

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

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 |
| 15h - 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 and 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 | BROADCAST TYPE | | | | | | | | |
| 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 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 all descriptors pertaining to no particular phy \(i.e., PHY IDENTIFIER field set to FFh\) first, followed by descriptors 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 [were either originated from the SAS device or expander device or received on a phy attached to an end device](#). If the SAS device or expander device has originated the Broadcast [or received the Broadcast from 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. [A value of 0000h indicates that no counter is maintained for the specified BROADCAST TYPE.](#)

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.

The BROADCAST REASON field indicates the reason that the Broadcast described by this broadcast descriptor was originated and is defined in table 184.

Table 184 — BROADCAST REASON field

| Code | BROADCAST TYPE field | Description |
|---|---|---|
| 0h | 0h (i.e., Broadcast (Change)) | Unspecified ^a |
| 0h | 3h (i.e., Broadcast (SES)) | Unspecified |
| 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 | 5h (i.e., Broadcast (Asynchronous Event)) | Unspecified |
| 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. | | |