

1) The meeting opened at 8:35 am and participants introduced themselves.

2) Attendance:

Mr. Tim Symons	P	Adaptec, Inc.
Mr. Paul von Stamwitz	AV	AMCC
Mr. Steven Wong	V	Comax Technology Inc
Mr. Doug Cole	A	Dallas Semiconductor
Mr. Kevin Marks	P	Dell, Inc.
Mr. Douglas Wagner	P	FCI
Mr. Elwood Parsons	P	Foxconn Electronics
Mr. Mike Fitzpatrick	P	Fujitsu
Mr. Rob Elliott	P	Hewlett Packard Co.
Dr. William Ham	A	Hewlett Packard Co.
Mr. Barry Olawsky	V	Hewlett Packard Co.
Mr. Dan Colegrove	P	Hitachi Global Storage Tech.
Mr. George O. Penokie	P	IBM / Tivoli Systems
Mr. Schelto van Doorn	V	Intel Corp
Mr. Bill Bissonette	A	Intel Corp.
Mr. Tim Hogleund	V	LSI Logic Corp.
Mr. Mark Evans	P	Maxtor Corp.
Mr. Michael Rost	V	Molex
Mr. Jay Neer	P	Molex Inc.
Mr. Bill Lye	A	PMC-Sierra
Mr. Ting Li Chan	V	QLogic Corp.
Mr. Henry Kuo	V	QLogic Corp.
Mr. John A. Fobel	AV	Rancho Technology, Inc.
Mr. Alvin Cox	V	Seagate Technology
Mr. William Martin	P	Sierra Logic, Inc.
Mr. Vit Novak	P	Sun Microsystems, Inc.
Mr. Robert Kando	A	Texas Instruments
Ms. Ashlie Fan	P	TycoElectronics
Mr. Dan Gorenc	A	TycoElectronics
Mr. Ron Mathews	AV	UNISYS Corporation
Mr. Don Schulte	V	Vitesse
Mr. Jeff Williams	AV	Xiotech Corp.

32 People Present

3) Agenda:

3.1) 04-222r3 SAS-2 More phy test patterns [Elliott]  
<http://www.t10.org/ftp/t10/document.04/04-222r3.pdf>

Discussion of proposal lead to additional edits by Rob.

Added that patterns are sent without scrambling.

Still a SAS 2 item.

Working group suggested again removing illegal k character combinations.

Define specific test patterns and why.

Data words only might be acceptable.

**Not recommended for inclusion in SAS: 2 Yes, 6 No, 8 Abstain**

3.2) 05-084r1 SAS 1-1 Compact Connectors (Internal and External) [Neer]

<http://www.t10.org/ftp/t10/document.05/05-084r1.pdf>

SAS keying needs to be defined in the proposal:

- End device has center blocking key

- Table routing has key on left

- Subtractive routing has key on right

- Cable has center and right slot on one end, center and left slot on other end.

Reorder sidebands to match the SFF-8484 internal multilane version.

Map pin numbering convention to physically match PCI Express and include it in the SFF document for both internal and external versions.

Change internal configuration to a single cable version as done with the SFF-8484 version and make the appearance of the connection illustration similar to the existing internal multilane figure.

Fix connector designations to match those on the figures.

**Recommended for inclusion in SAS 1.1 with editing: 15 Yes, 2 No, 6 Abstain**

3.3) 05-100r0 SAS-1.1 Compact cable sideband usage

<http://www.t10.org/ftp/t10/document.05/05-100r0.pdf>

Rob Elliott posted an item concerning the use of OOB pins.

This proposal adds a sideband function to the external cable to indicate loss characteristics.

It also adds a similar provision for identifying backplane loss characteristics. An indication of cable loss was removed from the internal version as it was not deemed beneficial with the low loss requirements on internal cables. Since the external compact cable is already in design without sidebands, it may be possible to add an option to indicate cable loss by attaching an appropriate resistor to one of the existing ground pins.

**The proposal was not voted on due to its late posting.**

3.4) 05-098r0 SAS-1.1 External cable intra-pair skew [Elliott]

<http://www.t10.org/ftp/t10/document.05/05-098r0.pdf>

The current specification requirement is 20 pS. Test data shows that this value is possible to achieve (but difficult). The discussion questioned whether the specification was necessary. This is a good topic for letter ballot comments.

**The proposal was not voted on due to its late posting.**

3.5) 05-075r0 OOB Signal Transmitter Requirements [Wanamaker]

<http://www.t10.org/ftp/t10/document.05/05-075r0.pdf>

Discussed aspects of the measurement and questioned if the originator was testing the parameter correctly. It was not felt by those present that the SAS specification needed to change.

**Not recommended for inclusion in SAS 1.1: 0 Yes, 5 No, 6 Abstain**

3.6) 05-083r1 SAS-1.1 PHY transmitter and receiver electrical table updates [Cox]

<http://www.t10.org/ftp/t10/document.05/05-083r1.pdf>

Drop system noise requirement as it is already included in the eye diagram and not normative.

**Unanimously recommended for inclusion in SAS 1.1 as edited**

3.7) 05-019r1 SAS 1.1 OOB For SAS/SATA Support [Bissonette]

<http://www.t10.org/ftp/t10/document.05/05-019r1.pdf>

White paper posted.

<http://www.t10.org/ftp/t10/document.05/05-077r1.pdf>

Updated on progress within the SATA – IO Phy group. OOB toggling can probably be considered in the SATA specification as a transient since clarification of SAS behavior has been presented. This would eliminate the need of the change proposed by 05-019.

3.8) 04-378r2 SAS-1.1 Clarification of SATA Signaling Level Specification (Olawsky)

<http://www.t10.org/ftp/t10/document.04/04-378r2.pdf>

Current revision approved during conference calls.

**Unanimously recommended for inclusion in SAS 1.1**

3.9) 05-079r2 SAS-1.1 Minimum XR/IR Receiver Signal Level for 3Gb SATA Mode [Olawsky]

<http://www.t10.org/ftp/t10/document.05/05-079r2.pdf>

Replaces the TBD in table 35 for receivers attached to 3Gbps SATA devices with 3 options, depending on the configuration. Edits include:

- Changing the word drive to device in option 3 to be consistent with the usage model documented in the SATA specification.
- Changing the 125 mV to 175 mV in option 2.
- Listing option 3 as option 2 and option 2 as option 3.
- Including the equation for the proposed graph illustrating the TCTF-low loss function.

**Unanimously recommended for inclusion in SAS 1.1 as edited**

3.10) 05-069r0 SAS-1.1 Transient during OOB [Cox]

<http://www.t10.org/ftp/t10/document.05/05-069r0.pdf>

**Unanimously recommended for inclusion in SAS 1.1**

3.11) 05-059r0 05-023r0 SAS-1.1 Connector figures [Allan]

<http://www.t10.org/ftp/t10/document.05/05-059r0.pdf>

Item 1 corrected by 05-023r1.

Item 2 resolved by adding a statement in section 5.2 rather than adding fixed and free throughout the document. Fixed and free are equivalent to receptacle and plug, respectively. SFF documents for SAS connectors shall include fixed and free in parenthesis after plug and receptacle as done in SFF-8470.

**Unanimously recommended for inclusion in SAS 1.1 as edited**

3.12) Xilinx cable testing.

Xilinx provided test data showing performance of external cables at 6Gbps.

3.13) 05-062r0 SAS 1.1 Signal Performance Measurements Annex [Penokie]

<http://www.t10.org/ftp/t10/document.05/05-062r1.pdf>

4) Recommendations to Plenary:

<b>Recommended for inclusion in SAS 1.1</b>		
04-378r2	SAS-1.1 Clarification of SATA Signaling Level Specification	Unanimous
05-059r0	05-023r0 SAS-1.1 Connector figures	Unanimous, as edited
05-062r1	SAS 1.1 Signal Performance Measurements Annex	Unanimous, as edited
05-069r0	SAS-1.1 Transient during OOB	Unanimous
05-079r2	SAS-1.1 Minimum XR/IR Receiver Signal Level for 3Gb SATA Mode	Unanimous, as edited
05-083r1	SAS-1.1 PHY transmitter and receiver electrical table updates	Unanimous, as edited
05-084r1	SAS 1-1 Compact Connectors (Internal and External)	15 Yes, 2 No, 6 Abstain, as edited
<b>Not recommended for inclusion in SAS 1.1</b>		
04-222r3	SAS-2 More phy test patterns	2 Yes, 6 No, 8 Abstain
05-075r0	OOB Signal Transmitter Requirements	0 Yes, 5 No, 6 Abstain
<b>Not voted on due to late posting, but discussed</b>		
05-098r0	SAS-1.1 External cable intra-pair skew	
05-100r0	SAS-1.1 Compact cable sideband usage	

5) Schedule:

Full day meeting at next T10 week.

Conference calls as required to address letter ballot comments.

6) Adjournment: Meeting was adjourned at 7:05 pm.