

Accredited Standards Committee\*  
**InterNational Committee for Information Technology Standards (INCITS)**

**Doc. No.:** T10/08-427r0

**Date:** November 4, 2008

**Reply to:** John Lohmeyer

To: T10 Membership  
From: Ralph Weber and John Lohmeyer  
Subject: SAS Protocol WG -- November 3, 2008  
Santa Ana, CA

## Agenda

1. Opening Remarks
2. Approval of Agenda
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  - 4.2 SAS-2 Far-end retimed loopback phy test function (07-119) [Elliott]
  - 4.3 SAS: Add low power transceiver options (08-015) [Houlder]
  - 4.4 Questions about SAS Interface Power Management proposal, 08-015 (08-370) [Houlder]
  - 4.5 SAS-2 SPC-4 Differentiate between ACK NAK timeout reasons (08-064) [Elliott]
  - 4.6 SAS-2.1 / SPL, Low power transceiver options, phy states (08-206) [Evans]
  - 4.7 SPL Link Layer Power Management (08-249) [Day]
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  - 5.3 SAS 2 - TRAIN\_DONE race condition fix (08-425) [Day]
  - 5.4 SAS 2 - Port selector discovery wording change (08-426) [Day]
  - 5.5 SAS-2.1 / SPL Overview of an optical OOB method (08-438) [Day]
  - 5.6 SAS-2.1 / SPL An optical OOB method (08-439) [Day]
  - 5.7 SAS2: late letter ballot comment on resetting of AWT (08-440) [Martin]
  - 5.8 CMOS Photonics based optical PMD for SAS 2.1 (08-444) [Palkert]
6. Review of Recommendations
7. Meeting Schedule
8. Adjournment

## Results of Meeting

### 1. Opening Remarks

John Lohmeyer called the meeting to order at 9:00 a.m. Monday, November 3, 2008. He thanked Curtis Stevens of Western Digital for hosting the meeting. As usual, the people present introduced themselves.

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## 2. Approval of Agenda

The draft agenda was approved with no additions or changes.

The following additions and changes were made during the course of the meeting:

- 5.8 CMOS Photonics based optical PMD for SAS 2.1 (08-444) [Palkert]

## 3. Attendance and Membership

Attendance at working group meetings does not count toward minimum attendance requirements for T10 membership. Working group meetings are open to any person or organization directly and materially affected by T10's scope of work. The following people attended the meeting:

Name	S	Organization
Mr. Paul von Stamwitz	P	AMCC
Mr. Kevin Marks	P	Dell, Inc.
Mr. William Martin	P	Emulex
Mr. Ralph O. Weber	P	ENDL Texas
Mr. Geoffrey Hibbert	A	Finisar Corp.
Mr. Mike Fitzpatrick	P	Fujitsu
Mr. Nathan Hastad	AV	General Dynamics
Mr. Rob Elliott	P	Hewlett Packard Co.
Mr. Dan Colegrove	P	Hitachi Global Storage Tech.
Dr. Mark Seidel	P	Intel Corp.
Mr. Pak Seto	V	Intel Corp.
Mr. John Geldman	P	Lexar Media, Inc.
Mr. Brad Besmer	A	LSI Corp.
Mr. Brian Day	A	LSI Corp.
Mr. John Lohmeyer	P	LSI Corp.
Mr. George Penokie	A	LSI Corp.
Mr. Tom Palkert	V	Luxtera
Mr. Gregory Tabor	P	Maxim Integrated Products
Mr. Jay Neer	P	Molex Inc.
Mr. Tim Symons	P	PMC-Sierra
Mr. Alvin Cox	A	Seagate Technology
Mr. Martin Czekalski	V	Seagate Technology
Mr. Gerald Houlder	P	Seagate Technology
Mr. Mark Evans	P	Western Digital
Mr. Michael Rogers	A	Western Digital
Mr. Curtis Stevens	A	Western Digital

26 People Present

Status Key: P - Principal  
 A - Alternate  
 AV - Advisory Member  
 E - Emeritus  
 L - Liaison  
 V - Visitor

## **4. Old Business**

### **4.1 SAS-2 revision 14 letter ballot comment resolution as of sas2r14 (08-212) [Elliott]**

Rob Elliott led the group through a discussion of the recent changes introduced as part of processing the SAS-2 letter ballot (08-212r7). Rob agreed to prepare a new revision to reflect the agreements reached by this meeting.

Rob noted that he expected the SAS-2 letter ballot work to be concluded this week.

### **4.2 SAS-2 Far-end retimed loopback phy test function (07-119) [Elliott]**

Rob Elliott asked that discussion of the proposal to define a far-end loopback testing mechanism for SAS (07-119r4) be deferred to the next meeting.

### **4.3 SAS: Add low power transceiver options (08-015) [Houlder]**

Gerry Houlder presented a proposal to manage via the SAS protocol lower power consumption on inactive SAS links or SAS links with reduced activity (08-015r5). The group requested numerous changes and Gerry agreed to prepare a new revision.

### **4.4 Questions about SAS Interface Power Management proposal, 08-015 (08-370) [Houlder]**

Gerry Houlder reported that discussion of this topic was completed at the last meeting. He asked that this item be removed from future agendas.

### **4.5 SAS-2 SPC-4 Differentiate between ACK NAK timeout reasons (08-064) [Elliott]**

Rob Elliott requested that discussion of his proposal to define new additional sense codes to indicate when different timeouts have been detected (08-064r0) be deferred to the next meeting.

### **4.6 SAS-2.1 / SPL, Low power transceiver options, phy states (08-206) [Evans]**

Mark Evans presented a proposal to add phy states for low power transceiver operation (08-206r2). The group requested several changes and Mark agreed to prepare a new revision.

### **4.7 SPL Link Layer Power Management (08-249) [Day]**

Due to the late hour, Brian Day asked that discussion of the detailed SAS Link Layer Power Management proposal (08-249r2) be deferred to the next meeting.

## **5. New Business**

### **5.1 SPL: Supplemental AIP diagram to 08-249 (08-412) [Day]**

Brian Day presented a proposal which showed the Annex L equivalent of AIP handling when low power operation is in progress (08-412r0). The group asked that the information appear in a formal SPL proposal, but Brian explained that he did not know how to fit all the information on a single page even in 9 point font.

Brian asked that further reviews of this topic be removed from future agendas.

### **5.2 SPL: Power Management Reporting and Control (08-420) [Besmer]**

Brad Besmer presented a proposal to enhance SMP functions to manage low power transitions (08-420r0). The group requested several changes and Brad agreed to prepare a new revision.

### 5.3 SAS 2 - TRAIN\_DONE race condition fix (08-425) [Day]

Brian Day presented a proposed late SAS-2 letter ballot comment regarding race conditions when multiple devices are training concurrently (08-425r0). He noted that the proposed changes enhance the interoperability of changes already included in SAS-2 r14g.

Concerns were raised about the degree to which both modifications (the r14g change and this change) require hardware changes for early-shipping SAS-2 products. Brian noted that this change increases the degree to which final SAS-2 interfaces will interoperate with early products.

Eventually, the group agreed that adding the new requirement was worth the difficulty.

Rob Elliott noted that the proposal fails to include needed changes to make the State Machine figures match the proposed text changes. Brian agreed to prepare a new revision.

Brian Day moved that 08-425r1 (r0 as modified) be recommended for inclusion in the SAS-2 Letter Ballot comment resolution. Bill Martin seconded the motion. In the absence of objections, the motion passed unanimously.

### 5.4 SAS 2 - Port selector discovery wording change (08-426) [Day]

Brian Day presented a presented a potential late SAS-2 letter ballot comment regarding SP State Machine for SATA Port Selectors (08-426r0). The proposal included two options.

- Option A was described as dumbing down the meaning (and value) of the Attached SATA Port Selector bit, but with the benefit of not requiring any State Machine changes.
- Option B included State Machine changes to improve the usefulness of the Attached SATA Port Selector bit, and return it to something closer to the originally intended meaning.

After discussing both options, the group supported the Option B changes.

Brian Day moved that 08-426r1 (r0 as modified to remove Option A) be recommended for inclusion in the SAS-2 Letter Ballot comment resolution. Rob Elliott seconded the motion. The motion passed 10:0:4.

### 5.5 SAS-2.1 / SPL Overview of an optical OOB method (08-438) [Day]

Brian Day presented an overview of an OOB protocol capable of supporting optical cables without changing the SP State Machines (08-438r0). The group felt that detailed mechanisms based on the proposal should be pursued. Brian noted that an initial proposal was on the agenda, but due to the late hour it could not be reviewed.

Brian asked that this overview presentation be removed from future agendas.

### 5.6 SAS-2.1 / SPL An optical OOB method (08-439) [Day]

Due to the late hour, Brian asked that discussion of this topic be deferred to the next meeting.

### 5.7 SAS2: late letter ballot comment on resetting of AWT (08-440) [Martin]

Bill Martin presented a proposal to update SAS-2 to clarify the AWT resetting requirements (08-440r0).

George Penokie moved that the author of 08-440r0 be asked to include OPEN REJECT (NO DESTINATION), OPEN REJECT (RESERVED INITIALIZE 0), OPEN REJECT (RESERVED INITIALIZE 1), and Open Timeout to the list of reasons to reset the arbitration wait timer in 7.13.3. Rob Elliott seconded the motion. The motion passed 5:1:8.

Bill Martin agreed to revise 08-440r0 as requested.

George Penokie moved that 08-440r1 (r0 as modified) be recommended for inclusion in the SAS-2 Letter Ballot comment resolution. Rob Elliott seconded the motion. The motion passed 7:0:7.

### **5.8 CMOS Photonics based optical PMD for SAS 2.1 (08-444) [Palkert]**

Tom Palkert showed how optical transceivers can be placed on a CMOS chip (08-444r0).

Tom asked that further discussion of this presentation be removed from further agendas.

### **6. Review of Recommendations**

The following documents were recommended for consideration by the Plenary:

No Plenary Vote needed, for inclusion in SAS-2 Letter Ballot response:

08-426r1 (Port selector discovery wording change) [Day]

08-425r1 (TRAIN\_DONE race condition fix) [Day]

08-440r1 (Late letter ballot comment on resetting of AWT) [Martin]

### **7. Meeting Schedule**

A SAS Protocol Working Group meeting is scheduled for:

Monday, January 12, 2009 commencing at 9:00 a.m. during T10 week.

### **8. Adjournment**

The meeting was adjourned at 6:10 p.m. on Monday November 3, 2008.