

To: T10 Technical Committee
 From: Steve Johnson, LSI (steve.johnson@lsi.com)
 Date: 19 March 2007
 Subject: 07-121r1 SAS-2 Add REASON field to DISCOVER and DISCOVER LIST

Revision history

Revision 0 (19 March2007) First revision
 Revision 1(19 March2007) Incorporated comments from March 12 SAS Protocol WG meeting.

Related documents

sas2r08 - Serial Attached SCSI - 2 (SAS-2) revision 8
 07-084r1 SAS-2 Add ATTACHED REASON field

Overview

A REASON field was added to the IDENTIFY address frame for a phy to indicate the reason it ran the link reset sequence.

An ATTACHED REASON field was included in the DISCOVER response (in byte 12, next to the ATTACHED DEVICE TYPE field) and is being proposed (see 07-084r0) to be added to the DISCOVER LIST function and port mode page. The corollary of this is needed to convey the reason for the link reset sequence initiated by an expander to an end device since this information can not be retrieved in any other manner.

Add REASON field to the following SMP responses to convey this information:

- a) DISCOVER response
- b) DISCOVER LIST function SHORT FORMAT descriptor

Suggested changes to SAS-2

10.4.3.7 DISCOVER function

Table 1 defines the response format.

Table 1 — DISCOVER response (part 1 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (10h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH (17h)							
4	(MSB)	EXPANDER CHANGE COUNT						(LSB)
5								
6	Reserved							
8								
9	PHY IDENTIFIER							
10	Reserved							
11								
12	Reserved	ATTACHED DEVICE TYPE			ATTACHED REASON			
13	Reserved			NEGOTIATED LOGICAL LINK RATE				

Table 1 — DISCOVER response (part 2 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
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							
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	ZONE ADDRESS RESOLVED	ZONE GROUP PERSISTENT	INSIDE ZPSDS	ZONING ENABLED
61	Reserved							
62								

Table 1 — DISCOVER response (part 3 of 3)

Byte\Bit	7	6	5	4	3	2	1	0
63	ZONE GROUP							
64	SELF-CONFIGURATION STATUS							
65	SELF-CONFIGURATION LEVELS COMPLETED							
66	Reserved							
67	Reserved							
68	SELF-CONFIGURATION SAS ADDRESS							
75	Reserved							
76	Reserved							
91	Reserved							
92	Reserved							
93	Reserved							
94	Reserved REASON				NEGOTIATED PHYSICAL LINK RATE			
95	Reserved							HARDWARE MUXING SUPPORTED
96	(MSB)	CRC						(LSB)
99								

The REASON field indicates the value of the REASON field transmitted in the IDENTIFY address frame (see 7.8.2) during the identification sequence. If a SATA phy is attached, the REASON field indicates the reason for the link reset sequence (see 7.8.2).

10.4.3.13.4 DISCOVER LIST response SHORT FORMAT descriptor

Table 2 defines the SHORT FORMAT descriptor.

Table 2 — SHORT FORMAT descriptor

Byte\Bit	7	6	5	4	3	2	1	0
0	PHY IDENTIFIER							
1	FUNCTION RESULT							
2	Restricted	ATTACHED DEVICE TYPE			Restricted for DISCOVER response byte 12			
3	Restricted for DISCOVER response byte 13				NEGOTIATED LOGICAL LINK RATE			
4	Restricted for DISCOVER response byte 14				ATTACHED SSP INITIATOR	ATTACHED STP INITIATOR	ATTACHED SMP INITIATOR	ATTACHED SATA HOST

Table 2 — SHORT FORMAT descriptor

Byte\Bit	7	6	5	4	3	2	1	0
5	ATTACHED SATA PORT SELECTOR	Restricted for DISCOVER response byte 15			ATTACHED SSP TARGET	ATTACHED STP TARGET	ATTACHED SMP TARGET	ATTACHED SATA DEVICE
6	VIRTUAL PHY	Reserved			ROUTING ATTRIBUTE			
7	Reserved REASON				Reserved			
8	ZONE GROUP							
9	Restricted for DISCOVER response byte 60	INSIDE ZPSDS PERSISTENT	REQUESTED INSIDE ZPSDS	ZONE ADDRESS RESOLVED	ZONE GROUP PERSISTENT	INSIDE ZPSDS	Reserved	
10	ATTACHED PHY IDENTIFIER							
11	PHY CHANGE COUNT							
12	ATTACHED SAS ADDRESS							
19								
20	Reserved							
23								

[The REASON field indicates the value of the REASON field transmitted in the IDENTIFY address frame \(see 7.8.2\) during the identification sequence. If a SATA phy is attached, the REASON field indicates the reason for the link reset sequence \(see 7.8.2\).](#)

10.2.7.2 Protocol-Specific Port mode page

10.2.7.2.3 Protocol-Specific Port mode page - Phy Control And Discover subpage

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The NUMBER OF PHYS field contains the number of phys in the SAS target device and indicates the number of SAS phy mode descriptors that follow. This field shall not be changeable with [the MODE SELECT command](#).

The SAS phy mode descriptor list contains a SAS phy mode descriptor for each phy in the SAS target device, not just the SAS target port, starting with the lowest numbered phy and ending with the highest numbered phy.

Table 3 defines the SAS phy mode descriptor.

Table 3 — SAS phy mode descriptor

Byte/Bit	7	6	5	4	3	2	1	0
0	Reserved							
1	PHY IDENTIFIER							
2	Reserved							
3	Reserved							
4	Reserved	ATTACHED DEVICE TYPE			Reserved			
5	Reserved REASON			NEGOTIATED LOGICAL LINK RATE				
6	Reserved				ATTACHED SSP INITIATOR PORT	ATTACHED STP INITIATOR PORT	ATTACHED SMP INITIATOR PORT	Reserved
7	Reserved				ATTACHED SSP TARGET PORT	ATTACHED STP TARGET PORT	ATTACHED SMP TARGET PORT	Reserved
8	SAS ADDRESS							
15	SAS ADDRESS							
16	ATTACHED SAS ADDRESS							
23	ATTACHED SAS ADDRESS							
24	ATTACHED PHY IDENTIFIER							
25	Reserved							
31	Reserved							
32	PROGRAMMED MINIMUM PHYSICAL LINK RATE				HARDWARE MINIMUM PHYSICAL LINK RATE			
33	PROGRAMMED MAXIMUM PHYSICAL LINK RATE				HARDWARE MAXIMUM PHYSICAL LINK RATE			
34	Reserved							
41	Reserved							
42	Vendor specific							
43	Vendor specific							
44	Reserved							
47	Reserved							

[Editor's Note 1: REASON field is defined here with this text being added to proposal 07-084r1. The](#)

[fields in the SAS phy log descriptor not defined in this subclause are defined in the SMP DISCOVER response \(see 10.4.3.7\). These fields shall not be changeable with the LOG SELECT command.](#)

10.2.8.1 Protocol-Specific Port log page

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The NUMBER OF PHYS field contains the number of phys in the SAS target port (not in the entire SAS target device) and indicates the number of SAS phy log descriptors that follow.

The SAS phy log descriptor list contains SAS phy log descriptors.

Table 4 defines the SAS phy log descriptor.

Table 4 — SAS phy log descriptor (part 1 of 2)

Byte/Bit	7	6	5	4	3	2	1	0
0	Reserved							
1	PHY IDENTIFIER							
2	Reserved							
3	SAS PHY LOG DESCRIPTOR LENGTH (m - 3)							
4	Reserved	ATTACHED DEVICE TYPE			Reserved			
5	Reserved REASON			NEGOTIATED LOGICAL LINK RATE				
6	Reserved				ATTACHED SSP INITIATOR PORT	ATTACHED STP INITIATOR PORT	ATTACHED SMP INITIATOR PORT	Reserved
7	Reserved				ATTACHED SSP TARGET PORT	ATTACHED STP TARGET PORT	ATTACHED SMP TARGET PORT	Reserved
8	SAS ADDRESS							
15	SAS ADDRESS							
16	ATTACHED SAS ADDRESS							
23	ATTACHED SAS ADDRESS							
24	ATTACHED PHY IDENTIFIER							
25	Reserved							
31	Reserved							
32	(MSB)	INVALID DWORD COUNT						(LSB)
35	INVALID DWORD COUNT							(LSB)

Table 4 — SAS phy log descriptor (part 2 of 2)

Byte\Bit	7	6	5	4	3	2	1	0
36	(MSB)	RUNNING DISPARITY ERROR COUNT						(LSB)
39								(LSB)
40	(MSB)	LOSS OF DWORD SYNCHRONIZATION						(LSB)
43								(LSB)
44	(MSB)	PHY RESET PROBLEM						(LSB)
47								(LSB)
48		Reserved						
50								
51		NUMBER OF PHY EVENT DESCRIPTORS						
Phy event descriptor list								
52		Phy event descriptor (first)(see table 254 in 10.4.3.11)						
63								
...		...						
m - 11		Phy event descriptor (last)(see table 254 in 10.4.3.11)						
m								

[Editor's Note 2: REASON field is defined here with this text being added to proposal 07-084r1. The fields in the SAS phy log descriptor not defined in this subclause are defined in the SMP DISCOVER response \(see 10.4.3.7\). These fields shall not be changeable with the LOG SELECT command.](#)
