To: T10 Technical Committee
From: Steve Finch (steve.finch@st.com)
Date: July 10, 2006
Subject: 06-273r1SAS2: Bus Inactivity Timeout Timer Is Broken

Revision history
Revision 0 (5 June 2005) First revision
Revision 1 (10 July 2006) Revision 0 "over thought" the problem. Revision 1 based upon feedback is both simpler and provides the correct behavior.

Related documents
sas2r04 - Serial Attached SCSI - 2 (SAS-2) revision 4
05-305r9 - SAS-2 Maximum SMP connection time

Overview

When sas2r00 was created base upon sas1 and approved changes, I believe we accidentally broke the Bus Inactivity Timeout Timer.

In section 8.2.3.4.1 PL_PM3:Connected state description, it states:

"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 10.2.7.1) 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:

a) create a Bus Inactivity Time Limit timer;
b) initialize the Bus Inactivity Time Limit timer as specified in table 122 (see 8.2.3.1); and
c) 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:

a) stop the Bus Inactivity Time Limit timer, if it is running; and
b) initialize the Bus Inactivity Time Limit timer as specified in table 122 (see 8.2.3.1)."

My interpretation is the timer to be created when the connection is established.
When the transport requests a frame to be transmitted, the timer is stopped. There is no case that it is again started. Thus no timeout will occur. This is WRONG.

Proposed solution:

Add a third step to the actions to be taken after receiving a Tx Frame message so that the second "if" quoted above reads as follows:

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"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:

   a) stop the Bus Inactivity Time Limit timer, if it is running; and
   b) initialize the Bus Inactivity Time Limit timer as specified in
table 122 (see 8.2.3.1).
   c) start the Bus Inactivity Time Limit timer."
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