

To: T10 Technical Committee

From: Bill Bissonette (Bill.Bissonette@intel.com)

Date: January 4, 2005

Subject: 05-019r0 SAS-1.1 SAS-SATA OOB Algorithm Proposal

Revision history

Revision 0 (January 4, 2005) First revision

Related documents

SAS1r07 - Serial Attached SCSI 1.1 revision 7

SATA 1.0a

SATA II Electrical specification 1.0

Overview

This proposal also addresses the prevention of OOB amplitudes that exceed maximum SATA input voltage allowance for phys that support attachment of SATA devices. **Question:** Should we worry about that fact that someone, in general, can always plug a SATA device into a SAS system – regardless if the system supports it or not? In other words, should we limit OOB amplitudes to 600 mV for all SAS phys?

Proposed change

1. Create a new row in the 'IT' section of table 30 for maximum OOB amplitude for phys that support SATA attachment that reads that reads:

Compliance point	Signal characteristic	Units	1,5 Gbps	3,0 Gbps
IT	Maximum OOB ALIGN burst amplitude, if attaching a SATA device is supported	mV(P-P)	600	600

2. Modify text in subclause 5.3.4 of SAS1.1r7 as follows:

Current text:

Expander phys 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 expander phy shall increase its transmit levels to the SAS voltage levels specified in table 30. If a COMINIT is not received within a hot-plug timeout at SATA 1.0 signal levels, the expander phy 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 expander phy shall initiate another OOB sequence using SATA 1.0 signal levels. The expander phy shall continue alternating between sending COMINIT at SATA 1.0 signal levels and SAS signal levels until a COMINIT is received.

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

NOTE 11 - SAS initiator phys supporting being attached to SATA devices may use the same algorithm as expander phys.

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Notes for this item: That proposal will require that SAS phys that support SATA shall not transmit OOB bursts of amplitudes higher than the maximum SATA Gen1i receiver tolerance. The current text requires toggling between SAS and SATA amplitudes which, in a hot plug environment, could cause damage to a SATA device if it is plugged in at an unfortunate time.

In simulations and measurements discussed to date regarding SATA support in SAS systems, it is indicated that 600mV OOB signaling (particularly if using 3Gb/s edge rates) will be able to meet the minimum OOB amplitude required in Table 30 after passing through a worst-case (TCTF) interconnect.