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

Doc. No.: T10/02-428r0

Date: October 25, 2002
Reply to: John Lohmeyer

To: T10 Membership
From: John Lohmeyer
Subject: SAS Protocol WG -- October 24-25, 2002
            Las Vegas, NV

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. Old Business
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    4.2   SAS Relative Offset (02-319) [Gardner/Sheffield]
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    4.4   SAS Spinup (02-360) [Elliott]
    4.5   SAS Disconnect-Reconnect Mode Parameters (02-324) [Gardner]
    4.6   STP Initiators closing connections (02-363) [Day]
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    4.8   CRC on Frame Header [Roberts]
    4.9   SAS Protocol Specific Port mode page (02-397) [Elliott]
    4.10 SAS Method to determine Source of Change Primitive (02-409) [Besmer]
    4.11 Remove SAS SMP margin control functions? (reflector message) [Elliott]
    4.12 SAS Remove SATA_ERROR primitive (02-418) [Hoglund]
    4.13 Proposal to change Bit Ordering and CRC diagrams in SAS rev. 2a (02-422) [Reif]
    4.14 SAS Additional Port Layer Tweaks (02-424) [Worden]
5. New Business
    5.1   SAS Target and Initiator Names (02-427) Penokie]
    5.2   Project proposal for Serial Attached SCSI - 2 (SAS-2) (02-429) [Elliott]
    5.3   SAS Target Connection Link Rate Handling (02-432) [Sheffield and Seto]
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    5.8   SAS New Open Reject Primitive (02-434) [Sheffield and Seto]
    5.9   SAS SMP Phy Control Extensions (02-439) [Sheffield]
    5.10 SAS STP Buffering (02-435) [Sheffield]
    5.11 SAS Expander Connection Link Rate Handling (02-438) [Sheffield and Seto]
    5.12 SAS Initiator Connection Link Rate Handling (02-431) [Sheffield and Seto]
    5.13 SAS SMP Report Phy SATA modifications (02-441) [Fairchild]
    5.14 Handling of invalid SAS address [Elliott]
    5.15 Handling of protocol mismatches in a wide port [Elliott]
6. Review of Recommendations to the Plenary
7. Meeting Schedule
8. Adjournment

Results of Meeting

1. Opening Remarks

John Lohmeyer called the meeting to order at 9:00 a.m., Thursday, October 24, 2002. He thanked Mike Fitzpatrick of Fujitsu hosting the meeting.

2. Approval of Agenda

The draft agenda was approved with the following changes:

    5.13   SAS SMP Report Phy SATA modifications (02-441) [Fairchild]

The following items was added or revised during the course of the meeting:

    5.14   Handling of invalid SAS address [Elliott]
    5.15   Handling of protocol mismatches in a wide port [Elliott]

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:

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        Name          S       Organization        Electronic Mail Address
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Mr. Ron Roberts       P  Adaptec, Inc.            Ron_Roberts@adaptec.com
Mr. Mike Fitzpatrick  P  Fujitsu                  mfitzpatrick@fcpa.
                                                  fujitsu.com
Mr. Rob Elliott       P  Hewlett Packard Co.      Elliott@hp.com
Mr. Steven Fairchild  V  Hewlett Packard Co.      Steve.Fairchild@hp.com
Mr. Jim Reif          V  Hewlett Packard Co.      jim.reif@hp.com
Mr. Werner Glinka      AV Hitachi America          werner.glinka@attglobal.
                                                  net
Mr. Steven Wirtz      V  I-TECH Corp.             steve_wirtz@i-tech.com
Mr. George O. Penokie P  IBM / Tivoli Systems     gop@us.ibm.com
Mr. Dan Colegrove     V  IBM Corp.                dcolegro@us.ibm.com
Mr. Pak Seto          V  Intel                    pak-lung.seto@intel.com
Mr. Robert Sheffield  A  Intel Corp.              robert.l.sheffield@intel.
                                                  com
Mr. Richard Beckett   V  Intel Corp.              richard.c.beckett@intel.
                                                  com
Mr. John Lohmeyer     P  LSI Logic Corp.          lohmeyer@t10.org
Mr. Tim Hoglund       V  LSI Logic Corp.          tim.hoglund@lsil.com
Mr. Steve Johnson     V  LSI Logic Corp.          sjohnson@lsil.com
Mr. Mark Evans        P  Maxtor Corp.             mark_evans@maxtor.com
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Mr. Pete McLean       A  Maxtor Corp.             pete_mclean@maxtor.com
Mr. Martin Czekalski  V  Maxtor Corp.             marty_czekalski@maxtor.
                                                  com
Mr. James R. (Bob)    P  Network Appliance Inc.   bob@netapp.com
Davis
Mr. Tony Goodfellow   V  Pacific Digital Corp.    tgoodfellow@
                                                  pacificdigital.com
Mr. Curtis Stevens    V  Pacific Digital Corp.    cstevens@pacificdigital.
                                                  com
Mr. Arie Krantz       V  QLogic Corp.             l_krantz@qlc.com
Mr. Jim Coomes        V  Seagate Technology       jim.coomes@seagate.com
Mr. John Worden       V  Seagate Technology       john.worden@seagate.com
Mr. Kenneth Hirata    P  Vixel Corp.              Ken.Hirata@Vixel.com

25 People Present

Status Key:  P    -  Principal
             A,A# -  Alternate
             AV   -  Advisory Member
             L    -  Liaison
             V    -  Visitor
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4. Old Business

4.1 SAS Working Draft Review [Elliott]

Rob Elliott presented SAS Rev 02b. He received editorial comments and agreed to incorporate them in the next revision.

4.2 SAS Relative Offset (02-319) [Gardner/Sheffield]

George Penokie moved and Bob Sheffield seconded that this topic be deferred to SAS-2. The motion passed unanimously.

4.3 SAS Data Corruption Problem (02-323) [Gardner/Sheffield]

George Penokie noted that the RAID issue Bob Sheffield had brought up on the conference call is real. He said that because of the large delay from the lost frame until the error is detected, SAS would burden RAID implementations. George wanted the sequence counter to be mandatory, but he was not satisfied with the 02-323 proposal. George proposed some rules for the sequence counter (02-442). He received input and agreed to prepare a proposal or to work with Bob on preparing a proposal.

4.4 SAS Spinup (02-360) [Elliott]

Rob Elliott presented 02-360r2, SAS Spinup. He agreed to make some editorial changes to make the state diagram work better in black and white presentation format. Rob Elliott moved and Mark Evans seconded that 02-360r3 (r2 as revised) be recommended for inclusion in SAS. The motion passed unanimously.

4.5 SAS Disconnect-Reconnect Mode Parameters (02-324) [Gardner]

In the absence of Ed Gardner, this item was deferred.

4.6 STP Initiators closing connections (02-363) [Day]

Tim Hoglund presented 02-363r2, SAS STP Initiators closing connections. He received some editorial feed back and agreed to revise the proposal. Tim Hoglund moved and Jim Reif seconded that 02-363r3 (r2 as revised) be recommended for inclusion in SAS. The motion passed unanimously.

4.7 Informative Annex on Expanders (02-291) [Hoglund]

Tim Hoglund presented 02-291r1, Informative Annex on Expanders. He received input and agreed to revise the proposal.

4.8 CRC on Frame Header [Roberts]

Ron Roberts asked that this item be deferred to the November 4 meeting.

4.9 SAS Protocol Specific Port mode page (02-397) [Elliott]

Rob Elliott presented 02-397r0, SAS Protocol Specific Port mode page. Rob Elliott moved and John Lohmeyer seconded that 02-397r0 be recommended for inclusion in SAS. The motion passed 5:3:0.

4.10 SAS Method to determine Source of Change Primitive (02-409) [Besmer]

John Lohmeyer presented a draft of 02-409r3, SAS Method to determine Source of Change Primitive. He received input and revised the proposal online. John Lohmeyer moved and Ron Roberts seconded that 02-409r3 be recommended for inclusion in SAS. The motion passed 6:1:2.

4.11 Remove SAS SMP margin control functions? (reflector message) [Elliott]

Rob Elliott proposed that the SAS SMP margin control function be removed from SAS since the only fields are reserved or vendor specific. He suggested that anyone interested in using this function would do better using a vendor specific function. Ron Roberts objected to the proposal. Rob Elliott moved and Pak Seto seconded that the SAS SMP margin control function be recommended for removal from SAS. The motion passed 9:1:2.

4.12 SAS Remove SATA_ERROR primitive (02-418) [Hoglund]

Tim Hoglund presented 02-418r0, SAS Remove SATA_ERROR primitive. He received input and agreed to revise his proposal.

4.13 Proposal to change Bit Ordering and CRC diagrams in SAS rev. 2a (02-422) [Reif]

Jim Reif presented 02-422r1, Proposal to change Bit Ordering and CRC diagrams in SAS rev. 2a. He received input and agreed to revise his proposal.

Later in the meeting Jim presented the revised document. He received further input and agreed to make further revisions. Jim Reif moved and Tim Hoglund seconded that 02-422r2 (r1 as revised) be recommended for inclusion in SAS. The motion passed unanimously.

4.14 SAS Additional Port Layer Tweaks (02-424) [Worden]

John Worden presented 02-424r2, SAS Additional Port Layer Tweaks. He received input and agreed to revise his proposal. John Worden moved and Rob Elliott seconded that 02-424r2 (r1 as revised) be recommended for inclusion in SAS. The motion passed unanimously.

5.   New Business

5.1   SAS Target and Initiator Names (02-427) Penokie]

George Penokie presented 02-427r0, SAS Target and Initiator Names. He received input and agreed to revise his proposal. George Penokie moved and Jim Coomes seconded that 02-427r1 (r0 as revised) be recommended for inclusion in SAS. The motion passed unanimously.

5.2   Project proposal for Serial Attached SCSI - 2 (SAS-2) (02-429) [Elliott]

John Lohmeyer noted that Rob Elliott had uploaded a SAS-2 project proposal. It will be considered at the November 7 T10 meeting.

5.3   SAS Target Connection Link Rate Handling (02-432) [Sheffield and Seto]

Bob Sheffield discussed the link rate issues in 02-432, 02-438, and 02-431 (agenda items 5.3, 5.11, and 5.12). Rob Elliott presented a draft proposal that he had discussed on the T10 Reflector. Rob agreed to post his link rate proposal as a T10 document. It will be added to the agenda for the October 29 conference call. Bob asked that his 02-432, 02-438, and 02-431 proposals be dropped from future agendas.

5.4   SAS EOFa Proposal (02-436) [Sheffield]

Bob Sheffield presented 02-436r0, SAS EOFa Proposal. This proposal would add an EOFa primitive to identify frames that the sender believes are bad (due to an internal error at the sender). The next frame would replace the bad frame. The proposal was controversial and Bob agreed to withdraw the proposal.

5.5   SAS SATA 1.0e Support (02-437) [Sheffield]

Bob Sheffield presented 02-437r0, SAS SATA 1.0e Support. He received input and agreed to revise his proposal.

5.6   SAS Simplified Support for Multiple STP Initiators (02-430) [Sheffield]

Bob Sheffield presented 02-430r0, SAS Simplified Support for Multiple STP Initiators. He received input and agreed to revise his proposal.

5.7   SAS Link Rate Clarification (02-433) [Sheffield and Seto]

Bob Sheffield presented 02-433r0, SAS Link Rate Clarification. He received input and agreed to revise his proposal. Bob Sheffield moved and Rob Elliott seconded that 02-433r1 (r0 as revised) be recommended for inclusion in SAS. The motion passed unanimously.

5.8   SAS New Open Reject Primitive (02-434) [Sheffield and Seto]

Covered under 5.3.

5.9   SAS SMP Phy Control Extensions (02-439) [Sheffield]

Bob Sheffield presented 02-439r0, SAS SMP Phy Control Extensions. This proposal would add SMP functions to force an expander to not send COMSAS during OOB. The proposal was controversial and Bob agreed to "go home and think about whether he wants to pursue the proposal".

5.10 SAS STP Buffering (02-435) [Sheffield]

Bob Sheffield presented 02-435r0, SAS STP Buffering. The proposal was controversial and Bob agreed to go back and think about an alternative proposal.

5.11 SAS Expander Connection Link Rate Handling (02-438) [Sheffield and Seto]

Covered under 5.3.

5.12 SAS Initiator Connection Link Rate Handling (02-431) [Sheffield and Seto]

Covered under 5.3.

5.13 SAS SMP Report Phy SATA modifications (02-441) [Fairchild]

Steve Fairchild presented 02-441r0, SAS SMP Report Phy SATA modifications. He received input and agreed to revise his proposal. Steve Fairchild moved and Tim Hoglund seconded that 02-441r1 (r0 as modified) be recommended for inclusion in SAS. The motion passed 7:0:2.

5.14 Handling of invalid SAS address [Elliott]

Rob Elliott presented a draft of a document that contains his proposed handling of invalid SAS addresses (i.e., all zero bits). He said he plans to post the document as a T10 document. He received input and agreed to revise the document before posting it. If Rob's proposal is accepted, it will in effect remove all special meanings for SAS addresses of zero. A SAS address of zero would remain invalid, but there would not be any places that would assign a special meaning to a SAS address of zero.

5.15 Handling of protocol mismatches in a wide port [Elliott]

Rob Elliott noted that wide links could report inconsistent protocols supported. What should be the response? The serious suggested answers were go back to OOB or ignore the issue. Ignore the issue won. Rob agreed to write up a proposal that would require wide ports to support the same protocol on all links, but not require attached devices to verify this requirement.

6.   Review of Recommendations to the Plenary

John Lohmeyer noted that the following recommendations were made during this meeting:

        that 02-360r3 (r2 as revised) be recommended for inclusion in SAS.
        that 02-363r3 (r2 as revised) be recommended for inclusion in SAS.
        that 02-397r0 be recommended for inclusion in SAS. [5:3:0]
        that 02-409r3 be recommended for inclusion in SAS. [6:1:2]
        that the SAS SMP margin control function be recommended for removal from SAS.
        that 02-424r2 (r1 as revised) be recommended for inclusion in SAS.
        that 02-427r1 (r0 as revised) be recommended for inclusion in SAS.
        that 02-433r1 (r0 as revised) be recommended for inclusion in SAS.
        that 02-441r1 (r0 as modified) be recommended for inclusion in SAS. [7:0:2]
        that 02-422r2 (r1 as revised) be recommended for inclusion in SAS.

The following recommendation was made on the October 22 conference call:

        that 02-396r2 (r1 as revised) be recommended for inclusion in SAS.
        that the Fallback and Increment Speed states be recommended for removal from the SP state machine in SAS.
        that 02-405r2 (r1 as revised) be recommend for inclusion in SAS.

that it be recommended that a SAS address of all 0 bits is not a valid SAS address and may be used to indicate there is no device present or other meanings.

The following recommendation was made on the October 15 conference call:

that 02-387r2 (r1 as revised) be recommended for inclusion in SAS.
that 02-383r2 (r1 as revised) be recommended for inclusion in SAS.
that 02-394r1 (r0 as revised) be recommended for inclusion in SAS.
that DEVICE TYPE numbers be changed to start at 1 and DEVICE TYPE 0 means no device is attached be recommended for included in SAS.

The following recommendation was made on the October 1 conference call:

that 02-359r3 (r2 as revised) be recommended for inclusion in SAS. [4:3:2]
that 02-393r1 (r0 as revised) be recommended for inclusion in SAS.

The following recommendation was made on the September 24 conference call:

that 02-318r1 be recommended for inclusion in SAS.
that 02-202r4 (r3 as revised) be recommended for inclusion in SAS.
that 02-276r3 (r2 as revised) be recommended for inclusion in SAS.
that we recommend to T10 that the SSP Task IU be changed to 28 bytes to match the command IU by removing the last 4 reserved bytes.

The following recommendation was made on the September 17 conference call:

that a statement saying STP initiators shall not generate BIST frames be recommended for inclusion in SAS.

7.   Meeting Schedule

SAS Protocol Working Group meetings are scheduled for:

Monday-Tuesday, November 4-5, 2002 commencing at 1:00 p.m. on Monday and ending at 5:00 p.m. on Tuesday in Huntington Beach, CA at the Hilton Waterfront Hotel (714-960-7873).

A SAS STP Study Group meeting is scheduled for:

Monday, November 4, 2002 commencing at 9:00 a.m. on Monday and ending at noon in Huntington Beach, CA at the Hilton Waterfront Hotel (714-960-7873).

John Lohmeyer agreed to host a SAS Protocol teleconference October 29. Call details are:

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   Tuesday October 29, 2002
   11:00 am -- 2:00 pm  EDT
   10:00 am -- 1:00 pm  CDT
    9:00 am -- noon     MDT
    8:00 am -- 11:00 am PDT

   USA Toll Free Number: 877-417-9828
           Toll Number: +1-706-679-9028
       Conference Code: 719 533 7560

WebEx Session: http://seagate.webex.com/
 Meeting Name: SAS Protocol teleconference
     Password: Carol23
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An editing meeting is planned for November 7-8, 2002 in Huntington Beach, CA. The meeting will start one hour following the plenary meeting and run through 1:00 p.m. on Friday.

8. Adjournment

The meeting was adjourned at approximately noon on Friday, October 25, 2002.