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

To: T10 Membership
From: John Lohmeyer
Subject: Serial Attached SCSI Protocol Working Group Meeting -- June 5-7, 2002
           Minneapolis, MN

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. Old Business
    4.1   SAS Bit order for scrambling and CRC (02-219) [Jim Coomes]
    4.2   CRC code sample [Coomes]
    4.3   SAS OOB timing (02-198) [Elliott]
    4.4   SAS PHY Control Request Modification (02-174) [Roberts]
    4.5   SAS PHY MARGIN CONTROL request (02-179) [Roberts]
    4.6   BREAK impact to transport layer [Hall]
    4.7   Behavior if extra ACK or NACK received [Hall]
    4.8   Primitive to say all credit has been sent [Galloway]
    4.9   AEN on SAS (02-196) [Penokie]
    4.10 What does it mean to ignore or discard a frame? [Galloway]
    4.11 SAS Identification State Machine (02-197) [Penokie]
    4.12 Seagate questions [Coomes]
    4.13 SAS Working Draft Review [Elliott]
    4.14 Scrambing code sample [Coomes]
5. Joint Session with SAS PHY Group
    5.1   Do we need far-end loop-back test?
    5.2   SAS Far-End Loopback removal (02-218) [Jim Coomes]
    5.3   SAS OOB timing (02-198) [Elliott]
    5.4   SAS PHY MARGIN CONTROL request (02-179) [Roberts]
6. New Business
    6.1   SAS Done Policy (02-201) [Dana Hall]
    6.2   SAS BREAK Policy (02-205) [Dana Hall]
    6.3   SAS Extra ACK/NAK Policy (02-204) [Dana Hall]
    6.4   SAS address frame field checking (02-211) [Rob Elliott]
    6.5   SAS Response IU format (02-212) [Bill Galloway]
    6.6   SAS Hash removal (02-213) [Bill Galloway]
    6.7   SAS Hash Transport Checking (02-214) [Bill Galloway]
    6.8   SAS Credit Not Ready (02-215) [Bill Galloway]
    6.9   SAS SMP transport layer state diagrams (02-216) [Rob Elliott]
    6.10 SAS OPEN_REJECT Priorities (02-217) [Jim Coomes]
    6.11 SAS Request/Confomation List (02-203) [Worden]
    6.12 SAS Port Control State Diagram Update (02-202) [Worden]
    6.13 Transport State Diagram Review () [Mark Evans]
7. Review of Recommendations to the Plenary

8.   Meeting Schedule
9.   Adjournment

Results of Meeting

1.   Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 9:00 a.m., Wednesday, June 5, 2002. He thanked Jim Coomes of Seagate for hosting the meeting.

As is customary, the people attending introduced themselves and a copy of the attendance list was circulated.

2.   Approval of Agenda

The draft agenda was approved with the following changes:

4.1	SAS Bit order for scrambling and CRC (02-219) [Jim Coomes]
4.3	SAS OOB timing (02-198) [Elliott] (replaced by item 5.3)
4.6	BREAK impact to transport layer [Hall] (replaced by item 6.2)
4.7	Behavior if extra ACK or NACK received [Hall] (replaced by item 6.3)
4.8	Primitive to say all credit has been sent [Galloway] (replaced by item 6.8)
4.14	Scrambing code sample [Coomes]
5.4	SAS PHY MARGIN CONTROL request (02-179) [Roberts]
6.10	SAS OPEN_REJECT Priorities (02-217) [Jim Coomes]
6.11	SAS Request/Confomation List (02-203) [Worden]
6.12	SAS Port Control State Diagram Update (02-202) [Worden]

The following items were added/revised during the course of the meeting:

6.13 Transport State Diagram Review () [Mark Evans]

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. Bill Galloway       P   BREA Technologies, Inc.    billg@breatech.com
Mr. Ronald Stockford    A   Dell Computer Corp.        ron_stockford@dell.com
Mr. Rob Elliott         P   Hewlett Packard Co.        Elliott@hp.com
Mr. Steven Fairchild    V   Hewlett Packard Co.        Steve.Fairchild@compaq.
                                                       com
Mr. Werner Glinka       AV  Hitachi America            werner.glinka@attglobal.
                                                       net
Mr. Matt Otto           V   I-TECH Corp.               matt_otto@i-tech.com
Mr. Steven Wirtz        V   I-TECH Corp.               steve_wirtz@i-tech.com
Mr. George O. Penokie   P   IBM / Tivoli Systems       gop@us.ibm.com
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Mr. Mark Erickson      V   IBM Corp.              merick@us.ibm.com
Mr. Alan Espeseth      V   IBM Corp.              espeseth@us.ibm.com
Mr. Edward Younk       V   IBM Corp.              ehyounh@us.ibm.com
Mr. Richard Beckett    V   Intel Corp.            richard.c.beckett@intel.
                                                  com
Mr. Robert Sheffield   V   Intel Corp.            robert.l.sheffield@intel.
                                                  com
Mr. John Lohmeyer      P   LSI Logic Corp.        lohmeyer@t10.org
Mr. Brian Day          V   LSI Logic Corp.        brian.day@lsil.com
Mr. David Noeldner     V   LSI Logic Corp.        dave.noeldner@lsil.com
Mr. David Weber        V   LSI Logic Corp.        david.weber@lsil.com
Mr. Mark Evans         P   Maxtor Corp.           mark_evans@maxtor.com
Mr. Steve Byan         V   Maxtor Corp.           stephen_byan@maxtor.com
Mr. Juzer Mogri        V   NEC Electronics        juzer_mogri@el.nec.com
Mr. Seow Tan           V   NEC Electronics        seow_tan@el.nec.com
Mr. Edward A. Gardner  P   Ophidian Designs       eag@ophidian.com
Mr. Ting Li Chan       V   QLogic Corp.           ting.chan@qlogic.com
Mr. Arie Krantz        V   QLogic Corp.           l_krantz@qlc.com
Mr. Gerald Houlder     P   Seagate Technology     gerry_houlder@seagate.com
Mr. Jim Coomes         V   Seagate Technology     jim_coomes@seagate.com
Mr. Alvin Cox          V   Seagate Technology     Alvin.Cox@seagate.com
Mr. John Worden        V   Seagate Technology     john.worden@seagate.com
Mr. Gary D. Moorhead   V   Seagate Technology     gary.moorhead@seagate.com
Mr. Chuck Thiesfeld    V   Seagate Technology     chuck.thiesfeld@seagate.
                                                  com


31 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 Bit order for scrambling and CRC (02-219) [Jim Coomes]

Jim Coomes presented 02-219r0, SAS Bit order for scrambling and CRC. Jim agreed to revise his document to add examples.

4.2 CRC code sample [Coomes]

Deferred.

4.3 SAS OOB timing (02-198) [Elliott]

(See item 5.3.)

4.4 SAS PHY Control Request Modification (02-174) [Roberts]

Ron Roberts asked that this item be deleted from future agendas.

4.5   SAS PHY MARGIN CONTROL request (02-179) [Roberts]

(See item 5.4.)

4.6   BREAK impact to transport layer [Hall]

(See item 6.2.)

4.7   Behavior if extra ACK or NACK received [Hall]

(See item 6.3.)

4.8   Primitive to say all credit has been sent [Galloway]

(See item 6.8.)

4.9   AEN on SAS (02-196) [Penokie]

George Penokie presented 02-196r0, AEN on SAS. The group explored the idea of not using an AEN primitive at all. Instead, a REQUEST SENSE command (or some new command) could be issued to the AEN well-known LUN. The command would not terminate until AEN data is available.

George agreed to prepare a revision for the next meeting.

4.10 What does it mean to ignore or discard a frame? [Galloway]

Bill Galloway asked that this item be deferred.

4.11 SAS Identification State Machine (02-197) [Penokie]

George Penokie presented 02-197r0, SAS Identification State Machine. He received feedback and agreed to prepare a revision 1.

4.12 Seagate questions [Coomes]

Jim Coomes asked that this item be deleted from future agendas.

4.13 SAS Working Draft Review [Elliott]

Rob Elliott presented the latest SAS working draft. He received extensive feedback from the group and ageed to make editorial changes in the next revision of the SAS working draft.

4.14 Scrambing code sample [Coomes]

Deferred.

5.   Joint Session with SAS PHY Group

5.1   Do we need far-end loop-back test?

(See item 5.2.)

5.2   SAS Far-End Loopback removal (02-218) [Jim Coomes]

Bill Galloway moved that the combined working groups recommend to T10 that 02-218r0, which recommends that the SMP FER Loopback function be removed, be accepted and that the SAS technical editor be directed to remove the SMP FER Loopback function. Jim Coomes seconded the motion. The motion passed 14:0:2.

5.3   SAS OOB timing (02-198) [Elliott]

Alvin Cox presented sas-r00a.pdf, section 6.7, showing the speed negotiation sequence. It was noted that the text needs to say that the devices fail back to the highest speed that both devices support.

Rob Elliott presented 02-198r2, SAS OOB timing. He received considerable feedback and agreed to revise his proposal for next time.

One question provoked a straw poll. 18 people were in favor of deleting the sentence in Rob's proposal suggesting that devices begin the phy reset sequence within 10 seconds of power on. 5 people favored changing the time to 1 second.

5.4   SAS PHY MARGIN CONTROL request (02-179) [Roberts]

Alvin Cox reviewed the changes that the SAS Physical working group had recommended, which were to change the Termination, Precompensation, and Equalization value fields to Reserved.

Jim Coomes moved that 02-179r1 (r0 as revised) be recommended for inclusion in the SAS working draft. Bill Galloway seconded the motion. In the absence of objections, the motion passed unanimously.

6.   New Business

6.1   SAS Done Policy (02-201) [Dana Hall]

Mark Evans noted that Dana Hall will not be attending this or future meetings. Mark and/or Steve Byan will pick up Dana's proposals.

Steve Byan presented 02-201r0, SAS Done Policy. He received feedback and agreed to revise the proposal.

6.2   SAS BREAK Policy (02-205) [Dana Hall]

Steve Byan presented 02-205r0, SAS BRK Policy. He received feedback and agreed to revise the proposal.

6.3   SAS Extra ACK/NAK Policy (02-204) [Dana Hall]

Steve Byan presented 02-204r0, SAS Extra ACK/NACK Policy. The group agreed that an extra ACK or NACK should not change the counter, however the group did not agree that the condition should be treated as an error. Steve agreed to revise the proposal.

6.4   SAS address frame field checking (02-211) [Rob Elliott]

Rob Elliott presented 02-211r0, SAS address frame field checking.

George Penokie moved that 02-211r1 (r0 as revised) be recommended for inclusion in the SAS working draft. Bill Galloway seconded the motion. In the absence of objections, the motion passed unanimously.

6.5 SAS Response IU format (02-212) [Bill Galloway]

Bill Galloway presented 02-212r0, SAS Response IU format. He received feedback from the group.

Rob Elliott moved that 02-212r1 (r0 as revised) be recommended for inclusion in the SAS working draft. Bill Galloway seconded the motion. In the absence of objections, the motion passed unanimously.

Bill Galloway moved that within the SAS working draft that the value of pad bytes and fill bytes be defined as vendor specific. Mark Evans seconded the motion. The motion passed 6:0:7.

6.6 SAS Hash removal (02-213) [Bill Galloway]

The SCSI Trade Association recommended that hashed address checking be retained (at least until they have more time to study the issue). In light of the STA recommendation, Bill Galloway asked that this proposal be withdrawn in favor of the 02-214 proposal in agenda item 6.7.

6.7 SAS Hash Transport Checking (02-214) [Bill Galloway]

Bill Galloway presented 02-214r0, SAS Hash Transport Checking. He received feedback from the group and revised his proposal during the meeting. On Friday morning, Bill presented 02-214r1.

Bill Galloway moved that 02-214r1 be recommended for inclusion in the SAS working draft. Jim Coomes seconded the motion. The motion passed 8:2:0.

6.8 SAS Credit Not Ready (02-215) [Bill Galloway]

Bill Galloway presented some of his thoughts on how to accomplish a credit not ready function for SAS. The changes would affect the SSP Link state machine. There was a discussion of what is a 'long time'. We eventually agreed that the CREDIT BLOCKED primitive should be sent if the device does not expect to have credit available within one millisecond. Bill agreed to write up the proposal incorporating the ideas discussed with the group.

6.9 SAS SMP transport layer state diagrams (02-216) [Rob Elliott]

Rob Elliott presented 02-216r0, SAS SMP transport layer state diagrams. He received feedback, mostly from George Penokie, who agreed to take over editorship of the proposal. George will revised the proposal for the next meeting.

6.10 SAS OPEN_REJECT Priorities (02-217) [Jim Coomes]

Jim Coomes presented 02-217r0, SAS OPEN_REJECT Priorities.

Jim Coomes moved that 02-217r0 be recommended for inclusion in the SAS working draft. Bill Galloway seconded the motion. In the absence of objections, the motion passed unanimously.

6.11 SAS Request/Confirmation List (02-203) [Worden]

John Worden presented 02-203r0, SAS Request/Confimation List. He received extensive feedback and agreed to revise his colorful proposal.

Rob Elliott moved that 02-203r1 (r0 as revised) be recommended for inclusion in the SAS working draft. Bill Galloway seconded the motion. In the absence of objections, the motion passed unanimously.

6.12 SAS Port Control State Diagram Update (02-202) [Worden]

John Worden presented 02-202r0, SAS Port Control State Diagram Update. He received feedback and agreed to revise the proposal.

6.13 Transport State Diagram Review () [Mark Evans]

Mark Evans reviewed the transport state diagram. He received feedback from the group and agreed to prepare a proposal to update this state diagram.

6.14 SAS State Machine Relationships () [Rob Elliott]

Rob Elliott presented a diagram showing the relationships of the various state machines in an effort to develop consistent nomenclature. The group agreed to use the following terms:

Transport layer:
SSP transport (ST)
STP transport (TT)
SMP transport (MT)

Port Control layer:
SAS Port Control (PC)

Protocol link layer:
SSP link (SP)
STP link (TP)
SMP link (MP)

SAS link layer:
SAS link (SL)

Physical layer:
SAS phy and Dword Sync (PH and DS)

7. Review of Recommendations to the Plenary

John Lohmeyer noted that the following recommendations have been made to the T10 plenary:

Recommendations from May 14, 2002 teleconference:
    that 02-169r2 be accepted for inclusion in the SAS working draft.
    that 02-170r1 be accepted for inclusion in the SAS working draft.

Recommendations from May 21, 2002 teleconference:
    none.

Recommendations from this meeting:
    that 02-179r1 (r0 as revised) be recommended for inclusion in the SAS working draft.
    02-211r1 (r0 as revised) be accepted for inclusion in the SAS working draft.
    02-212r1 (r0 as revised) be accepted for inclusion in the SAS working draft.
    02-218r0, which recommends that the SMP FER Loopback function be removed, be accepted and that the SAS technical editor be directed to remove the SMP FER Loopback function.
    that 02-203r1 (r0 as revised) be recommended for inclusion in the SAS working draft.
    that 02-217r0 be recommended for inclusion in the SAS working draft.

7.1 Meeting Schedule

Serial Attached SCSI Working Group meetings are scheduled for:

Wednesday-Friday, June 5-7, 2002 commencing at 9:00 am on Wednesday and ending at noon on Friday in Minneapolis, MN at the Hilton Inn (952-854-2100).

Monday-Wednesday, June 24-26, 2002 commencing at 9:00 am on Monday and ending at noon on Wednesday in Denver, CO at the Embassy Suites (303-375-0400).

Monday-Tuesday, July 15-16, 2002 commencing at 1:00 p.m. on Monday and ending at 8:00 pm on Tuesday in Colorado Springs, CO at the Wyndham Colorado Springs Hotel (719-260-1800).

Wednesday-Friday, August 21-23, 2002 commencing at 9:00 am on Wednesday and ending at noon on Friday in TBD with TBD host.

A SAS Protocol teleconference is scheduled for June 18, 2002:

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   Tuesday June 18, 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: to be announced on T10 reflector
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8. Adjournment

The meeting was adjourned at noon on Friday, June 7, 2002.