

To: T10 Technical Committee  
 From: Rob Elliott, HP (elliott@hp.com)  
 Date: 7 April 2007  
 Subject: 07-176r0 SAS-2 SMP function result for incomplete descriptor lists

### **Revision history**

Revision 0 (7 April 2007) First revision

### **Related documents**

sas2r09 - Serial Attached SCSI - 2 (SAS-2) revision 9

### **Overview**

Several SMP request frames include a NUMBER OF <DESCRIPTORS> field followed by those descriptors and the CRC. If the number of descriptors actually present in the frame is shorter than the number specified in that field, the management device server needs to report an error. The proposed new function result is INCOMPLETE DESCRIPTOR LIST. Note that excess bytes after the descriptor list are not an error; they must be presumed to be defined in future versions of the standard.

The SMP functions with such fields are:

- a) ZONED BROADCAST request and the NUMBER OF BROADCAST SOURCE ZONE GROUPS field
- b) CONFIGURE ZONE PERMISSION request and the number of ZONE PERMISSION CONFIGURATION DESCRIPTORS field
- c) CONFIGURE PHY EVENT INFORMATION request and the NUMBER OF PHY EVENT CONFIGURATION DESCRIPTORS field

### **Suggested changes to SAS-2**

#### **10.4.3.2 SMP function response frame format**

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The FUNCTION RESULT field is defined in table 221.

**Table 221** — FUNCTION RESULT field (part 1 of 5)

<b>Code</b>	<b>Name</b>	<b>SMP function(s)</b>	<b>Description</b>
00h	SMP FUNCTION ACCEPTED	All	The management device server supports the SMP function. The ADDITIONAL RESPONSE BYTES field contains the requested information.
01h	UNKNOWN SMP FUNCTION	Unknown	The management device server does not support the requested SMP function. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
02h	SMP FUNCTION FAILED	All	The management device server supports the SMP function, but the requested SMP function failed. The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.
03h	INVALID REQUEST FRAME LENGTH	All	The management device server supports the SMP function, but the SMP request frame length was invalid (i.e., did not match the frame size defined for the function). The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.

Table 221 — FUNCTION RESULT field (part 2 of 5)

Code	Name	SMP function(s)	Description
04h	INVALID EXPANDER CHANGE COUNT	CONFIGURE GENERAL, ENABLE DISABLE ZONING, ZONE LOCK, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE, CONFIGURE ROUTE INFORMATION, PHY CONTROL, PHY TEST FUNCTION, CONFIGURE PHY EVENT INFORMATION	The management device server supports the SMP function, but the EXPECTED EXPANDER CHANGE COUNT field does not match the current expander change count. The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.
05h	BUSY	ZONE UNLOCK	The locked zoning expander device is processing the activate step.
06h	<u>INCOMPLETE DESCRIPTOR LIST</u>	<u>ZONED BROADCAST, CONFIGURE ZONE PERMISSION, CONFIGURE PHY EVENT INFORMATION</u>	<p><u>The SMP request frame length causes a list in the request frame to be truncated as follows:</u></p> <p>a) <u>ZONED BROADCAST request: the broadcast source zone group list does not contain all the broadcast source zone groups specified by the NUMBER OF BROADCAST SOURCE ZONE GROUPS field;</u></p> <p>b) <u>CONFIGURE ZONE PERMISSION request: the zone permission configuration descriptor list does not contain all the descriptors specified by the NUMBER OF ZONE PERMISSION CONFIGURATION DESCRIPTORS field; and</u></p> <p>c) <u>CONFIGURE PHY EVENT INFORMATION request: the phy event configuration descriptor list does not contain all the descriptors specified by the NUMBER OF PHY EVENT CONFIGURATION DESCRIPTORS field.</u></p> <p><u>The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.</u></p>

Table 221 — FUNCTION RESULT field (part 3 of 5)

Code	Name	SMP function(s)	Description
10h	PHY DOES NOT EXIST	DISCOVER, DISCOVER LIST, REPORT PHY ERROR LOG, REPORT PHY SATA, REPORT ROUTE INFORMATION, REPORT PHY EVENT INFORMATION, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ROUTE INFORMATION, PHY CONTROL, PHY TEST FUNCTION, CONFIGURE PHY EVENT INFORMATION	The phy specified by the PHY IDENTIFIER field or the STARTING PHY IDENTIFIER field in the SMP request frame does not exist (e.g., the value is not within the range of zero to the value of the NUMBER OF PHYs field reported in the SMP REPORT GENERAL response). The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
11h	INDEX DOES NOT EXIST	REPORT ROUTE INFORMATION, CONFIGURE ROUTE INFORMATION	The phy specified by the PHY IDENTIFIER field in the SMP request frame does not have the table routing attribute (see 4.6.7.1), or the expander route index specified by the EXPANDER ROUTE INDEX field does not exist (i.e., the value is not in the range of 0000h to the value of the EXPANDER ROUTE INDEXES field in the SMP REPORT GENERAL response). The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
12h	PHY DOES NOT SUPPORT SATA	REPORT PHY SATA and PHY CONTROL (TRANSMIT SATA PORT SELECTION SIGNAL)	The phy specified by the PHY IDENTIFIER field in the SMP request frame is not part of an STP target port. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
13h	UNKNOWN PHY OPERATION	PHY CONTROL	The operation specified by the PHY OPERATION field in the SMP request frame is unknown. The SMP function had no affect. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
14h	UNKNOWN PHY TEST FUNCTION	PHY TEST FUNCTION	The operation specified by the PHY TEST FUNCTION field in the SMP request frame is unknown. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
15h	PHY TEST FUNCTION IN PROGRESS	PHY TEST FUNCTION	The specified phy is already performing a phy test function. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.

Table 221 — FUNCTION RESULT field (part 4 of 5)

Code	Name	SMP function(s)	Description
16h	PHY VACANT	DISCOVER, REPORT PHY ERROR LOG, REPORT PHY SATA, REPORT ROUTE INFORMATION, REPORT PHY EVENT INFORMATION, CONFIGURE ROUTE INFORMATION, PHY CONTROL, CONFIGURE PHY EVENT INFORMATION	The management device server processing the SMP request frame does not have access to the phy (e.g., because of zoning or vendor-specific reasons), although the value is within the range of zero to the value of the NUMBER OF PHYs field reported in the SMP REPORT GENERAL response. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
17h	UNKNOWN PHY EVENT INFORMATION SOURCE	CONFIGURE PHY EVENT INFORMATION	The phy event information source specified by a PHY EVENT INFORMATION SOURCE field is not supported. The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.
18h	UNKNOWN DESCRIPTOR TYPE	DISCOVER LIST	The descriptor type specified by the DESCRIPTOR TYPE field is not supported. The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.
19h	UNKNOWN PHY FILTER	DISCOVER LIST	The phy filter specified by the PHY FILTER field is not supported. The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.
1Ah	LOGICAL LINK RATE NOT SUPPORTED	PHY CONTROL	The logical link rate specified by the REQUESTED LOGICAL LINK RATE field is not supported.
20h	SMP ZONE VIOLATION	CONFIGURE GENERAL, ENABLE DISABLE ZONING, ZONED BROADCAST, PHY CONTROL, PHY TEST FUNCTION, CONFIGURE PHY EVENT INFORMATION	The management device server supports the function, but zoning is enabled and the SMP initiator port does not have access to a necessary zone group according to the zone permission table (see 4.9.3.2). The ADDITIONAL RESPONSE BYTES may be present but shall be ignored.

**Table 221** — FUNCTION RESULT field (part 5 of 5)

Code	Name	SMP function(s)	Description
21h	NO MANAGEMENT ACCESS RIGHTS	ENABLE DISABLE ZONING, ZONE LOCK	<p>Either:</p> <ul style="list-style-type: none"> <li>a) the ZONE ENABLE bit is set to zero and a zoning expander device processes an ENABLE DISABLE ZONING request when the PHYSICAL PRESENCE bit is set to zero; or</li> <li>b) the ZONE ENABLE bit is set to one and a zoning expander device processes a ZONE LOCK request when the ZONE LOCK bit is set to zero, the PHYSICAL PRESENCE bit is set to zero, and the zone manager does not have access to zone group 2.</li> </ul> <p>The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.</p>
22h	UNKNOWN ENABLE DISABLE ZONING VALUE	ENABLE DISABLE ZONING	The ENABLE DISABLE ZONING field is set to 11b (i.e., Reserved). The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
23h	ZONE LOCK VIOLATION	ENABLE DISABLE ZONING, ZONE LOCK, ZONE ACTIVATE, ZONE UNLOCK, CONFIGURE ZONE PHY INFORMATION, CONFIGURE ZONE PERMISSION TABLE	<p>The ZONE ENABLE bit is set to one and:</p> <ul style="list-style-type: none"> <li>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</li> <li>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.</li> </ul>
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	UNKNOWN ZONE PHY INFORMATION VALUE	CONFIGURE ZONE PHY INFORMATION	A specified zone phy information value is not supported. The ADDITIONAL RESPONSE BYTES field may be present but shall be ignored.
All others	Reserved		

Table 222 defines the priority of the SMP function results defined in table 221.

**Table 222** — Function result priority (part 1 of 4)

SMP function	SMP function result priority
REPORT GENERAL (see 10.4.3.3)	<ul style="list-style-type: none"> <li>1) INVALID REQUEST FRAME LENGTH;</li> <li>2) SMP FUNCTION FAILED; and</li> <li>3) SMP FUNCTION ACCEPTED</li> </ul>
REPORT MANUFACTURER INFORMATION (see 10.4.3.4)	<ul style="list-style-type: none"> <li>1) INVALID REQUEST FRAME LENGTH;</li> <li>2) SMP FUNCTION FAILED; and</li> <li>3) SMP FUNCTION ACCEPTED</li> </ul>

Table 222 — Function result priority (part 2 of 4)

SMP function	SMP function result priority
READ GPIO REGISTER (see SFF-8485)	1) INVALID REQUEST FRAME LENGTH; 2) SMP FUNCTION FAILED; and 3) SMP FUNCTION ACCEPTED
REPORT SELF-CONFIGURATION STATUS (see 10.4.3.5)	1) INVALID REQUEST FRAME LENGTH; 2) SMP FUNCTION FAILED; and 3) SMP FUNCTION ACCEPTED
REPORT ZONE PERMISSION TABLE (see 10.4.3.6)	1) INVALID REQUEST FRAME LENGTH; 2) SMP FUNCTION FAILED; and 3) SMP FUNCTION ACCEPTED
DISCOVER (see 10.4.3.7)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
REPORT PHY ERROR LOG (see 10.4.3.8)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
REPORT PHY SATA (see 10.4.3.9)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) PHY DOES NOT SUPPORT SATA; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
REPORT ROUTE INFORMATION (see 10.4.3.10)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) INDEX DOES NOT EXIST; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
REPORT PHY EVENT INFORMATION (see 10.4.3.11)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
REPORT PHY BROADCAST COUNTS (see 10.4.3.12)	1) INVALID REQUEST FRAME LENGTH; 2) SMP FUNCTION FAILED; and 3) SMP FUNCTION ACCEPTED
DISCOVER LIST (see 10.4.3.13)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) UNKNOWN DESCRIPTOR TYPE; 4) UNKNOWN PHY FILTER; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
REPORT EXPANDER ROUTE TABLE (see 10.4.3.14)	1) INVALID REQUEST FRAME LENGTH; 2) SMP FUNCTION FAILED; and 3) SMP FUNCTION ACCEPTED

Table 222 — Function result priority (part 3 of 4)

SMP function	SMP function result priority
CONFIGURE GENERAL (see 10.4.3.15)	1) INVALID REQUEST FRAME LENGTH; 2) SMP ZONE VIOLATION; 3) INVALID EXPANDER CHANGE COUNT; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
WRITE GPIO REGISTER (see SFF-8485)	1) INVALID REQUEST FRAME LENGTH; 2) SMP FUNCTION FAILED; and 3) SMP FUNCTION ACCEPTED
ENABLE DISABLE ZONING (see 10.4.3.16)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) UNKNOWN ENABLE DISABLE ZONING VALUE; 4) NO MANAGEMENT ACCESS RIGHTS; 5) INVALID EXPANDER CHANGE COUNT; 6) SMP FUNCTION FAILED; and 7) SMP FUNCTION ACCEPTED
ZONED BROADCAST (see 10.4.3.17)	1) INVALID REQUEST FRAME LENGTH; 2) <a href="#">INCOMPLETE DESCRIPTOR LIST</a> ; 3) SMP ZONE VIOLATION; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
ZONE LOCK (see 10.4.3.18)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) NO MANAGEMENT ACCESS RIGHTS; 4) INVALID EXPANDER CHANGE COUNT; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
ZONE ACTIVATE (see 10.4.3.19)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) INVALID EXPANDER CHANGE COUNT; 4) SMP FUNCTION FAILED; and 5) SMP FUNCTION ACCEPTED
ZONE UNLOCK (see 10.4.3.20)	1) INVALID REQUEST FRAME LENGTH; 2) ZONE LOCK VIOLATION; 3) NOT ACTIVATED; 4) BUSY; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
CONFIGURE ZONE PHY INFORMATION (see 10.4.3.21)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) ZONE LOCK VIOLATION; 4) UNKNOWN ZONE PHY INFORMATION VALUE; 5) INVALID EXPANDER CHANGE COUNT; 6) SMP FUNCTION FAILED; and 7) SMP FUNCTION ACCEPTED

Table 222 — Function result priority (part 4 of 4)

SMP function	SMP function result priority
CONFIGURE ZONE PERMISSION (see 10.4.3.22)	1) INVALID REQUEST FRAME LENGTH; 2) <a href="#">INCOMPLETE DESCRIPTOR LIST</a> ; 3) ZONE LOCK VIOLATION; 4) INVALID EXPANDER CHANGE COUNT; 5) SMP FUNCTION FAILED; and 6) SMP FUNCTION ACCEPTED
CONFIGURE ROUTE INFORMATION (see 10.4.3.23)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) INDEX DOES NOT EXIST; 5) INVALID EXPANDER CHANGE COUNT; 6) SMP FUNCTION FAILED; and 7) SMP FUNCTION ACCEPTED
PHY CONTROL (see 10.4.3.24)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) SMP ZONE VIOLATION; 5) LOGICAL LINK RATE NOT SUPPORTED; 6) UNKNOWN PHY OPERATION; 7) PHY DOES NOT SUPPORT SATA; 8) INVALID EXPANDER CHANGE COUNT; 9) SMP FUNCTION FAILED; and 10) SMP FUNCTION ACCEPTED
PHY TEST FUNCTION (see 10.4.3.25)	1) INVALID REQUEST FRAME LENGTH; 2) PHY DOES NOT EXIST; 3) PHY VACANT; 4) SMP ZONE VIOLATION; 5) UNKNOWN PHY TEST FUNCTION; 6) PHY TEST FUNCTION IN PROGRESS; 7) INVALID EXPANDER CHANGE COUNT; 8) SMP FUNCTION FAILED; and 9) SMP FUNCTION ACCEPTED
CONFIGURE PHY EVENT INFORMATION (see 10.4.3.26)	1) INVALID REQUEST FRAME LENGTH; 2) <a href="#">INCOMPLETE DESCRIPTOR LIST</a> ; 3) PHY DOES NOT EXIST; 4) PHY VACANT; 5) SMP ZONE VIOLATION; 6) UNKNOWN PHY EVENT INFORMATION SOURCE; 7) INVALID EXPANDER CHANGE COUNT; 8) SMP FUNCTION FAILED; and 9) SMP FUNCTION ACCEPTED