



To: T10 Technical Committee
 From: Kevin Marks
 Date: April 15, 2006
 Subject: T10/06-181r1 – SAS-2: Zone group values after a link reset sequence

Revision History

Revision 0 (4/11/06) – Initial proposal

Revision 1 (4/15/06) – Changes based on 4/13/06 Zoning Conference Call

- Reworded subclause 4.8.4 to make it apply to more conditions than just phy_ready to phy_ready and added phy is disabled and power on rows to table 26.
- Replaced “enters/exits” wording from table 26 to “transitions to/from.”
- Proposed an alternate section 4.8.4 that deals with completion of a link reset sequence rather than phy state machine states and table 26 only includes events that cause the zoning expander to change the zone group value to the default values.

Related Documents

SAS-2 revision 3 (<http://www.t10.org/ftp/t10/drafts/sas2/sas2r03.pdf>)

[New text to be added](#)

~~Text to be deleted~~

Editorial Text

Overview

This proposal was created to address what the phy zone information fields contain at power-on. Currently the text does not address this and a literal interpretation could mean that regardless if the phy zone information is load from an EEPROM at power-on the phy would end up in Zone group zero anyways.

The proposal also includes some minor editorial changes.

Suggested Changes to SAS-2r3:

4.8.1 Zoning overview

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<< 7th Paragraph >>

The following cases apply:

- a) if an OPEN address frame is received from a non-zoning expander device via a table routed phy for which the ZONE ADDRESS RESOLVED bit is set to one, then the source zone group is determined based on the [source](#) SAS address in the OPEN address frame. In this case, proper management of the zoning expander device extends the zoning capability to beyond the ZPSDS; or

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4.8.2 Zoning expander device requirements

In addition to the requirements for expander devices described in 4.6, a zoning expander device shall:

- a) contain a zoning expander route table (see 4.8.3.4);

- b) contain a zone permission table that supports 128 zone groups (see 4.8.3.3);
- c) allow or deny connection requests based on the [zoning](#) permission table;
- d) set the ZONE DEVICE bit to one in its SMP REPORT GENERAL response;
- e) be self-configuring;
- f) contain an SMP initiator port (see 4.6.1); and
- g) support all zoning-related SMP functions.

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4.8.3 Zone operation

4.8.3.1 Zone phy information

Each phy of a zoning expander device shall support the following zone phy information fields:

- a) ZONE PARTICIPATING bit;
- b) ZONE ADDRESS RESOLVED bit;
- c) ZONE GROUP PERSISTENT bit; and
- d) ZONE GROUP field.

The ZONE PARTICIPATING bit indicates a boundary of the ZPSDS. The ZONE PARTICIPATING bit shall be set to zero when the phy is attached to an end device or an expander device that does not support zoning. The ZONE PARTICIPATING bit shall be set to one when the phy is attached to a zoning expander device. If the ZONE PARTICIPATING bit is set to zero, then zoning information shall not be sent on the phy and any zoning information received on the phy shall be ignored.

The ZONE ADDRESS RESOLVED bit specifies the method used to determine the source zone group for a connection request received by a phy at the boundary of the ZPSDS as specified in table 24 (see 4.8.3.5).

The ZONE ADDRESS RESOLVED bit may be set to one when:

- a) the phy is contained within a zoning expander device; and
- b) the ZONE PARTICIPATING bit for the phy is set to zero.

The ZONE ADDRESS RESOLVED bit shall be set to zero when:

- a) the phy is contained within a non-zoning expander device; or
- b) the phy is contained within a zoning expander device and the ZONE PARTICIPATING bit for the phy is set to one.

The ZONE GROUP field has a value in the range 0 to 127 that indicates the zone group to which the phy belongs.

The ZONE GROUP PERSISTENT bit specifies the method of determining the zone group value of the phy after a link reset sequence (see 4.8.4). If the ZONE PARTICIPATING bit is set to one, the ZONE GROUP PERSISTENT bit shall be set to one.

All phys in an expander port shall have the same zone phy information (see 4.6.2). [The default \(e.g., power on\) values for the zone phy information fields are vendor specific.](#)

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4.8.4 Zone groups and link reset sequences

If the ZONE GROUP PERSISTENT bit is set to one, then [a link reset sequence](#) ~~the zone group~~ shall not [cause the zone group value to](#) change ~~across a link reset sequence~~. If the ZONE GROUP PERSISTENT bit

is set to zero, [then the zone group value after a link reset sequence is specified in table 26 based on the initial condition of the phy prior to the link reset sequence.](#), ~~and the initial conditions shown in table 26 are met, then the value of the zone group shall follow the rules in table 26.~~

Table 26 — Zone groups ~~and value after~~ link reset sequences with ZONE GROUP PERSISTENT bit set to zero

Initial condition	Event	New zone group
SAS device attached.	Phy exits transitions from the SP15:SAS_PHY_Ready state, and later re-enters transitions back to the SP15:SAS_PHY_Ready state, receiving an IDENTIFY address frame during the identification sequence with the same SAS address as prior to the exit-out-of transition from the SP15:SAS_PHY_Ready state.	The zoning expander device shall set the phy's ZONE GROUP field to the value that it contained prior to the phy exiting transitioning from the SP15:SAS_PHY_Ready state.
Phy is in the SP15:SAS_PHY_Ready state, with an initial zone group value assigned.	Phy exits transitions from the SP15:SAS_PHY_Ready state, and later: <ul style="list-style-type: none"> a) re-enters transitions back to the SP15:SAS_PHY_Ready state, receiving an IDENTIFY address frame during the identification sequence with a different SAS address than prior to the exit-out transition from of SP15:SAS_PHY_Ready state; or b) enters transitions to the P22:SATA_PHY_Ready state. 	The zoning expander device shall set the phy's ZONE GROUP field to the default value (e.g., zero) .
SATA device attached.	Phy exits transitions from the SP22:SATA_PHY_Ready state, and later re-enters transitions back to the SP22:SATA_PHY_Ready state before the Hot-Plug Timeout timer expires.	The zoning expander device shall set the phy's ZONE GROUP field to the value that it contained prior to the phy exiting transitioning from the SP22:SATA_PHY_Ready state.
Phy is in the SP22:SATA_PHY_Ready state, with an initial zone group value assigned.	Phy exits transitions from the SP22:SATA_PHY_Ready state, and later: <ul style="list-style-type: none"> a) re-enters transitions back to the SP22:SATA_PHY_Ready state after the Hot-Plug Timeout timer expires; b) enters transitions to the SP15:SAS_PHY_Ready state. 	The zoning expander device shall set the phy's ZONE GROUP field to the default value (e.g., zero) .
Phy is disabled.	Phy is reset with the SMP PHY CONTROL function LINK RESET or HARD RESET phy operation	The zoning expander device shall set the phy's ZONE GROUP field to the default value (e.g., zero).
Power on	Phy transitions to the SP22:SATA_PHY_Ready state or SP15:SAS_PHY_Ready state.	The zoning expander device shall set the phy's ZONE GROUP field to the default value (e.g., zero).

<<Or>>

4.8.4 Zone groups and link reset sequences

If the ZONE GROUP PERSISTENT bit is set to one, then of a link reset sequence shall not cause the zone group value to change. If the ZONE GROUP PERSISTENT bit is set to zero, then table 26 specifies events based the initial condition of the phy that shall cause the zoning expander device to change the ZONE GROUP field to the default value (e.g., zero).

Table 26 — Events that causing the ZONE GROUP field to change to the default value when the ZONE GROUP PERSISTENT bit set to zero

Initial condition	Event
Power on	A link reset sequence completes.
Phy is disabled.	Phy is reset with the SMP PHY CONTROL function LINK RESET or HARD RESET phy operation.
SAS device attached. Phy is enabled with a valid physical link rate.	A link reset sequence completes and: a) the SAS address received in the IDENTIFY address frame during the identification sequence is different from the SAS address prior to the completion of the link reset sequence; or b) a SATA device attached.
SATA device attached. Phy is enabled with a valid physical link rate.	A link reset sequence completes and: a) from the initial condition to the completion of the link reset sequence the Hot-Plug Timeout timer expired; b) the zoning expander device has detected the possibility that a new SATA device has been inserted. The method of detection is outside the scope of this standard (e.g., a change in the ELEMENT STATUS CODE field in the device or array device element in SES, a change in the attached SATA device WWN, etc); or c) a SAS device attached.