to the non-zero value defined table 6; and
b) have the format shown in table 6.

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to the value defined in table 5. A REQUEST LENGTH field set to zero specifies no dwords follow before the CRC field.

~~The REQUEST LENGTH field shall be set to 00h.~~

The CRC field is defined in 10.4.3.1.

Table 6 defines the response format.

Table 6 — REPORT MANUFACTURER INFORMATION response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (01h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (00h or 0Eh)							
4	(MSB)							
5	EXPANDER CHANGE COUNT							(LSB)
6								
7	Reserved							
8	Reserved							SAS-1.1 FORMAT
9								
11	Reserved							
12	(MSB)							
19	VENDOR IDENTIFICATION							(LSB)
20	(MSB)							
35	PRODUCT IDENTIFICATION							(LSB)
36	(MSB)							
39	PRODUCT REVISION LEVEL							(LSB)
40	(MSB)							
47	COMPONENT VENDOR IDENTIFICATION							(LSB)
48	(MSB)							
49	COMPONENT ID							(LSB)
50	COMPONENT REVISION LEVEL							
51	Reserved							
52								
59	Vendor specific							
60	(MSB)							
63	CRC							(LSB)

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

The FUNCTION field shall be set to 01h.

The FUNCTION RESULT field is defined in 10.4.3.3.

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to one of the values defined in table 6.

~~For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h indicates that there are 14 dwords before the CRC field.~~

The EXPANDER CHANGE COUNT field is defined in the SMP REPORT GENERAL response (see 10.4.3.3).

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10.4.3.5 REPORT SELF-CONFIGURATION STATUS function

10.4.3.5.1 REPORT SELF-CONFIGURATION STATUS function overview

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10.4.3.5.2 REPORT SELF-CONFIGURATION STATUS request

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 01h.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to the value defined in table xx.

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10.4.3.5.3 REPORT SELF-CONFIGURATION STATUS response

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

The RESPONSE LENGTH field is defined in 10.4.3.4.4.

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10.4.3.5.4 Self-configuration status descriptor

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10.4.3.6 REPORT ZONE PERMISSION TABLE function

10.4.3.6.1 REPORT ZONE PERMISSION TABLE function overview

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10.4.3.6.2 REPORT ZONE PERMISSION TABLE request

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 01h.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to the value defined in table xx.

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10.4.3.6.3 REPORT ZONE PERMISSION TABLE response

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

The RESPONSE LENGTH field is defined in 10.4.3.4.4.

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10.4.3.6.4 Zone permission descriptor

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10.4.3.7 REPORT ZONE MANAGER PASSWORD function

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 00h.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to the value defined in table xx. A REQUEST LENGTH field set to zero specifies no dwords follow before the CRC field.

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~~The RESPONSE LENGTH field shall be set to 09h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to the value defined in table xx.

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10.4.3.8 REPORT BROADCAST function

10.4.3.8.1 REPORT BROADCAST function overview

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10.4.3.8.2 REPORT BROADCAST request

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 01h.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to the value defined in table xx.

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10.4.3.8.3 REPORT BROADCAST response

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

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to the value defined in table xx.

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10.4.3.8.4 REPORT BROADCAST response broadcast descriptor

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10.4.3.9 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 5 - The DISCOVER LIST function (see 10.4.3.15) returns information about one or more phys.

Table 7 defines the request format.

Table 7 — DISCOVER request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (10h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h or 02h)							
4	Reserved							
7								
8	Reserved							IGNORE ZONE GROUP
9	PHY IDENTIFIER							
10	Reserved							
11								
12	(MSB)	CRC						
15								(LSB)

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

The FUNCTION field shall be set to 10h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the DESCOVERY response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 52 bytes of table 8 plus a CRC field

If the allocated response length is not set to zero, then the DESCOVERY response shall:

a) have a RESPONSE LENGTH field set to the non-zero value defined table 8; and
b) have the format shown in table 8.

~~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.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to one of the values defined in table 7. A REQUEST LENGTH field set to zero specifies 2 dwords follow 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 (see table 315 in 10.4.3.3).

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 8 defines the request format~~

Table 8 — 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 (00h or 1Ah)							
4	(MSB)			EXPANDER CHANGE COUNT				
5								(LSB)
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								
32	ATTACHED PHY IDENTIFIER							
33	Reserved					ATTACHED INSIDE ZPSDS PERSISTENT	ATTACHED REQUESTED INSIDE ZPSDS	ATTACHED BREAK_REPLY CAPABLE
34	Reserved							
39								
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							

Table 8 — DISCOVER response (part 2 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
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								
50	Vendor specific							
51								
52	ATTACHED DEVICE NAME							
59								
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								
63	ZONE GROUP							
64	SELF-CONFIGURATION STATUS							
65	SELF-CONFIGURATION LEVELS COMPLETED							
66	Reserved							
67								
68	SELF-CONFIGURATION SAS ADDRESS							
75								
76	PROGRAMMED PHY CAPABILITIES							
79								
80	CURRENT PHY CAPABILITIES							
83								
84	ATTACHED PHY CAPABILITIES							
87								
88	Reserved							
93								

Table 8 — DISCOVER response (part 3 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
94	REASON				NEGOTIATED PHYSICAL LINK RATE			
95	Reserved						NEGOTIATED SSC	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							
108	(MSB)			CRC				
111								(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 10.4.3.3.

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to one of the values defined in table 8.

~~The RESPONSE LENGTH field shall be set to 1Ah. 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.~~

...

10.4.3.10 REPORT PHY ERROR LOG function

The REPORT PHY ERROR LOG function returns error logging information about the specified phy. This SMP function may be implemented by any management device server.

Table 9 defines the request format.

Table 9 — REPORT PHY ERROR LOG request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (11h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h or 02h)							
4	Reserved							
8								
9	PHY IDENTIFIER							
10	Reserved							
11								
12	(MSB)							
15	CRC							(LSB)

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

The FUNCTION field shall be set to 11h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the REPORT PHY ERROR LOG response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 28 bytes of table 10 plus a CRC field

If the allocated response length is not set to zero, then the REPORT PHY ERROR LOG response shall:

a) have a RESPONSE LENGTH field set to the non-zero value defined table 10; and
b) have the format shown in table 10.

~~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.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to one of the values defined in table 9. A REQUEST LENGTH field set to zero specifies 2 dwords follow before the CRC field.

The PHY IDENTIFIER field specifies the phy (see 4.2.8) for which information shall be reported.

The CRC field is defined in 10.4.3.1.

~~Table 10 defines the response format~~

Table 10 — REPORT PHY ERROR LOG response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (11h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (00h or 06h)							
4	(MSB)							
5				EXPANDER CHANGE COUNT				(LSB)
6								
8				Reserved				
9	PHY IDENTIFIER							
10								
11				Reserved				
12	(MSB)							
15				INVALID DWORD COUNT				(LSB)
16	(MSB)							
19				RUNNING DISPARITY ERROR COUNT				(LSB)
20	(MSB)							
23				LOSS OF DWORD SYNCHRONIZATION COUNT				(LSB)
24	(MSB)							
27				PHY RESET PROBLEM COUNT				(LSB)
28	(MSB)							
31				CRC				(LSB)

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

The FUNCTION field shall be set to 11h.

The FUNCTION RESULT field is defined in 10.4.3.3.

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to one of the values defined in table 10.

~~The RESPONSE LENGTH field shall be set to 06h. For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h indicates that there are 6 dwords before the CRC field.~~

....

10.4.3.11 REPORT PHY SATA function

The REPORT PHY SATA function returns information about the SATA state for a specified phy. This SMP function shall be implemented by management device servers behind SMP target ports that share SAS addresses with STP target ports and by management device servers in expander devices with STP/SATA bridges. This SMP function shall not be implemented by any other type of management device server.

Table 11 defines the request format.

Table 11 — REPORT PHY SATA request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (12h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h or 02h)							
4	Reserved							
8								
9	PHY IDENTIFIER							
10	AFFILIATION CONTEXT							
11	Reserved							
12	(MSB) CRC							
15								(LSB)

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

The FUNCTION field shall be set to 12h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the REPORT PHY SATA response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 56 bytes of table 12 plus a CRC field

If the allocated response length is not set to zero, then the REPORT PHY SATA response shall:

a) have a RESPONSE LENGTH field set to the non-zero value defined table 12; and
b) have the format shown in table 12.

~~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.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to one of the values defined in table 11. A REQUEST LENGTH field set to zero specifies 2 dwords follow before the CRC field.

The PHY IDENTIFIER field specifies the phy (see 4.2.8) for which information shall be reported.

The AFFILIATION CONTEXT field specifies the relative identifier of the affiliation context for which information shall be reported (see 7.17.4).

The CRC field is defined in 10.4.3.1.

~~Table 15 defines the response format~~.

Table 12 — REPORT PHY SATA response (part 1 of 2)

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (12h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (00h or 10h)							
4	(MSB) EXPANDER CHANGE COUNT							
5								(LSB)
6	Reserved							
8								
9	PHY IDENTIFIER							
10	Reserved							
11	Reserved					STP I_T NEXUS LOSS OCCURRED	AFFILIATIONS SUPPORTED	AFFILIATION VALID
12	Reserved							
15								
16	STP SAS ADDRESS							
23								
24	REGISTER DEVICE TO HOST FIS							
43								
44	Reserved							
47								
48	AFFILIATED STP INITIATOR SAS ADDRESS							
55								
56	STP I_T NEXUS LOSS SAS ADDRESS							
63								

Table 12 — REPORT PHY SATA response (part 2 of 2)

Byte\Bit	7	6	5	4	3	2	1	0
64	Reserved							
65	AFFILIATION CONTEXT							
66	CURRENT AFFILIATION CONTEXTS							
67	MAXIMUM AFFILIATION CONTEXTS							
68	(MSB)			CRC				
71								(LSB)

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

The FUNCTION field shall be set to 12h.

The FUNCTION RESULT field is defined in 10.4.3.3.

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to one of the values defined in table 12.

~~The RESPONSE LENGTH field shall be set to 10h. For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h indicates that there are 13 dwords before the CRC field.~~

....

10.4.3.12 REPORT ROUTE INFORMATION function

The REPORT ROUTE INFORMATION function returns an expander route entry from a phy-based expander route table within an expander device (see 4.6.7.3). This SMP function shall be supported by management device servers in expander devices if the EXPANDER ROUTE INDEXES field is set to a non-zero value in the SMP REPORT GENERAL response (see 10.4.3.3). This SMP function may be used as a diagnostic tool to resolve topology issues.

Table 13 defines the request format.

Table 13 — REPORT ROUTE INFORMATION request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (13h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h or 02h)							
4	Reserved							
5								
6	(MSB) EXPANDER ROUTE INDEX							
7								(LSB)
8	Reserved							
9	PHY IDENTIFIER							
10	Reserved							
11								
12	(MSB) CRC							
15								(LSB)

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

The FUNCTION field shall be set to 13h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the REPORT ROUTE INFORMATION response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 40 bytes of table 14 plus a CRC field

If the allocated response length is not set to zero, then the REPORT ROUTE INFORMATION response shall:

a) have a RESPONSE LENGTH field set to the non-zero value defined table 14; and
b) have the format shown in table 14

~~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.~~

The REQUEST LENGTH field is defined in 10.4.3.2.4 and shall be set to one of the values defined in table 13. A REQUEST LENGTH field set to zero specifies 2 dwords follow before the CRC field.

The EXPANDER ROUTE INDEX field specifies the expander route index for the expander route entry being requested (see 4.6.7.3).

The PHY IDENTIFIER field specifies the phy for which the expander route entry is being requested.

The CRC field is defined in 10.4.3.1.

Table 14 defines the response format.

Table 14 — REPORT ROUTE INFORMATION response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (13h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (00h or 09h)							
4	(MSB)	EXPANDER CHANGE COUNT						
5								(LSB)
6	(MSB)	EXPANDER ROUTE INDEX						
7								(LSB)
8	Reserved							
9	PHY IDENTIFIER							
10		Reserved						
11								
12	EXPANDER ROUTE ENTRY DISABLED	Reserved						
13		Reserved						
15								
16		ROUTED SAS ADDRESS						
23								
24		Reserved						
39								
40	(MSB)	CRC						
43								(LSB)

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

The FUNCTION field shall be set to 13h.

The FUNCTION RESULT field is defined in 10.4.3.3.

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to one of the values defined in table 14.

~~The RESPONSE LENGTH field shall be set to 09h. For compatibility with previous versions of this standard, a RESPONSE LENGTH field set to 00h indicates that there are 9 dwords before the CRC field.~~

...

10.4.3.13 REPORT PHY EVENT function

10.4.3.13.1 REPORT PHY EVENT function overview

...

10.4.3.13.2 REPORT PHY EVENT request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.13.3 REPORT PHY EVENT response

...

~~.The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.13.4 REPORT PHY EVENT response phy event descriptor

...

10.4.3.14 REPORT PHY BROADCAST COUNTS function

...

10.4.3.15 DISCOVER LIST function

10.4.3.15.1 DISCOVER LIST function overview

...

10.4.3.15.2 DISCOVER LIST request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.15.3 DISCOVER LIST response

...

~~.The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.15.4 DISCOVER LIST response SHORT FORMAT descriptor

...

10.4.3.16 REPORT PHY EVENT LIST function

10.4.3.16.1 REPORT PHY EVENT LIST function overview

...

10.4.3.16.2 REPORT PHY EVENT LIST request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.16.3 REPORT PHY EVENT LIST response

...

~~.The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.16.4 REPORT PHY EVENT LIST response phy event list descriptor

...

10.4.3.17 REPORT EXPANDER ROUTE TABLE LIST function

10.4.3.17.1 REPORT EXPANDER ROUTE TABLE LIST function overview

...

10.4.3.17.2 REPORT EXPANDER ROUTE TABLE LIST request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.17.3 REPORT EXPANDER ROUTE TABLE LIST response

...

~~.The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.17.4 REPORT EXPANDER ROUTE TABLE descriptor

...

10.4.3.18 CONFIGURE GENERAL function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 04h.~~

If the REQUEST LENGTH field is set to 04h, then the CONFIGURE GENERAL function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

....

10.4.3.19 ENABLE DISABLE ZONING function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 02h.~~

If the REQUEST LENGTH field is set to 02h, then the ENABLE DISABLE ZONING function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

....

10.4.3.20 ZONED BROADCAST function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 02h.~~

If the REQUEST LENGTH field is set to 02h, then the ENABLE DISABLE ZONING function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

....

10.4.3.21 ZONE LOCK function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 09h.~~

If the REQUEST LENGTH field is set to 09h, then the ZONE LOCK function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 03h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to the value defined in table xx.

....

10.4.3.22 ZONE ACTIVATE function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 01h.~~

If the REQUEST LENGTH field is set to 01h, then the ZONE ACTIVATE function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.23 ZONE UNLOCK function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 01h.~~

If the REQUEST LENGTH field is set to 01h, then the ZONE UNLOCK function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.24 CONFIGURE ZONE MANAGER PASSWORD function

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

~~The REQUEST LENGTH field shall be set to 11h.~~

If the REQUEST LENGTH field is set to 11h, then the CONFIGURE ZONE MANAGER PASSWORD function request shall have the format shown in table xx.

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.25 CONFIGURE ZONE PHY INFORMATION function

10.4.3.25.1 CONFIGURE ZONE PHY INFORMATION function overview

...

10.4.3.25.2 CONFIGURE ZONE PHY INFORMATION request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.25.3 Zone phy configuration descriptor

...

10.4.3.25.4 CONFIGURE ZONE PHY INFORMATION response

...

~~.The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.26 CONFIGURE ZONE PERMISSION TABLE function

10.4.3.26.1 CONFIGURE ZONE PERMISSION TABLE function overview

...

10.4.3.26.2 CONFIGURE ZONE PERMISSION TABLE request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.26.3 Zone permission configuration descriptor

...

10.4.3.26.4 CONFIGURE ZONE PERMISSION TABLE response

~~.The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...

10.4.3.27 CONFIGURE ROUTE INFORMATION function

The CONFIGURE ROUTE INFORMATION function sets an expander route entry within the expander route table of a configurable expander device. This SMP function shall be supported by management device servers in expander devices if the CONFIGURABLE ROUTE TABLE field is set to one in the SMP REPORT GENERAL response (see 10.4.3.3). Other management device servers shall not support this SMP function.

Table 15 defines the request format.

Table 15 — CONFIGURE ROUTE INFORMATION request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (90h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (09h)							
4	(MSB)	EXPECTED EXPANDER CHANGE COUNT						
5								(LSB)
6	(MSB)	EXPANDER ROUTE INDEX						
7								(LSB)
8	Reserved							
9	PHY IDENTIFIER							
10		Reserved						
11								
12	DISABLE EXPANDER ROUTE ENTRY	Reserved						
13		Reserved						
15								
16		ROUTED SAS ADDRESS						
23								
24		Reserved						
39								
40	(MSB)	CRC						
43								(LSB)

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

The FUNCTION field shall be set to 90h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the CONFIGURE ROUTE INFORMATION response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 4 bytes of table 16 plus a CRC field

If the allocated response length is not set to zero, then the CONFIGURE ROUTE INFORMATION response shall:

a) have a RESPONSE LENGTH field set to the value defined table 16; and
b) have the format shown in table 16

~~The REQUEST LENGTH field shall be set to 09h. For compatibility with previous versions of this standard, a REQUEST LENGTH field set to 00h specifies that there are 9 dwords before the CRC field.~~

If the REQUEST LENGTH field is set to 09h or 00h, then the CONFIGURE ROUTE INFORMATION function request shall have the format shown in table xx.

...

Table 16 defines the response format.

Table 16 — CONFIGURE ROUTE INFORMATION response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (90h)							
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 90h.

The FUNCTION RESULT field is defined in 10.4.3.3.

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

The CRC field is defined in 10.4.3.3.

10.4.3.28 PHY CONTROL function

The PHY CONTROL function requests actions by the specified phy. This SMP function may be implemented by any management device server. In zoning expander devices, if zoning is enabled then this function shall only be processed from SMP initiator ports that have access to zone group 2 or the zone group of the specified phy (see 4.9.3.2).

Table 17 defines the request format.

Table 17 — PHY CONTROL request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (91h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00h or 09h)							
4	(MSB)							
5	EXPECTED EXPANDER CHANGE COUNT							(LSB)
6	Reserved							
8								
9	PHY IDENTIFIER							
10	PHY OPERATION							
11	Reserved							UPDATE PARTIAL PATHWAY TIMEOUT VALUE
12	Reserved							
23								
24	ATTACHED DEVICE NAME							
31								
32	PROGRAMMED MINIMUM PHYSICAL LINK RATE				Reserved			
33	PROGRAMMED MAXIMUM PHYSICAL LINK RATE				Reserved			
34	Reserved							
35								
36	Reserved				PARTIAL PATHWAY TIMEOUT VALUE			
37	Reserved							
39								
40	(MSB)							
43	CRC							(LSB)

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

The FUNCTION field shall be set to 91h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the PHY CONTROL response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 4 bytes of table 18 plus a CRC field

If the allocated response length is not set to zero, then the PHY CONTROL response shall:

a) have a RESPONSE LENGTH field set to the value defined table 18; and
b) have the format shown in table 18

~~The REQUEST LENGTH field shall be set to 09h. For compatibility with previous versions of this standard, a REQUEST LENGTH field set to 00h specifies that there are 9 dwords before the CRC field.~~

If the REQUEST LENGTH field is set to 09h or 00h, then the PHY CONTROL function request shall have the format shown in table 19.

...

Table 18 defines the response format.

Table 18 — PHY CONTROL response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (91h)							
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 91h.

The FUNCTION RESULT field is defined in 10.4.3.3.

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

The CRC field is defined in 10.4.3.3.

10.4.3.29 PHY TEST FUNCTION function

The PHY TEST FUNCTION function requests actions by the specified phy. This SMP function may be implemented by any management device server. In zoning expander devices, if zoning is enabled then this function shall only be processed from SMP initiator ports that have access to zone group 2 or the zone group of the specified phy (see 4.9.3.2).

Table 19 defines the request format.

Table 19 — PHY TEST FUNCTION request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (92h)							
2	ALLOCATED RESPONSE LENGTH							
3	REQUEST LENGTH (00 or 09h)							
4	(MSB)							
5	EXPECTED EXPANDER CHANGE COUNT							(LSB)
6	Reserved							
8								
9	PHY IDENTIFIER							
10	PHY TEST FUNCTION							
11	PHY TEST PATTERN							
12	Reserved							
14								
15	Reserved				PHY TEST PATTERN PHYSICAL LINK RATE			
16	Reserved							
18								
19	PHY TEST PATTERN DWORDS CONTROL							
20	PHY TEST PATTERN DWORDS							
27								
28	Reserved							
39								
40	(MSB)							
43	CRC							(LSB)

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

The FUNCTION field shall be set to 92h.

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

If the ALLOCATED RESPONSE LENGTH field is set to zero, then the PHY TEST FUNCTION response shall:

a) have a RESPONSE LENGTH field set to zero; and
b) only return the first 4 bytes of table 20 plus a CRC field

If the allocated response length is not set to zero, then the PHY TEST FUNCTION response shall:

a) have a RESPONSE LENGTH field set to the value defined table 20; and
b) have the format shown in table 20

~~The REQUEST LENGTH field shall be set to 09h. For compatibility with previous versions of this standard, a REQUEST LENGTH field set to 00h specifies that there are 9 dwords before the CRC field.~~

If the REQUEST LENGTH field is set to 09h or 00h, then the PHY TEST FUNCTION function request shall have the format shown in table 19.

...

Table 20 defines the response format.

Table 20 — PHY TEST FUNCTION response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (92h)							
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 92h.

The FUNCTION RESULT field is defined in 10.4.3.3.

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

The CRC field is defined in 10.4.3.3.

10.4.3.30 CONFIGURE PHY EVENT function

10.4.3.30.1 CONFIGURE PHY EVENT function overview

....

10.4.3.30.2 CONFIGURE PHY EVENT request

...

Add to function table in byte 2 'ALLOCATED RESPONSE LENGTH'

The ALLOCATED RESPONSE LENGTH field is defined in 10.4.3.2.3.

...

10.4.3.30.3 CONFIGURE PHY EVENT request phy event configuration descriptor

...

10.4.3.30.4 CONFIGURE PHY EVENT response

...

~~The RESPONSE LENGTH field shall be set to 00h.~~

The RESPONSE LENGTH field is defined in 10.4.3.4.4 and shall be set to 00h.

...