

**To: T10 SAS Protocol Working Group**

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**Subject: SAS 2: Changes to phy reset sequence 10ms rule**

### **Revision History**

Revision 0 - Initial draft (October 27, 2006)

Revision 1 - Update based on feedback from Nov. 2006 meeting (January 12, 2007)

- a) Changed text regarding the receiving phy response within 10ms to a NOTE
- b) At meeting, received feedback indicating initiators that don't support hot plug could bombard phy resets faster than 10ms. However, in reviewing further, a device that does not support the hot plug would only re-issue a phy reset sequence based on power-on, hard reset, or a new management application layer request. It is the intention of this proposal to remove the 10ms rule for these events.

### **Related Documents**

sas2r06 - Serial Attached SCSI - 2 Draft revision 05a

### **Overview**

There is currently a requirement in section 6.7.1 that says:

“Phys shall not originate a phy reset sequence until 10 ms have elapsed since the previous attempt at running a phy reset sequence (e.g., if a reply to COMINIT is not detected in an OOB sequence, or after a speed negotiation sequence fails).”

However, most of the reasons for originating a phy reset sequence (as listed in section 6.7.1 shown below) would not make sense to enforce this rule. This is particularly true for an expander phy handling a management application layer request. With some advice from Rob Elliott (HP), I believe that the original intent of this rule was to limit how quickly devices would re-originate the phy reset sequence after hot plug events, as somewhat indicated by the parenthetical examples.

This proposal removes the global 10ms rule, and applies it only to the hot plug timeout condition. It also adds a requirement for a phy to respond to a COMINIT within 10ms, if it plans to respond to that COMINIT.

### **Proposed Changes**

## **6.7 Phy reset sequences**

### **6.7.1 Phy reset sequences overview**

The phy reset sequence consists of:

- 1) an OOB sequence; and
- 2) a speed negotiation sequence.

The phy reset sequence shall only affect the phy, not the port or device containing the phy or other phys in the same port or device.

A phy shall originate a phy reset sequence after:

- a) power on;
- b) hard reset (i.e., receiving a HARD\_RESET primitive sequence before an IDENTIFY address frame) (see 4.4.2);
- c) management application layer request (see 6.8.1);

- d) losing dword synchronization and not attempting to re-acquire dword synchronization (see 6.8.4.9 and 6.8.5.8);
- e) Receive Identify Timeout timer expires (see 7.9.4); and
- f) for expander phys, after a hot-plug timeout (see 6.7.5).

A SAS phy may originate a phy reset sequence after a hot-plug timeout (see 6.7.5).

After receiving a HARD\_RESET primitive sequence before an IDENTIFY address frame, a phy should start the phy reset sequence within 250 ms.

~~Phys shall not originate a phy reset sequence until 10 ms have elapsed since the previous attempt at running a phy reset sequence (e.g., if a reply to COMINIT is not detected in an OOB sequence, or after a speed negotiation sequence fails).~~

Table 1 defines phy reset sequence timing parameters used by the SP state machine (see 6.8).

**Table 1 — Phy reset sequence timing specifications**

Parameter	Minimum	Maximum Time	Comments
Hot-plug timeout	10 ms	500 ms	The <del>maximum</del> time after which an expander phy shall retry an unsuccessful phy reset sequence, and after which a SAS initiator phy should retry an unsuccessful phy reset sequence (see 6.7.5).

#### 6.7.4.1 SAS OOB sequence

To initiate a SAS OOB sequence a phy shall transmit a COMINIT.

On receipt of a COMINIT, a phy shall either:

- a) if the receiving phy has not yet transmitted a COMINIT, transmit a COMINIT followed by a COMSAS;  
or
- b) if the receiving phy has transmitted a COMINIT, transmit a COMSAS.

**NOTE 1** - If the receiving phy does not respond within 10ms, the other device may retransmit a COMINIT.

On receipt of a COMSAS, if the receiving phy has not yet transmitted a COMSAS, the phy shall transmit a COMSAS.

After completing the transmission of a COMSAS and the successful receipt a COMSAS the SAS OOB sequence is complete and the SAS speed negotiation sequence begins.

A phy shall distinguish between COMINIT and COMSAS and continue with a SAS speed negotiation sequence (see 6.7.4.2) after completing the SAS OOB sequence.