

**To: T10 SAS Protocol Working Group**  
**From: Brian Day, LSI Logic**  
**Subject: SAS 2: Changes to ATTACHED SATA DEVICE bit**

### **Revision History**

Revision 0 - Initial draft (August 30, 2006)

### **Related Documents**

sas2r05a - Serial Attached SCSI - 2 Draft revision 05a

### **Overview**

Annex G, section G.4 states:

While waiting for the initial Register Device-to-Host FIS, an STP/SATA bridge returns:

- a) In the SMP DISCOVER response (see 10.4.3.5):
  - A) the ATTACHED DEVICE TYPE field is set to 000b;
  - B) the NEGOTIATED PHYSICAL LINK RATE field is set to G1 (i.e., 8h) or G2 (i.e., 9h);
  - C) the ATTACHED SATA DEVICE bit is set to one; and
  - D) the ATTACHED SAS ADDRESS field is set to the SAS address of the STP target port of the STP/SATA bridge;

and
- b) OPEN\_REJECT (NO DESTINATION) for connection requests to the SAS address of the STP target port.

However, item "C" in the above list may not be true in all cases. The SAS specification only indicates the ATTACHED SATA DEVICE bit is updated when in the SP state machine is in spin-up hold state. If the OOB sequence did not transition through the spin-up hold state, then the ATTACHED SATA DEVICE bit may not necessarily get set to one.

This proposal modifies the behavior of the bit so that it is set to one whenever the SP state machine transitions to the SATA related states.

### **Proposed Changes**

#### **6.8.3.2 SP0:OOB\_COMINIT state**

##### **6.8.3.2.1 State description**

This state is the initial state for this state machine.

This state machine waits for receipt of a COMINIT Transmitted message and/or a COMINIT Detected message.

Upon entry into this state, this state shall:

- a) set the COMWAKE\_Received state machine variable to zero;
- b) send a Stop DWS message to the SP\_DWS state machine; ~~and~~
- c) send a Phy Layer Not Ready confirmation to the link layer; and
- d) set the ATTACHED SATA DEVICE bit to zero in the SMP DISCOVER response (see 10.4.3.5) and the SMP DISCOVER LIST response (see 10.4.3.12.3).

If this state was entered due to power on, the phy shall set the ATTACHED SATA PORT SELECTOR bit to zero in the SMP DISCOVER response (see 10.4.3.5) and the SMP DISCOVER LIST response (see 10.4.3.12.3).

If this state was not entered because of a Disable Phy request, this state shall send a Transmit COMINIT message to the SP transmitter upon entry into this state.

If this state was entered because of a Disable Phy request, this state shall ignore COMINIT Detected messages until this state is re-entered due to a power on, hard reset, or Management Reset request.

If the phy supports SATA port selectors and this state receives a COMWAKE Detected message, this state shall:

- a) set the COMWAKE\_Received state machine variable to one; and
- b) if the ATTACHED SATA PORT SELECTOR bit is set to zero in the SMP DISCOVER response (see 10.4.3.5) and the SMP DISCOVER LIST response (see 10.4.3.12.3):
  - A) set the ATTACHED SATA PORT SELECTOR bit to one in the SMP DISCOVER response and the SMP DISCOVER LIST response; and
  - B) send a SATA Port Selector Change confirmation to the link layer.

### 6.8.3.9 SP7:OOB\_AwaitCOMSAS state

#### 6.8.3.9.1 State description

Upon entry into this state the COMSAS Detect Timeout timer shall be initialized and started.

#### 6.8.3.9.2 Transition SP7:OOB\_AwaitCOMSAS to SP2:OOB\_NoCOMSASTimeout

This transition shall occur if the phy does not support SATA and the COMSAS Detect Timeout timer expires. The state machine shall set the MgmtReset state machine variable to zero before the transition.

#### 6.8.3.9.3 Transition SP7:OOB\_AwaitCOMSAS to SP6:OOB\_AwaitNoCOMSAS

This transition shall occur after receiving a COMSAS Detected message.

The state machine shall set the MgmtReset state machine variable to zero before the transition.

The state machine shall set the ATTACHED SATA PORT SELECTOR bit to zero in the SMP DISCOVER response (see 10.4.3.5) and the SMP DISCOVER LIST response (see 10.4.3.12.3). If the ATTACHED SATA PORT SELECTOR bit in the SMP DISCOVER response and the SMP DISCOVER LIST response was set to one prior to this transition, the state machine shall send a SATA Port Selector Change confirmation to the link layer before the transition.

#### 6.8.3.9.4 Transition SP7:OOB\_AwaitCOMSAS to SP16:SATA\_COMWAKE

This transition shall occur if:

- a) the phy supports SATA;
- b) the COMSAS Detect Timeout timer expires; and
  - A) the MgmtReset state machine variable is set to one; or
  - B) the phy does not implement SATA spinup hold.

The state machine shall set the MgmtReset state machine variable to zero before the transition.

[The state machine shall set the ATTACHED SATA DEVICE bit to one in the SMP DISCOVER response \(see 10.4.3.5\) and the SMP DISCOVER LIST response \(see 10.4.3.12.3\) before the transition.](#)

#### 6.8.3.9.5 Transition SP7:OOB\_AwaitCOMSAS to SP26:SATA\_SpinupHold

This transition shall occur if:

- a) the phy supports SATA;
- b) the COMSAS Detect Timeout timer expires;
- c) the phy implements SATA spinup hold; and
- d) the MgmtReset state machine variable is set to zero.

[The state machine shall set the ATTACHED SATA DEVICE bit to one in the SMP DISCOVER response \(see 10.4.3.5\) and the SMP DISCOVER LIST response \(see 10.4.3.12.3\) before the transition.](#)

## 6.8.6 SATA port selector state

### 6.8.6.1 State description

Figure 1 shows the SP25:SATA\_PortSel state. This state controls transmission of the SATA port selection signal when a specified phy processes a Transmit SATA Port Selection Signal request.

<figure not shown>

**Figure 1 — SP (phy layer) state machine – SATA port selector state**

Upon entry into this state, the phy shall:

- a) send a Transmit SATA Port Selection Signal message to the SP transmitter; ~~and~~
- b) set the ATTACHED SATA PORT SELECTOR bit to zero in the SMP DISCOVER response (see 10.4.3.5) and the SMP DISCOVER LIST response (see 10.4.3.12.3); and
- c) set the ATTACHED SATA DEVICE bit to zero in the SMP DISCOVER response (see 10.4.3.5) and the SMP DISCOVER LIST response (see 10.4.3.12.3)

**And the table in section 10.4.3.5:**

**Table 1 — ATTACHED SATA PORT SELECTOR and ATTACHED SATA DEVICE bits**

ATTACHED SATA PORT SELECTOR bit value <sup>a b</sup>	ATTACHED SATA DEVICE bit value <sup>c d</sup>	Description
0	0	Neither a SATA port selector nor a SATA device is attached and ready on the selected phy.
0	1	The attached phy is a SATA device phy. No SATA port selector is present (i.e., the SP state machine did not detect COMWAKE in response to the initial COMINIT, but sequenced through the normal (non-SATA port selector) SATA device OOB sequence).
1	0	The attached phy is a SATA port selector host phy, and either: a) the attached phy is the inactive host phy, or b) the attached phy is the active host phy and a SATA device is either not present or not ready behind the SATA port selector (i.e., the SP state machine detected COMWAKE while waiting for COMINIT).
1	1	The attached phy is a SATA port selector's active host phy and a SATA device is present behind the SATA port selector (i.e., the SP state machine detected COMWAKE while waiting for COMINIT, timed out waiting for COMSAS, and exchanged COMWAKE with an attached SATA device).

<sup>a</sup> The ATTACHED SATA PORT SELECTOR bit is invalid if the NEGOTIATED PHYSICAL LINK RATE field is set to UNKNOWN (i.e., 0h), DISABLED (i.e., 1h), or RESET\_IN\_PROGRESS (i.e., 5h).  
<sup>b</sup> Whenever the ATTACHED SATA PORT SELECTOR bit changes, the phy shall originate a Broadcast (Change)(see 7.11).  
<sup>c</sup> For the purposes of the ATTACHED SATA DEVICE bit, the SATA port selector is not considered a SATA device.  
<sup>d</sup> ~~The ATTACHED SATA DEVICE bit shall be updated at SATA spin-up hold time (see 6.8.7 and 6.10).~~