

To: T10 Technical Committee
 From: Luben Tuikov, Vitesse Semiconductor (ltuikov@vitesse.com), and Rob Elliott, HP (elliott@hp.com)
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 Subject: 06-199r1 SAS-2 No BROADCASTs before link reset sequence completes

Revision history

Revision 0 (12 April 2006) First revision
 Revision 1 (9 May 2006) Second revision: Changed the wording as per WG's comments.

Related documents

sas2r03 - Serial Attached SCSI - 2 (SAS-2) revision 3

Overview

BROADCAST should only be allowed after the link reset sequence (OOB sequence + speed negotiation sequence + identification sequence) completes, not after the phy reset sequence (OOB sequence + speed negotiation sequence) completes.

This is shown in figure 36 (Transmit data path and state machines in an expander phy), where the MUX lets through BROADCAST only after "Link reset sequence completes." It is also implied by the definition of ports, which are only created when the identification sequence is finished and the device knows the incoming and outgoing SAS addresses.

However, 7.2.5.4 (BROADCAST) says BROADCAST may be sent after a phy reset sequence, which is incorrect.

Suggested changes

7.2.5.4 BROADCAST

BROADCASTs are used to notify all SAS ports in a domain of an event.

The versions of BROADCAST representing different reasons are defined in table 1.

Table 1 — BROADCAST primitives

Primitive	Description
BROADCAST (CHANGE)	Notification of a configuration change.
BROADCAST (RESERVED CHANGE 0)	Reserved. Processed the same as BROADCAST (CHANGE) by SAS ports (i.e, SAS initiator ports and SAS target ports).
BROADCAST (RESERVED CHANGE 1)	Reserved. Processed the same as BROADCAST (CHANGE) by SAS ports (i.e., SAS initiator ports and SAS target ports).
BROADCAST (SES)	Notification of an asynchronous event from a logical unit with a peripheral device type set to 0Dh (i.e., enclosure services device) (see SPC-3 and SES-2) in the SAS domain.
BROADCAST (EXPANDER)	Notification of an expander event, including: a) a phy event information peak value detector reaching its threshold value; and b) a phy event information peak value detector being cleared. These expander events do not include SAS domain changes.
BROADCAST (RESERVED 2)	Reserved.
BROADCAST (RESERVED 3)	Reserved.
BROADCAST (RESERVED 4)	Reserved.

A phy that has not completed the link reset sequence shall not transmit a BROADCAST. A phy shall not transmit a BROADCAST inside a connection.

A BROADCAST received by a phy that has not completed the link reset sequence shall be ignored.

When an expander port receives a BROADCAST it shall transmit the same BROADCAST on at least one phy in all other expander ports. ~~BROADCAST shall only be sent outside of connections after the phy reset sequence has completed.~~

An expander device is not required to queue multiple identical BROADCASTs for the same expander port. If a second identical BROADCAST is requested before the first BROADCAST has been transmitted, the second BROADCAST may be ignored.

BROADCAST (CHANGE) is sent by an expander device to notify SAS initiator ports and other expander devices that a configuration change has occurred. BROADCAST (CHANGE) may also be transmitted by SAS initiator ports. BROADCAST (CHANGE) shall be ignored by SAS target ports.

BROADCAST (SES) is sent by a SAS target port to notify SAS initiator ports that an asynchronous event has occurred in an enclosure, and SSP initiator ports should poll all the logical units with peripheral device types set to 0Dh (i.e., enclosure services devices)(see SPC-3 and SES-2) in the SAS domain. BROADCAST (SES) shall be ignored by SAS target ports.

BROADCAST (EXPANDER) is sent by an expander device to notify SAS initiator ports that an expander event has occurred, including:

- a) one or more of its phy event information peak value detectors has reached its threshold value; and
- b) one or more of its phy event information peak value detectors has been cleared by an SMP CONFIGURE PHY EVENT INFORMATION function (see 10.4.3.15).

BROADCAST (RESERVED CHANGE 0) and BROADCAST (RESERVED CHANGE 1) shall be processed the same as BROADCAST (CHANGE) by SAS ports. BROADCAST (RESERVED 2), BROADCAST (RESERVED 3), and BROADCAST (RESERVED 4) shall be ignored by SAS ports.

See 7.11 for details on SAS domain changes. See 10.4.3.3 for details on counting BROADCAST (CHANGE) generation in an expander device. See 4.10 for details on phy event information.