To:      T10 Technical Committee
From:   Tyson Hartshorn, Steve Johnson LSI Logic
Date:    7 March 2007
Subject: 07-039r0 SAS-2 Self-Configuration Status Updates

## Revision history

Revision 0, 07-039 (March 7, 2007) First revision.

## Related documents
sas2r08 - Serial Attached SCSI 2 revision 8.

## Overview

The REPORT SELF-CONFIGURATION STATUS function currently only supports a maximum of 256 descriptors. Changes are proposed to increase the index fields from 8 bits to 16 bits to support more than 256 descriptors and to provide an indicator in REPORT GENERAL and DISCOVER LIST for initiators to determine if new events have been added or not. This prevents querying via the REPORT SELF-CONFIGURATION STATUS request every time a change occurs on the topology.

## Suggested changes

Increase the following fields in REPORT SELF-CONFIGURATION STATUS from 8 bits to 16 bits:

1) The STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field of the request.
2) The STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field of the response.
3) The MAXIMUM SUPPORTED SELF-CONFIGURATION STATUS DESCRIPTORS field of the response.
4) The TOTAL NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS field of the response.
5) The NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS field of the response.

Add 16 bit fields to the REPORT GENERAL and DISCOVER LIST responses to indicate the index of the last self configuration status log written by the management device server.

Table 1 defines the response format.

**Table 1 — REPORT GENERAL response** (part 1 of 2)

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------|---|---|---|---|---|---|---|---|
| 0 | SMP FRAME TYPE (41h) | | | | | | | |
| 1 | FUNCTION (00h) | | | | | | | |
| 2 | FUNCTION RESULT | | | | | | | |
| 3 | RESPONSE LENGTH (0Ch) | | | | | | | |
| 4 | (MSB) | | | | EXPANDER CHANGE COUNT | | | |
| 5 | | | | | | | | (LSB) |
| 6 | (MSB) | | | | EXPANDER ROUTE INDEXES | | | |
| 7 | | | | | | | | (LSB) |
| 8 | Reserved | | | | | | | |
| 9 | NUMBER OF PHYS | | | | | | | |

**Table 1 — REPORT GENERAL response** (part 2 of 2)

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 10 | TABLE TO TABLE SUPPORTED | Reserved | | | ZONE ADDRESS RESOLVED SUPPORTED | CONFIGURES OTHERS | CONFIGURING | EXTERNALLY CONFIGURABLE ROUTE TABLE |
| 11 | Reserved | | | | | | | |
| 12 | ENCLOSURE LOGICAL IDENTIFIER | | | | | | | |
| 19 | | | | | | | | |
| 20 | Reserved | | | | | | | |
| 29 | | | | | | | | |
| 30 | (MSB) | STP BUS INACTIVITY TIME LIMIT | | | | | | |
| 31 | | | | | | | | (LSB) |
| 32 | (MSB) | STP MAXIMUM CONNECT TIME LIMIT | | | | | | |
| 33 | | | | | | | | (LSB) |
| 34 | (MSB) | STP SMP I_T NEXUS LOSS TIME | | | | | | |
| 35 | | | | | | | | (LSB) |
| 36 | Reserved | | | ZONE LOCKED | PHYSICAL PRESENCE SUPPORTED | PHYSICAL PRESENCE ASSERTED | ZONING SUPPORTED | ZONING ENABLED |
| 37 | Reserved | | | | | | | |
| 38 | (MSB) | MAXIMUM NUMBER OF ROUTED SAS ADDRESSES | | | | | | |
| 39 | | | | | | | | (LSB) |
| 40 | ACTIVE ZONE MANAGER SAS ADDRESS | | | | | | | |
| 47 | | | | | | | | |
| 48 | (MSB) | ZONE LOCK INACTIVITY TIME LIMIT | | | | | | |
| 49 | | | | | | | | (LSB) |
| 50 | (MSB) | LAST SELF-CONFIGURATION STATUS DESCRIPTOR INDEX | | | | | | |
| 51 | | | | | | | | (LSB) |
| 52 | (MSB) | CRC | | | | | | |
| 55 | | | | | | | | (LSB) |

The LAST SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field specifies the last self-configuration status descriptor index that the management device server wrote to its internal log.

### 0.0.0.1 REPORT SELF-CONFIGURATION STATUS function

#### 0.0.0.1.1 REPORT SELF-CONFIGURATION STATUS function overview

The REPORT SELF-CONFIGURATION STATUS function returns self-configuration expander device status. This SMP function shall be implemented by the management device server in self-configuring expander devices and shall not be implemented by any other management device servers.

#### 0.0.0.1.2 REPORT SELF-CONFIGURATION STATUS request

Table 2 defines the request format.

**Table 2 — REPORT SELF-CONFIGURATION STATUS request**

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------|---|---|---|---|---|---|---|---|
| 0 | SMP FRAME TYPE (40h) | | | | | | | |
| 1 | FUNCTION (03h) | | | | | | | |
| 2 | Reserved | | | | | | | |
| 3 | REQUEST LENGTH (01h) | | | | | | | |
| 4 | Reserved | | | | | | | |
| ~~6~~5 | | | | | | | | |
| 6 | (MSB) STARTING SELF-CONFIGURATION STATUS DESCRIPTOR | | | | | | | |
| 7 | | | | | | | | (LSB) |
| 8 | (MSB) CRC | | | | | | | |
| 11 | | | | | | | | (LSB) |

The STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field specifies the first self-configuration status descriptor that the management device server shall return in the SMP response frame. If the STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field specifies a descriptor which contains no status information, the management device server shall return a response with the NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS field set to zero.

**0.0.0.1.3 TREPORT SELF-CONFIGURATION STATUS response**

Table 3 defines the response format.

**Table 3 — REPORT SELF-CONFIGURATION STATUS response**

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | SMP FRAME TYPE (41h) | | | | | | | |
| 1 | FUNCTION (03h) | | | | | | | |
| 2 | FUNCTION RESULT | | | | | | | |
| 3 | RESPONSE LENGTH | | | | | | | |
| 4 | (MSB) | | | EXPANDER CHANGE COUNT | | | | |
| 5 | | | | | | | | (LSB) |
| 6 | | | | Reserved | | | | |
| 6 | (MSB) | | | STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX | | | | |
| 7 | | | | | | | | (LSB) |
| 8 | | | | Reserved | | | | |
| 129 | | | | | | | | |
| 10 | (MSB) | | | MAXIMUM SUPPORTED SELF-CONFIGURATION STATUS DESCRIPTORS | | | | |
| 11 | | | | | | | | (LSB) |
| 12 | (MSB) | | | TOTAL NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS | | | | |
| 13 | | | | | | | | (LSB) |
| 14 | (MSB) | | | NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS | | | | |
| 15 | | | | | | | | (LSB) |
| Self-configuration status descriptor list | | | | | | | | |
| 16 | Self-configuration status descriptor (first)(see table 183) | | | | | | | |
| 31 | | | | | | | | |
| | ... | | | | | | | |
| n - 20 | Self-configuration status descriptor (last)(see table 183) | | | | | | | |
| n - 4 | | | | | | | | |
| n - 3 | (MSB) | | | CRC | | | | |
| n | | | | | | | | (LSB) |

The EXPANDER CHANGE COUNT field is defined in the SMP REPORT GENERAL response (see 10.4.3.3). If the SMP initiator port detects a change in the value of this field while retrieving multiple response frames, it should start again because the status information returned is incomplete and inconsistent.

The STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field indicates the index of the first self-configuration status descriptor being returned, and is set to the same value as the STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field in the SMP request frame.

The MAXIMUM SUPPORTED SELF-CONFIGURATION STATUS DESCRIPTORS field indicates how many self-configuration status descriptors are supported by the management device server.

The TOTAL NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS field indicates how many self-configuration status descriptors are available at this time from the management device server.

The NUMBER OF SELF-CONFIGURATION STATUS DESCRIPTORS field indicates how many self-configuration status descriptors follow in this SMP response frame.

The management device server shall return all the self-configuration status descriptors that fit in one SMP response frame starting with the descriptor specified by the STARTING SELF-CONFIGURATION STATUS DESCRIPTOR INDEX field.

The CRC field is defined in 10.4.3.2.

### 0.0.0.2 DISCOVER LIST function

#### 0.0.0.2.1 DISCOVER LIST function overview

The DISCOVER LIST function returns information about the device (i.e., some fields from the REPORT GENERAL response (see 10.4.3.3)) and one or more phys (i.e., some fields from the DISCOVER response (see 10.4.3.7)). This SMP function shall be implemented by all management device servers. This function is intended to provide the necessary information in a single SMP response for a self-configuring expander device to perform the discover process and configure its own expander routing table.

#### 0.0.0.2.2 DISCOVER LIST response

Table 4 defines the response format.

**Table 4 — DISCOVER LIST response** (part 1 of 2)

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | SMP FRAME TYPE (41h) | | | | | | | |
| 1 | FUNCTION (16h) | | | | | | | |
| 2 | FUNCTION RESULT | | | | | | | |
| 3 | RESPONSE LENGTH ((n - 7) / 4) | | | | | | | |
| 4 | (MSB) | | | EXPANDER CHANGE COUNT | | | | |
| 5 | | | | | | | | (LSB) |
| 6 | Reserved | | | | | | | |
| 7 | | | | | | | | |
| 8 | STARTING PHY IDENTIFIER | | | | | | | |
| 9 | NUMBER OF DISCOVER LIST DESCRIPTORS | | | | | | | |
| 10 | Reserved | | | | PHY FILTER | | | |
| 11 | Reserved | | | | DESCRIPTOR TYPE | | | |
| 12 | DESCRIPTOR LENGTH | | | | | | | |
| 13 | Reserved | | | | | | | |
| 15 | | | | | | | | |

**Table 4 — DISCOVER LIST response** (part 2 of 2)

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| **16** | ZONING SUPPORTED | ZONING ENABLED | Reserved | | | | CONFIGURING | CONFIGURABLE ROUTE TABLE |
| **17** | Reserved | | | | | | | |
| **18** | (MSB) | LAST SELF-CONFIGURATION STATUS DESCRIPTOR INDEX | | | | | | |
| **19** | | | | | | | | (LSB) |
| ~~19~~20 | Reserved | | | | | | | |
| **31** | | | | | | | | |
| **32** | Vendor specific | | | | | | | |
| **47** | | | | | | | | |
| DISCOVER LIST descriptor list | | | | | | | | |
| **48** | DISCOVER LIST descriptor (first)(see table 259 in 0.0.0.2.1, and table 237 in 10.4.3.7 or table 261 in 10.4.3.13.4) | | | | | | | |
| | ... | | | | | | | |
| | DISCOVER LIST descriptor (last)(see table 259 in 0.0.0.2.1, and table 237 in 10.4.3.7 or table 261 in 10.4.3.13.4) | | | | | | | |
| **n - 4** | | | | | | | | |
| **n - 3** | (MSB) | CRC | | | | | | |
| **n** | | | | | | | | (LSB) |

The LAST SELF-CONFIGURATION STATUS DESCRIPTOR INDEX is defined in the SMP REPORT GENERAL response (see 10.4.3.3).