

## SAS-1.1 Transient during OOB

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To: T10 Technical Committee  
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Subject: SAS-1.1 Transient during OOB

Due to the mode transition (i.e., output voltage change) that may occur during the OOB sequence after COMSAS has been exchanged, this proposal adds wording to Section 5.3.7.5 and references it in Section 6.7.4.1 (based on SAS 1.1 rev 8) in an effort to aid the designer of SAS hardware.

Proposed additional text is highlighted in red.

### 5.3.7.5 Transmitter device signal output levels for OOB signals

Transmitter devices supporting being attached to SATA devices shall use SATA 1.0 signal levels (see ATA/ATAPI-7 V3) during the first OOB sequence after a power on or hard reset if the 1,5 Gbps transfer rate is supported. As soon as COMSAS has been exchanged, the transmitter device shall increase its transmit levels to the SAS voltage levels specified in table 32 (see 5.3.7) and table 33 (see 5.3.7.3). If a COMINIT is not received within a hot-plug timeout at SATA 1.0 signal levels, the transmitter device shall increase its transmit levels to the SAS voltage levels and perform the OOB sequence again. If no COMINIT is received within a hot-plug timeout of the second OOB sequence the transmitter device shall initiate another OOB sequence using SATA 1.0 signal levels. The transmitter device shall continue alternating between sending COMINIT at SATA 1.0 signal levels and SAS signal levels until a COMINIT is received.

Depending on the signal level at the beginning of the OOB sequence, a transmitter device that supports being attached to SATA devices may increase its transmit level to the SAS voltage levels as soon as COMSAS has been exchanged. This mode transition (i.e., output voltage change) may result in a transient during the idle time between COMSAS the SAS speed negotiation sequence.

If the OOB sequence is completed at the SAS voltage level and a SATA device is detected rather than a SAS target device, the transmitter device shall switch to SATA 1.0 voltage levels and repeat the OOB sequence.

Transmitter devices that do not support being attached to SATA devices shall transmit OOB signals using SAS signal levels.

### 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.

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 after completing the SAS OOB sequence.

[See 5.3.7.5 concerning possible transients during the OOB sequence.](#)