

To: T10 Technical Committee  
From: Steve Johnson, LSI Logic (sjohnson@lsil.com)  
Date: 7 March, 2005  
Subject: 05-055r1 SAS-1.1 SMP Enclosure WWN and Connector information

### **Revision history**

Revision 0 (25 February 2005) First revision  
Revision 1(7 March 2005) Modifications from meeting voted for inclusion into 1.1

### **Related documents**

sas1r08 - Serial Attached SCSI 1.1 revision 7  
ses2r10 - SCSI Enclosure Services 2.0 revision 9

### **Overview**

SAS currently does not provide a method to consistently map BUS:ID based on the SAS physical topology without using SES. There are many solution that may not use an SES device (i.e SGPIO) but still must understand the physical location of a SCSI device in an enclosure or server. Many operating systems require the device drivers to present SCSI devices using BUS:TargetID:LUN mapping. Some of the operating systems require that the target maintain a consistent mapping across initiator resets and OS reboots. Locating some basic information in SMP responses provided the OS based initiator with a method to constantly map SCSI devices to BUS:ID without relying on SES. This improves discovery performance and provides a means independent of SES or when SES devices go off line.

### **Suggested changes**

Add new field to SMP REPORT GENERAL response:

- 1) Add the ENCLOSURE LOGICAL IDENTIFIER field. This field is used to associate an expander to an enclosure.

Add new fields to SMP DISCOVER response:

- 1) The CONNECTOR TYPE field indicates the type of connector and is defined in SES-2. A CONNECTOR TYPE field set to 00h indicates no connector information and that the CONNECTOR ELEMENT INDEX field and the CONNECTOR PHYSICAL LINK fields are invalid and shall be ignored.
- 2) The CONNECTOR ELEMENT INDEX indicates the element index of a Connector element to which the phy is attached and is defined in SES-2.
- 3) The CONNECTOR PHYSICAL LINK field indicates the physical link in the connector to which this phy is attached and is defined in SES-2.

### **10.4.3.3 REPORT GENERAL function**

Table 162 defines the response format.

**Table 1 — REPORT GENERAL response**

Byte/Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (00h)							
2	FUNCTION RESULT							
3	Reserved							
4	(MSB)	EXPANDER CHANGE COUNT						(LSB)
5								
6	(MSB)	EXPANDER ROUTE INDEXES						(LSB)
7								
8	Reserved							
9	NUMBER OF PHYS							
10	Reserved						CONFIGURING	CONFIGURABLE ROUTE TABLE
11	Reserved							
<a href="#">12</a>								
<a href="#">19</a>	<del>Reserved</del> <a href="#">ENCLOSURE LOGICAL IDENTIFIER</a>							
<a href="#">20</a>								
27	Reserved							
28	(MSB)	CRC						(LSB)
31								

[The ENCLOSURE LOGICAL IDENTIFIER field identifies the enclosure of which the expander device is a member of, if any, and is defined in SES-2. A value of zero indicates the field is undefined.](#)

#### 10.4.3.5 DISCOVER function

Table 2 defines the response format.

Table 2 — DISCOVER response

Byte/Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (10h)							
2	FUNCTION RESULT							
3	Reserved							
4	Ignored							
7	Ignored							
8	Reserved							
9	PHY IDENTIFIER							
10	Ignored							
11	Reserved							
12	Ignored	ATTACHED DEVICE TYPE			Ignored			
13	Reserved				NEGOTIATED PHYSICAL 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	SAS ADDRESS							
24	ATTACHED SAS ADDRESS							
31	ATTACHED SAS ADDRESS							
32	ATTACHED PHY IDENTIFIER							
33	Reserved							
39	Reserved							
40	PROGRAMMED MINIMUM PHYSICAL LINK RATE				HARDWARE MINIMUM PHYSICAL LINK RATE			
41	PROGRAMMED MAXIMUM PHYSICAL LINK RATE				HARDWARE MAXIMUM PHYSICAL LINK RATE			
42	PHY CHANGE COUNT							
43	VIRTUAL PHY	Reserved			PARTIAL PATHWAY TIMEOUT VALUE			
44	Reserved				ROUTING ATTRIBUTE			
<a href="#">45</a>	<a href="#">Reserved</a>	<a href="#">Reserved</a> <a href="#">CONNECTOR TYPE</a>						
<a href="#">46</a>	<a href="#">CONNECTOR ELEMENT INDEX</a>							
<a href="#">47</a>	<a href="#">CONNECTOR PHYSICAL LINK</a>							
<a href="#">48</a>	Reserved							
49	Reserved							
50	Vendor specific							
51	Vendor specific							

Table 2 — DISCOVER response

Byte\Bit	7	6	5	4	3	2	1	0
52	(MSB)							
55	CRC							
	(LSB)							

The CONNECTOR TYPE field indicates the type of connector the phy is associated with and is defined in SES-2. A CONNECTOR TYPE field set to 00h indicates no connector information and that the CONNECTOR ELEMENT INDEX field and the CONNECTOR PHYSICAL LINK fields are invalid and shall be ignored.

The CONNECTOR ELEMENT INDEX indicates the element index of the Connector element to which the phy is attached, if any, and is defined in SES-2.

The CONNECTOR PHYSICAL LINK field indicates the physical link in the connector, to which this phy is attached, if any, and is defined in SES-2.

NOTE 1 Proposal informative only, not to be included in spec: When the CONNECTOR TYPE is set to 20h the CONNECTOR ELEMENT INDEX is the "bay number" or "slot". All phys of a wide connector share the same CONNECTOR ELEMENT INDEX. See 04-374r1 SES-2 "Define a SAS Expander element" for more information about these fields