

To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 18 June 2007
Subject: 07-285r0 SAS-2 STP bus inactivity time limit clarification

Revision history

Revision 0 (18 June 2007) First revision

Related documents

sas2r10 - Serial Attached SCSI - 2 (SAS-2) revision 10

Overview

The port layer measures the STP bus inactivity time as the time the phy is transmitting and receiving SATA_SYNC, but the definition of the STP BUS INACTIVITY TIME LIMIT field in the CONFIGURE GENERAL field specifies that time between frames be used. Particularly at the beginning of a connection, the SATA_SYNC definition is more general and should prevail.

Suggested changes

8.2.3.4.1 PL_PM3:Connected state description

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If:

- a) the protocol for the connection is SSP, the port is an SSP target port, and the BUS INACTIVITY TIME LIMIT field in the Disconnect-Reconnect mode page (see 10.2.7.2) is set to a non-zero value; or
- b) the protocol for the connection is STP, the port is an STP initiator port, and the STP BUS INACTIVITY TIME LIMIT field is not set to zero in the SMP REPORT GENERAL response for the destination STP target port,

then, upon entry into this state, this state shall:

- 1) create a Bus Inactivity Time Limit timer;
- 2) initialize the Bus Inactivity Time Limit timer as specified in table 149 (see 8.2.3.1); and
- 3) start the Bus Inactivity Time Limit timer.

If a Bus Inactivity Time Limit timer has been created and:

- a) the connection is SSP or SMP and this state receives a Tx Frame message; or
- b) the connection is STP and the phy is not both transmitting and receiving SATA_SYNC,

then this state shall:

- 1) stop the Bus Inactivity Time Limit timer, if it is running;
- 2) initialize the Bus Inactivity Time Limit timer as specified in table 149 (see 8.2.3.1); and
- 3) start the Bus Inactivity Time Limit timer.

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If a Bus Inactivity Time Limit timer expires:

- a) if the connection is SSP and there is no Tx Frame request outstanding (i.e., this state is not waiting for an ACK Received or NAK Received confirmation), then this state shall send a Close Connection request to the link layer;
- b) if the connection is SSP and there is a Tx Frame request outstanding (i.e., this state is waiting for an ACK Received or NAK Received confirmation), then this state shall send a Close Connection request to the link layer after receiving an ACK Received or NAK Received confirmation; and
- c) if the connection is STP, then this state shall send a Close Connection request to the link layer.

10.2.7.2 Disconnect-Reconnect mode page overview

10.2.7.2.1 Disconnect-Reconnect mode page overview

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10.2.7.2.2 BUS INACTIVITY TIME LIMIT field

The value in the BUS INACTIVITY TIME LIMIT field contains the maximum ~~period~~time in 100 μ s increments that an SSP target port is permitted to maintain a connection (see 4.1.12) without transferring a frame to the SSP initiator port. ~~This value shall be the number of 100 ms increments between frames that the SSP target port transmits during a connection.~~ When this ~~number~~time is exceeded, the SSP target port shall prepare to close the connection (i.e., by requesting to have the link layer transmit DONE). This value may be rounded as defined in SPC-4. A value of ~~zero~~0000h in this field ~~shall specify~~specifies that there is no bus inactivity time limit. The bus inactivity time limit is enforced by the port layer (see 8.2.3).

10.2.7.2.3 MAXIMUM CONNECT TIME LIMIT field

The value in the MAXIMUM CONNECT TIME LIMIT field contains the maximum duration of a connection in 100 μ s increments (see 4.1.12) (e.g., a value of ~~one~~0001h in this field means that the time is less than or equal to 100 μ s and a value of ~~two~~0002h in this field means that the time is less than or equal to 200 μ s). ~~This value shall be the number of 100 ms increments that an SSP target port transmits during a connection after which~~When this time is exceeded, the SSP target port shall prepare to close the connection. If an SSP target port is transferring a frame when the maximum connection time limit is exceeded, the SSP target port shall complete transfer of the frame before preparing to close the connection. This value may be rounded as defined in SPC-4. A value of ~~zero~~0000h in this field ~~shall specify~~specifies that there is no maximum connection time limit. The maximum connection time limit is enforced by the port layer (see 8.2.3).

10.4.3.3 REPORT GENERAL function

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The STP BUS INACTIVITY TIME LIMIT field indicates the bus inactivity time limit for STP connections, which is set by the CONFIGURE GENERAL function (see 10.4.3.16).

The STP MAXIMUM CONNECT TIME LIMIT field indicates the maximum connect time limit for STP connections, which is set by the CONFIGURE GENERAL function (see 10.4.3.16).

The STP SMP I_T NEXUS LOSS TIME field indicates the time that an STP target port and an SMP initiator port retry certain connection requests which is set by the CONFIGURE GENERAL function (see 10.4.3.16).

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10.4.3.16 CONFIGURE GENERAL function

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The STP BUS INACTIVITY TIME LIMIT field ~~contains~~specifies the maximum ~~period~~time in 100 μ s increments that an STP target port is permitted to maintain a connection (see 4.1.12) ~~without transferring a frame to the STP initiator port while transmitting and receiving SATA_SYNC.~~ ~~This value shall be the number of 100 ms increments between frames that the STP target port transmits during a connection.~~ When this ~~number~~time is exceeded, the STP target port shall close the connection. A value of ~~zero~~0000h in this field specifies that there is no bus inactivity time limit. This value is reported in the STP BUS INACTIVITY TIME LIMIT field in the SMP REPORT GENERAL response (see 10.4.3.3). The bus inactivity time limit is enforced by the port layer (see 8.2.3).

The STP MAXIMUM CONNECT TIME LIMIT field ~~contains~~specifies the maximum duration of a connection in 100 μ s increments (see 4.1.12) (e.g., a value of ~~one~~0001h in this field means that the time is less than or equal to 100 μ s and a value of ~~two~~0002h in this field means that the time is less than or equal to 200 μ s). ~~This value shall be the number of 100 ms increments that an STP target port transmits during a connection after which~~When this time is exceeded, the STP target port shall close the connection at the next opportunity. If ~~an~~the STP target port is transferring a frame when the maximum connection time limit is exceeded, the STP target port

- | shall complete transfer of the frame before closing the connection. A value of ~~zero~~0000h in this field specifies that there is no maximum connection time limit. This value is reported in the STP MAXIMUM CONNECT TIME LIMIT field in the SMP REPORT GENERAL response (see 10.4.3.3). The maximum connection time limit is enforced by the port layer (see 8.2.3).
- | The STP SMP I_T NEXUS LOSS TIME field ~~contains~~specifies the time that an STP target port or SMP initiator port shall retry connection requests that are rejected with responses indicating the destination port may no longer be present (see 8.2.2) before recognizing an I_T nexus loss (see 4.5). Table 1 defines the values of the STP SMP I_T NEXUS LOSS TIME field. This value is enforced by the port layer (see 8.2.2).

Table 1 — STP SMP I_T NEXUS LOSS TIME field

Code	Description
0000h	Vendor-specific amount of time.
0001h to FFFEh	Time in milliseconds.
FFFFh	The port shall never recognize an I_T nexus loss (i.e., it shall retry the connection requests forever).

NOTE 1 - The default value of the STP SMP I_T NEXUS LOSS TIME field should be non-zero. It is recommended that this value be 2 000 ms.

NOTE 2 - An STP initiator port should retry connection requests for the time indicated by the STP SMP I_T NEXUS LOSS TIME field in the SMP REPORT GENERAL response for the STP target port to which it is trying to establish a connection.