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

| Doc. No.: T10/02-235r0 |
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Date:   June 26, 2002
Reply to:   John Lohmeyer

To:         T10 Membership
From:       John Lohmeyer
Subject:    Serial Attached SCSI Protocol Working Group Meeting -- June 24-25, 2002
            Denver, CO

# 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   SAS CRC Generation and Scrambling (02-231) [Coomes]
    4.3   AEN on SAS (02-196) [Penokie]
    4.4   What does it mean to ignore or discard a frame? [Galloway]
    4.5   SAS Identification State Machine (02-197) [Penokie]
    4.6   SAS Working Draft Review [Elliott]
    4.7   SAS OOB timing (02-198) [Elliott]
    4.8   Transmitting a DONE primitive to close an SSP connection (02-201) [Mark Evans]
    4.9   Behavior when receiving a BREAK primitive while in an SAS connection (02-205) [Mark Evans]
    4.10  Dealing with extra ACK and NAK primitives in SAS (02-204) [Steve Byan]
    4.11  SAS Credit Not Ready (02-215) [Bill Galloway]
    4.12  SAS SMP transport layer state diagrams (02-216) [Penokie]
    4.13  SAS Port Control State Diagram Update (02-202) [Worden]
    4.14  SSP transport layer state machines (02-230) [Mark Evans]
5.  New Business
    5.1   Name consistency between port and transport layers [Worden]
    5.2   SAM-3 Identifiers and names for SAS (02-245) [Elliott]
    5.3   SPC-3 Protocol-specific changes for SAS (02-246) [Elliott]
6.  Review of Recommendations to the Plenary
7.  Meeting Schedule
8.  Adjournment

# Results of Meeting

## 1.   Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 9:00 a.m., Monday, June 24, 2002. He thanked LSI Logic 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:

> 5.1    Name consistency between port and transport layers [Worden]

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

> 5.2    SAM-3 Identifiers and names for SAS (02-245) [Elliott]
> 5.3    SPC-3 Protocol-specific changes for SAS (02-246) [Elliott]

## 3. Attendance and Membership

Attendance at working group meetings does not count toward minimum attendance requirements for T10 member-ship. 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. Don Allingham      V   Adaptec, Inc.            don_allingham@adaptec.com
Mr. Bill Galloway      P   BREA Technologies, Inc.  billg@breatech.com
Mr. Gary McMillian     V   Consultant               mcmillian@mindspring.com
Mr. Rob Elliott        P   Hewlett Packard Co.      Elliott@hp.com
Mr. Steven Fairchild   V   Hewlett Packard Co.      Steve.Fairchild@compaq.
                                                    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
Mr. Chris Fournier     V   IBM Corp.                chrisfou@us.ibm.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. Tim Hoglund        V   LSI Logic Corp.          tim.hoglund@lsil.com
Mr. David Weber        V   LSI Logic Corp.          david.weber@lsil.com
Mr. Mark Evans         P   Maxtor Corp.             mark_evans@maxtor.com
Mr. David Cressman     V   Maxtor Corp.             dave_cressman@maxtor.com
Mr. Edward A. Gardner  P   Ophidian Designs         eag@ophidian.com
Mr. Jim Coomes         V   Seagate Technology       jim_coomes@seagate.com
Mr. John Worden        V   Seagate Technology       john.worden@seagate.com
Mr. Willis Whittington V   Seagate Technology       Willis.Whittington@
                                                    seagate.com

19 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. Rob had previously requested that Jim show the input byte order. Jim agreed to do so, but had not yet updated the document. There are no technical issues with the document.

Later in the meeting, Jim reviewed 02-219r1. He received further comments and agreed to prepare a revision 2.

### 4.2  SAS CRC Generation and Scrambling (02-231) [Coomes]

Jim Coomes presented 02-231, SAS CRC Generation and Scrambling. Bill Galloway volunteered to attempt to split the CRC generation and scrambling sections to fit the SAS document structure. There are no technical issues with the document.

### 4.3  AEN on SAS (02-196) [Penokie]

George Penokie presented 02-196r1, AEN on SAS. This proposal returns the approach of broadcasting an AEN primitive to all initiators when an AEN event occurs on a target. The previous approach of using an outstanding command to a well-known logical unit was unacceptable to target vendors due to the resources consumed.

George received input on his proposal and agreed to revise it. George Penokie moved that 02-196r2 (r1 as revised) be recommended to T10 for inclusion in SAS. Bill Galloway seconded the motion. In absence of objections, the motion passed unanimously. George noted that some portions of the proposal affect SPC-3, which should be addressed by the CAP working group.

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

Bill Galloway requested that this item be deferred.

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

This document was previously recommended for inclusion in the SAS working draft on the June 18, 2002 teleconference call.

### 4.6  SAS Working Draft Review [Elliott]

Rob Elliott presented the current SAS working draft. He explained the SAS object model in Figure 4.

Tim Hoglund presented an idea of adding a field to the open frame called blocked count. It would be used instead of AWT for back-off decisions during arbitration. It would simplify the process of deciding which opens should back off to prevent deadlock. He plans to write up a proposal before the July 9th conference call.

The group reviewed an email from Sriram Srinivasan dated 6/24/2002 regarding SAS primitives inside frames. Sriram questioned whether primitives are permitted between the CRC and the EOF. The group agreed that primitives are permitted here. It appears that the definition of dword needs some clarification. In some places we mean 4 contiguous characters. Other places we mean a dword that starts with Dxx.y (data character). The group agreed to add a definition:

   data dword: A dword that starts with a Dxx.y (data character).

The description of the CRC location was changed to: "The last data dword after the SOF prior to the EOF always contains a CRC."

### 4.7  SAS OOB timing (02-198) [Elliott]

Rob Elliott presented 02-198r3, SAS OOB Timing. He noted that he had not found a better name for the unit interval and was still using UI(OOB).

Rob pointed out a race condition in the speed negotiation that could result in one device thinking a speed is supported and the other thinking it is not supported. Bill Galloway suggested a solution. If a device does not lock to the ALIGNs within a specified time, then it shall not switch to ALIGN(1)s. We need the PHY group's input on this change.

Rob also described a new bit he added to the REPORT PHY response called PHY RESET PROBLEM.

Rob agreed to revise his proposal and to post a message on the T10 reflector noting the change to the ALIGN/ALIGN(1) timing. If the PHY group has any issues with this topic, we can have a joint session on our July 9th teleconference.

### 4.8  Transmitting a DONE primitive to close an SSP connection (02-201) [Mark Evans]

Mark Evans presented 02-201r2, Transmitting a DONE primitive to close an SSP connection. He received input and agreed to prepare a revised document. Mark Evans moved that 02-201r3 (r2 as revised) be recommended to T10 for inclusion in SAS. Bill Galloway seconded the motion. In absence of objections, the motion passed unanimously.

### 4.9  Behavior when receiving a BREAK primitive while in an SAS connection (02-205) [Mark Evans]

Mark Evans presented 02-205r2, Behavior when receiving a BREAK primitive while in an SAS connection. He received input and agreed to prepare a revised document. Mark Evans moved that 02-205r3 (r2 as revised) be recommended to T10 for inclusion in SAS. Bill Galloway seconded the motion. In absence of objections, the motion passed unanimously.

### 4.10 Dealing with extra ACK and NAK primitives in SAS (02-204) [Steve Byan]

This document was previously recommended for inclusion in the SAS working draft on the June 18, 2002 teleconference call.

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

Bill Galloway presented 02-215r0, SAS Credit Not Ready. He received input and agreed to prepare revision 1.

During the course of the discussion, there was straw poll regarding the state machine labels. There were 2 people in favor of retaining the state machine labels, 9 people were opposed to retaining the labels, and 3 people abstained.

### 4.12 SAS SMP transport layer state diagrams (02-216) [Penokie]

George Penokie presented 02-216r1, SAS SMP transport layer state diagrams. He received generous feedback and agreed to revise his document.

George Penokie moved that in state SMP_SFR1 in figure 69 in SAS-R00C, that the protocol violation and the failed frame confirmations be deleted and any corresponding text be deleted. Bill Galloway seconded the motion. In absence of objections, the motion passed unanimously.

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

John Worden presented 02-202r0, SAS Port Control State Diagram Update. He received input and agreed to revise his document.

### 4.14 SSP transport layer state machines (02-230) [Mark Evans]

Mark Evans presented 02-230r0, SSP transport layer state machines. There were three impacts on the port layer:

1. Add a frame sent confirmation from the SSP_TF4 from the SSP Link layer up to the port layer.
2. The port layer needs to send a wait_for_balance request down to the SSP link layer replacing the inter-locked and non-interlocked requests.
3. The SSP link layer sends a balanced confirmation up to the port layer so the port layer knows when it can change link layers (for wide links).

Rob agreed to work with John Worden to make these changes.

Mark received lots of 'wonderful' input and agreed to revise his proposal.


## 5.   New Business

### 5.1   Name consistency between port and transport layers [Worden]

John Worden began by presenting 02-203r2, SAS Request-Confirmation List. He made a few minor corrections. He then presented 02-xxxr0, SAS Port and Transport Request-Confirmation list. This document is intended to help with name consistency between these two layers. He received extensive input and agreed to revise and post his document.

### 5.2   SAM-3 Identifiers and names for SAS (02-245) [Elliott]

Rob Elliott presented 02-245r0, SAM-3 Identifiers and names for SAS. This document is a proposal for SAM-3 adding SAS information to Annex A in SAM-3.

Rob Elliott moved that 02-245r0 be recommended to T10 for inclusion in SAM-3. Bill Galloway seconded the motion. In absence of objections, the motion passed unanimously.

### 5.3   SPC-3 Protocol-specific changes for SAS (02-246) [Elliott]

Rob Elliott presented 02-246r0, SPC-3 Protocol-specific changes for SAS. This document is a proposal for SPC-3 adding SAS information.

Rob Elliott moved that 02-246r0 be recommended to T10 for inclusion in SPC-3. Bill Galloway seconded the motion. In absence of objections, the motion passed unanimously.


## 6.   Review of Recommendations to the Plenary

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

Recommendations from the 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 the May 21, 2002 teleconference:
   none.

Recommendations from the June 5-7, 2002 working group 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.
   that 02-214r1 be recommended for inclusion in the SAS working draft.

Recommendations from the June 18, 2002 teleconference:
   that 02-204r1 be recommended for inclusion in the SAS working draft.
   that 02-197r2 (r1 as revised) be recommended for inclusion in the SAS working draft.

Recommendations from the June 24-26, 2002 working group meeting:
   that 02-196r2 (r1 as revised) be recommended to T10 for inclusion in SAS.
   that 02-201r3 (r2 as revised) be recommended to T10 for inclusion in SAS.
   that 02-205r3 (r2 as revised) be recommended to T10 for inclusion in SAS.
   that in state SMP_SFR1 in figure 69 in SAS-R00C, that the protocol violation and the failed frame confirma-
            tions be deleted and any corresponding text be deleted.
   that 02-245r0 be recommended to T10 for inclusion in SAM-3.
   that 02-246r0 be recommended to T10 for inclusion in SPC-3.

## 7.   Meeting Schedule

Serial Attached SCSI Working Group meetings are scheduled for:

   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 Shrewsbury, MA at Maxtor. Host contact: Mark Evans.

A SAS Protocol teleconference is scheduled for July 9, 2002:

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  Tuesday July 9, 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 Wednesday, June 26, 2002.