

To: T10 Technical Committee
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 Subject: Serial Attached SCSI - 2 (SAS-2)

Revision history

Revision 0, 07-103r0 (17 April 2007) First revision.
 Revision 1, 07-103r1 (28 August 2007) Second Revision
 Revision 2, 07-103r2 (5 November 2007) Third Revision

Related documents

sas2r11 - Serial Attached SCSI 2 revision 11.

Overview

There currently exists two different SMP functions to retrieve broadcast counts. The REPORT BROADCAST function is intended to retrieve originated broadcast counts and the REPORT PHY BROADCAST COUNTS to retrieve received broadcast counts. This proposal suggests that retrieving all broadcast counters can be done efficiently with a single list based SMP function.

Suggested changes

1. Remove the REPORT PHY BROADCAST COUNTS function and make its function code reserved.
2. Extend the REPORT BROADCAST function to return all originated and received broadcast counters, for a given type specified in the function request, in a descriptor list format.

Table 180 — SMP functions (FUNCTION field) (part 1 of 3)

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	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 Broadcast counters	9.4.5.4
07h - 0Fh	Reserved for general SMP input functions		
10h	DISCOVER	Return information about the specified phy	10.4.3.9
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

Table 180 — SMP functions (FUNCTION field) (part 2 of 3)

Code	SMP function	Description	Reference
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
<u>15h</u> - 1Fh	Reserved for phy-based SMP input 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 SMP input functions		
30h - 3Fh	Reserved for SMP input functions		
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	
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

Table 180 — SMP functions (FUNCTION field) (part 3 of 3)

Code	SMP function	Description	Reference
94h - 9Fh	Reserved for phy-based SMP output functions		
A0h - BFh	Reserved for SMP output functions		
C0h - FFh	Vendor specific		

9.4.5.4 REPORT BROADCAST function

9.4.5.4.1 REPORT BROADCAST function overview

The REPORT BROADCAST function returns information about Broadcasts (see 4.1.13), [of the specified type, that were either originated from this expander device or SAS device, or received on a phy directly attached to an end device.](#)

This SMP function may implemented by any management device server.

9.4.5.4.2 REPORT BROADCAST request

Table 181 defines the request format.

Table 181 — REPORT BROADCAST request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (06h)							
2	Reserved				BROADCAST TYPE			
3	REQUEST LENGTH (00h)							
4	(MSB)							
7	CRC							
	(LSB)							

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

The FUNCTION field shall be set to 06h.

[The BROADCAST TYPE field, defined in the ZONED BROADCAST request \(see table 378 in 10.4.3.20\), specifies the type of Broadcast for which counts shall be returned in the response descriptor list.](#)

The REQUEST LENGTH field shall be set to 00h.

The CRC field is defined in 10.4.3.1.

9.4.5.4.3 REPORT BROADCAST response

Table 182 defines the response format.

Table 182 — REPORT BROADCAST response

Byte/Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (06h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH							
4	(MSB)	EXPANDER CHANGE COUNT						(LSB)
5								
6	Reserved				BROADCAST TYPE			
7	NUMBER OF BROADCAST DESCRIPTORS							
Broadcast descriptor list								
8	Broadcast descriptor (first)(see table 357 in 9.4.5.4.4)							
15								
...	...							
n - 11	Broadcast descriptor (last)(see table 357 in 9.4.5.4.4)							
n - 4								
n - 3	(MSB)	CRC						(LSB)
n								

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

The FUNCTION field shall be set to 06h.

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).

[The BROADCAST TYPE field, defined in the ZONED BROADCAST request \(see table 378 in 10.4.3.20\), indicates the type of Broadcast described by the broadcast descriptors.](#)

The NUMBER OF BROADCAST DESCRIPTORS field indicates how many broadcast descriptors follow.

NOTE 81 - The number of broadcast descriptors is limited to 126 by the SMP response frame size.

The broadcast descriptor list contains broadcast descriptors as defined in 9.4.5.4.4. [Broadcast descriptors shall be returned for all Broadcasts of the type specified in the BROADCAST TYPE field, for which the count is non-zero. Broadcast descriptors shall be returned with the descriptor, if any, pertaining to no particular phy \(i.e., PHY IDENTIFIER field set to FFh\) first, followed by descriptors, if any, in ascending order sorted by the PHY IDENTIFIER field.](#)

The CRC field is defined in 10.4.3.2.

9.4.5.4.4 REPORT BROADCAST response broadcast descriptor

Table 183 defines the broadcast descriptor.

Table 183 — Broadcast descriptor

Byte\Bit	7	6	5	4	3	2	1	0
0	PHY IDENTIFIER							
1	Reserved							
2	Reserved				BROADCAST REASON			
3	Reserved							
4	(MSB)	ORIGINATING BROADCAST COUNT						(LSB)
5								
6	Reserved							
15								

The PHY IDENTIFIER field indicates the phy that caused the Broadcast described by this broadcast descriptor to be originated [or on which it was received](#). A PHY IDENTIFIER field set to FFh indicates that no specific phy caused the Broadcast described by this broadcast descriptor.

The **ORIGINATING BROADCAST COUNT** field counts the number of Broadcasts that

- [a\) originated from a SAS device or expander device; or](#)
- [b\) received on a phy attached to an end device.](#)

If the SAS device or expander device has originated the Broadcast [or received the Broadcast on a phy attached to an end device](#) since transmitting a REPORT BROADCAST response, it shall increment this field at least once from the value in the previous REPORT BROADCAST response. It shall not increment this field when forwarding a Broadcast. This field shall wrap to at least 0001h after the maximum value (i.e., FFFFh) has been reached.

NOTE 82 - A management application client that uses the **ORIGINATING BROADCAST COUNT** field should read and save all the ORIGINATING BROADCAST COUNT field values after performing the discover process (see 4.7), and then read them after each receipt of each Broadcast to ensure that none of the counts increments a multiple of 65 535 times between reading them.

[For Broadcasts that are originated](#), the BROADCAST REASON field indicates the reason that the Broadcast described by this broadcast descriptor was originated and is defined in table 184. [For Broadcasts that are received, the BROADCAST REASON field shall be set to zero.](#)

Table 184 — BROADCAST REASON field

Code	BROADCAST TYPE field	Description
0h	0h (i.e., Broadcast (Change))	Unspecified ^{a&b}
0h	4h (i.e., Broadcast (Expander))	Unspecified
1h		A phy event information peak value detector has reached its threshold value.
2h		A phy event information peak value detector has been cleared by the SMP CONFIGURE PHY EVENT INFORMATION function (see 10.4.3.30)
3h		The expander device is going to temporarily have reduced functionality (e.g., disable SMP access, reduced performance, disable phy to phy communication) for a period of time (see 4.6.8)
0h	8h (i.e., Broadcast (Zone Activate))	Unspecified
All others		Reserved
^a In an expander device, the Broadcast (Change) count is also reported in the REPORT GENERAL response (see 10.4.3.3) and in other SMP response frames containing an EXPANDER CHANGE COUNT field. ^b Broadcast (Change) originated by this device shall be counted and the PHY IDENTIFIER field set to FFh.		