

To: T10 Technical Committee
From: Robert Sheffield (Robert.L.Sheffield@intel.com), Intel Corporation
Date: January 7, 2004
Subject: T10/04-030r0, SAS-1.1: Fix SP Hang States

Revision History

Revision 0 (January 7, 2004) first revision

Related Documents

SAS1.1-r02 – Serial Attached SCSI-1.1 revision 02

Overview

The SP state machine does not account very well for the possibility that attached target devices (SSP, STP, or SATA) may under certain conditions revert to the initial reset state transmitting COMINIT. There are several states in the SP state machine that do not monitor COMINIT Detected and will never advance to another state if the attached device reverts to transmitting COMINIT. SAS revision 5 does provide that when a phy receives COMINIT while in an SP state that is not monitoring COMINIT Detected, it should send a RESET request to the management application (which presumably would then issue a RESET causing the SP to revert to the SP0:OOB_COMINIT state). However this does not provide the level of concise control that should be provided at the phy-layer of SAS.

This proposal suggests adding state transitions in the SP state machine, triggered by COMINIT Detected, to each state that currently does not monitor COMINIT Detected and does not have a outbound transition defined based on an event initiated by the immediate phy (e.g. COMINIT Transmitted) to define the specific behavior of the SP state machine when the attached device reverts to transmitting COMINIT.

Suggested Changes

In subclause 6.7.1 SP state machine overview, modify the second set of bullets on page 121 as follows:

The SP state machine shall start in the SP0:OOB_COMINIT state after:

- a) a power on;
- b) a hard reset; or
- c) receiving a Management Reset request from the management layer (e.g., from the SMP PHY CONTROL function in an expander device). ~~Receipt of a COMINIT in any state that does not have an exit transition triggered by receipt of COMINIT should cause a Management Reset request.~~

Add a new subclauses in subclause 6.7.3.8 to explain the transition from SP6 to SP0:

6.7.3.8.3 Transition SP6:OOB_AwaitNoCOMSAS to SP0:OOB_COMINIT

This transition shall occur after receiving a COMINIT Detected message.

Modify subclause 6.7.3.9.1 as shown to capture COMINIT Detected as a trigger for that transition:

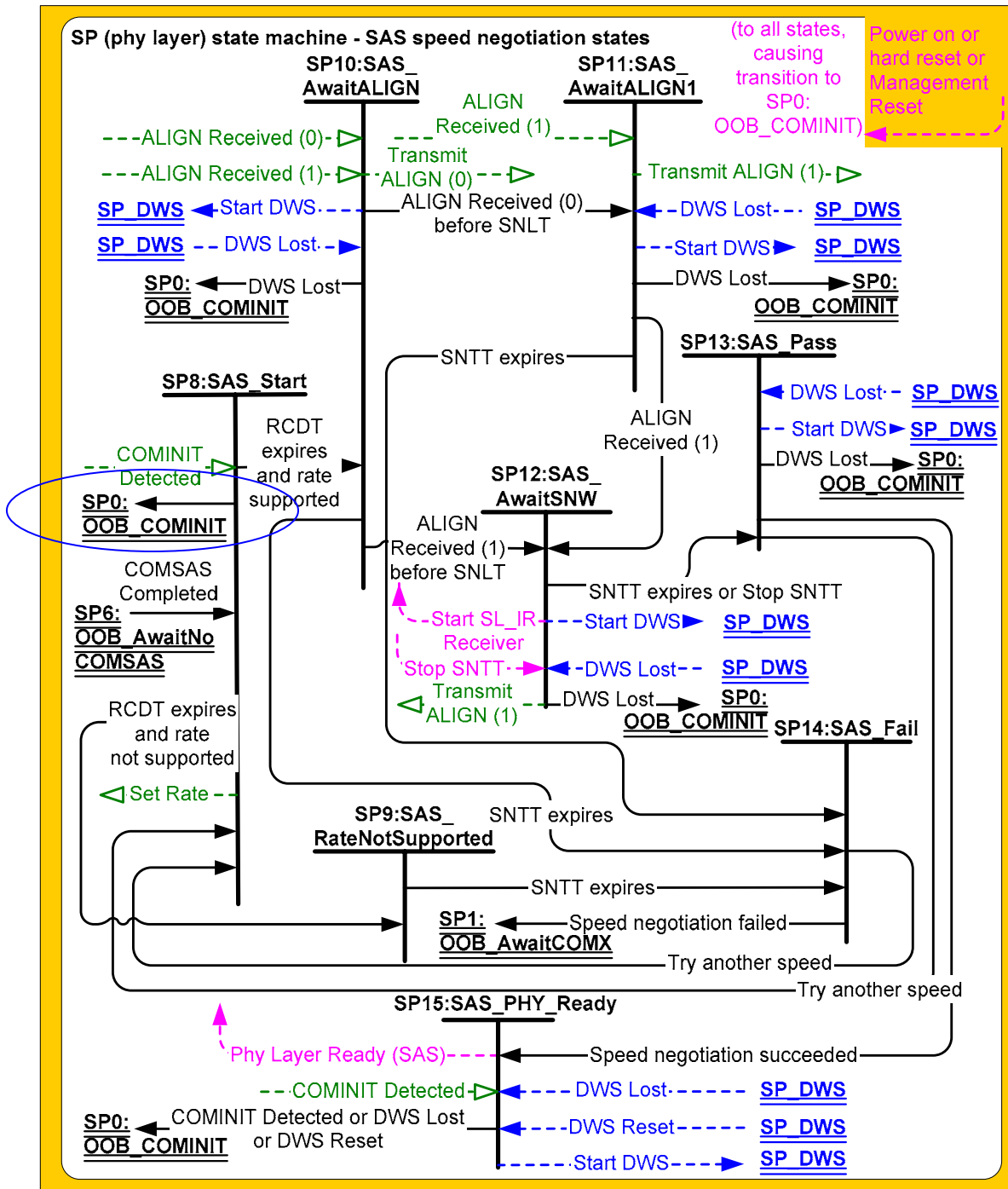
6.7.3.9.2 Transition SP7:OOB_AwaitCOMSAS to SP0:OOB_COMINIT

This state shall send a SATA Spinup Hold confirmation to the link layer and perform this transition if.

- a) this phy is in an expander device;
- b) this phy supports attachment to a SATA device;
- c) the COMSAS Detect Timeout timer expires;
- d) this expander device implements SATA spinup hold; and
- e) the SP0:OOB_COMINIT state was not originally entered because of an SMP Reset request (i.e., SMP PHY CONTROL-based requests to reset the phy bypass spinup hold).

| This state shall perform this transition after receiving a COMINIT Detected message.

Replace figure 69 – SP (phy layer) state machine – speed negotiation states with the following figure:



Add subclause 6.7.4.2.4 describing the new transition to SP0 as follows:

6.7.4.2.4 Transition SP8:SAS_Start to SP0:OOB_COMINIT

This state shall perform this transition after receiving a COMINIT Detected message.

Add subclause 6.7.5.3.3 describing the new transition to SP0 as follows:

6.7.5.3.3 Transition SP17:SATA_AwaitCOMWAKE to SP0:OOB_COMINIT

This state shall perform this transition after receiving a COMINIT Detected message.

Add subclause 6.7.5.4.3 describing the new transition to SP0 as follows:

6.7.5.4.3 Transition SP18:SATA_AwaitNoCOMWAKE to SP0:OOB_COMINIT

This state shall perform this transition after receiving a COMINIT Detected message.

Add subclause 6.7.5.9.4 describing the new transition to SP0 as follows:

6.7.5.9.4 Transition SP23:SATA_PM_Partial to SP0:OOB_COMINIT

This state shall perform this transition after receiving a COMINIT Detected message.

Add subclause 6.7.5.10.4 describing the new transition to SP0 as follows:

6.7.5.10.4 Transition SP23:SATA_PM_Slumber to SP0:OOB_COMINIT

This state shall perform this transition after receiving a COMINIT Detected message.