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

Doc. No.:	T10/03-122r0

Date: March 12, 2003
Reply to: John Lohmeyer

To: T10 Membership
From: Ralph Weber and John Lohmeyer
Subject: SAS Protocol WG -- Mar 10-11, 2003
           Dallas, TX

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. Old Business
    4.1   SAS Working Draft Review (SAS) [Elliott]
        4.1.1 4.6.7.5 Expander route index order wording (reflector messages)
        4.1.2 6.7.4.8.1 SP15 state SP to SL_IR handoff
        4.1.3 6.8 SP_DWS wording (reflector messages and 03-114) (Pak Seto, Intel and George Penokie, IBM)
        4.1.4 7.12.5.2 Subtractive port NO DESTINATION vs BAD DESTINATION (Rob Elliott, HP)
        4.1.5 7.14.2 SL transmitter and receiver BREAK should be ignored inside OPEN address frames (03-120) (George Penokie, IBM)
        4.1.6 7.16.1 SSP link layer - Livelock paragraph for port layer (note for Mark Evans, Maxtor)
        4.1.7 7.16.7.5 Concern on reflector about DONE Timeout vs. Credit Timeout (Brian Day, LSI Logic)
        4.1.8 7.16.7.10 SSP_TC should be a single state state machine (Rob Elliott, HP)
        4.1.9 7.16.7.11 SSP_TAN should be single state state machine (Rob Elliott, HP)
        4.1.10 8.1 Port layer rewrite (Mark Evans, Maxtor)
        4.1.11 10.2.9 SCSI vital product data - device name format waiting on CAP approval of 02-419 (Rob Elliott, HP)
        4.1.12 J SAS logo - need to resolve with SCSI Trade Association (John Lohmeyer, LSI Logic)
    4.2   SAS Disconnect-Reconnect Mode Parameters (02-324) [Gardner]
    4.3   CRC on Frame Header [Roberts]
    4.4   Transport Layer Retries (02-487) [Jones]
5. New Business
    5.1   SAS Revision 3 T10 letter ballot comment resolution (03-055) [Elliott]
    5.2   SAS Requests and Confirmations (03-023) [Evans]
    5.3   SAS Port Layer Description Modifications (03-024) [Evans]
    5.4   SAS logo or icon? [Penokie]
    5.5   SAS: SP_DWS Wording Changes (03-114) [Penokie]
    5.6   SAS: Terminating Discovery (03-115) [Nixon]
    5.7   SAS Invalid Initiator Connection Tag (03-119) [Day]
    5.8   SAS: Section 7 SL changes (03-120) [Penokie]
    5.9   SAS: SPC: Media Access Commands During SCSI Power Conditions (03-121) [Penokie]
    5.10   SAS: Scrambling Text [Coomes]
    5.11   SAS Timeline [Elliott]
    5.12   Transition SSP_TF2 to SSP_TF4 wording changes (03-126) [Penokie]
    5.13   UML Diagrams [Penokie]
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, March 10, 2003. He thanked Paul Aloisi and Bob Kando of Texas Instruments for hosting the meeting. As usual, the people present introduced themselves.

2.   Approval of Agenda

The draft agenda was approved with the following changes:

4.1.1   4.6.7.5 Expander route index order wording (reflector messages)
4.1.2   6.7.4.8.1 SP15 state
4.1.3   6.8 SP_DWS wording (reflector messages and 03-114) (Pak Seto, Intel and George Penokie, IBM)
4.1.4   7.12.5.2 Subtractive port NO DESTINATION vs BAD DESTINATION (Rob Elliott, HP)
4.1.5   7.14.2 SL transmitter and receiver BREAK should be ignored inside OPEN address frames (03-120) (George Penokie, IBM)
4.1.6   7.16.1 SSP link layer - Livelock paragraph for port layer (note for Mark Evans, Maxtor)
4.1.7   7.16.7.5 Concern on reflector about DONE Timeout vs. Credit Timeout (Brian Day, LSI Logic)
4.1.8   7.16.7.10 SSP_TC should be a single state state machine (Rob Elliott, HP)
4.1.9   7.16.7.11 SSP_TAN should be single state state machine (Rob Elliott, HP)
4.1.10 8.1 Port layer rewrite (Mark Evans, Maxtor)
4.1.11 10.2.9 SCSI vital product data - device name format waiting on CAP approval of 02-419 (Rob Elliott, HP)
4.1.12 J SAS logo - need to resolve with SCSI Trade Association (John Lohmeyer, LSI Logic)
5.10   SAS: Scrambling Text [Coomes]
5.11   SAS Timeline [Elliott]

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

5.12   Transition SSP_TF2 to SSP_TF4 wording changes (03-126) [Penokie]
5.13   UML Diagrams [Penokie]

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          Electronic Mail Address
---------------------- -- ------------------------ ------------------------
Mr. Ron Roberts         P  Adaptec, Inc.            rkroberts@aol.com
Mr. Robert H. Nixon     P  Emulex                   bob.nixon@emulex.com
Mr. Ralph O. Weber      P  ENDL Texas               roweber@acm.org
Mr. Mike Fitzpatrick    P  Fujitsu                  mfitzpatrick@fcpa.
                                                    fujitsu.com
Mr. Rob Elliott         P  Hewlett Packard Co.      Elliott@hp.com
Mr. Werner Glinka       AV Hitachi America          werner.glinka@attglobal.
                                                    net
```

```
Mr. Dan Colegrove      AV Hitachi Global Storage   dcolegro@us.ibm.com
                          Tech.
Mr. George O. Penokie  P  IBM / Tivoli Systems      gop@us.ibm.com
Mr. Cris Simpson       P  Intel Corp.               cris.simpson@intel.com
Mr. Robert Sheffield   A  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. Mark Evans         P  Maxtor Corp.              mark_evans@maxtor.com
Mr. Martin Czekalski   V  Maxtor Corp.              marty_czekalski@maxtor.
                                                    com
Mr. Nathan Obr         A# Microsoft Corp.           natobr@microsoft.com
Mr. Edward A. Gardner  AV Ophidian Designs          eag@ophidian.com
Mr. Curtis Stevens     V  Pacific Digital Corp.     cstevens@pacificdigital.
                                                    com
Mr. Bill Galloway      P  Pivot3, Inc.              billg@pivot3.com
Mr. Larrie Carr        V  PMC-Sierra, Inc.
Mr. Arie Krantz        V  QLogic Corp.              l_krantz@qlc.com
Mr. Jim Jones          A  Quantum Corp.             jim.jones@quantum.com
Mr. Gerald Houlder     P  Seagate Technology        gerry.houlder@seagate.com
Mr. Jim Coomes         V  Seagate Technology        jim.coomes@seagate.com
Mr. John Worden        V  Seagate Technology        john.worden@seagate.com
Mr. Vit Novak          P  Sun Microsystems, Inc.    vit.novak@sun.com
Mr. Robert Kando       A. Texas Instruments         Robert.Kando@ti.com
Mr. Phil Shelton       A  UNISYS Corporation        phil.shelton@unisys.com
Mr. Haluk Aytac        V  Velio                     haluk@velio.com
Mr. Kenneth Hirata     P  Vixel Corp.               Ken.Hirata@Vixel.com

30 People Present

Status Key:  P    -  Principal
             A,A# -  Alternate
             AV   -  Advisory Member
             L    -  Liaison
             V    -  Visitor
```

4.   Old Business

4.1 SAS Working Draft Review (SAS) [Elliott]

4.1.1   4.6.7.5 Expander route index order wording (reflector messages)

After discussing the reflector messages, the group concluded that in the absence of any specific proposed changes the SAS document will remain as written.

4.1.2   6.7.4.8.1 SP15 state SP to SL_IR handoff

Mark Evans described a problem where one end of a connection can miss an IDENTIFY due to clock tolerance and COMSAS detection tolerance. He proposed adding a 2 ms delay prior to transmitting the IDENTIFY.

Rob Elliott agreed to announce the problem and proposed solutions on the reflector, and the group agreed to consider a solution for the problem on the second day of the meeting.

George Penokie moved that IDENTIFY be accepted before the SNTT timer expires. Bill Galloway seconded the motion. In the absence of any objections, the motion passed unanimously. The SAS editor was instructed to incorporate the results of the motion as part of resolving the SAS letter ballot.

4.1.3   6.8 SP_DWS wording (reflector messages and 03-114) (Pak Seto, Intel and George Penokie, IBM)

This topic was covered under item 5.5.

4.1.4   7.12.5.2 Subtractive port NO DESTINATION vs BAD DESTINATION (Rob Elliott, HP)

The group agreed to change BAD DESTINATION to NO DESTINATION when a request comes in a subtractive routing port that cannot be forwarded to anywhere except back to the subtractive routing port.

4.1.5   7.14.2 SL transmitter and receiver BREAK should be ignored inside OPEN address frames (03-120) (George Penokie, IBM)

This topic was discussed under item 5.8.

4.1.6   7.16.1 SSP link layer - Livelock paragraph for port layer (note for Mark Evans, Maxtor)

Mark agreed to include this issue in his proposal (03-024), which was discussed later in the meeting (see 5.3).

4.1.7   7.16.7.5 Concern on reflector about DONE Timeout vs. Credit Timeout (Brian Day, LSI Logic)

Brian Day described a race condition that occurs when one end of a connection sends DONE but doesn't give the other end credits. George Penokie stated that this race condition is no different from several other conditions and therefore no changes are required. The group eventually agreed to make a change such that the DONE timer is not started unless the device knows that credit is available at the other device or a CREDIT BLOCKED has been sent to the other device.

George agreed to incorporate the changes that are needed in the next revision of 03-114, which was discussed later in the meeting.

4.1.8   7.16.7.10 SSP_TC should be a single-state state machine (Rob Elliott, HP)

George Penokie agreed to incorporate the resolution for this issue in 03-120.

4.1.9   7.16.7.11 SSP_TAN should be single-state state machine (Rob Elliott, HP)

George Penokie agreed to incorporate the resolution for this issue in 03-120, which was discussed later in the meeting.

4.1.10   8.1 Port layer rewrite (Mark Evans, Maxtor)

This topic was covered under item 5.3.

4.1.11   10.2.9 SCSI vital product data - device name format waiting on CAP approval of 02-419 (Rob Elliott, HP)

Rob Elliott noted that if CAP approves 02-419, SAS would be changed accordingly.

Rob asked that discussion of this topic be deleted from future agendas.

4.1.12   J SAS logo - need to resolve with SCSI Trade Association (John Lohmeyer, LSI Logic)

This topic was discussed under item 5.4.

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

Ed Gardner asked that discussion of this topic be removed from future agendas.

4.3 CRC on Frame Header [Roberts]

Ron Roberts asked that this topic be deferred to SAS-2.

4.4 Transport Layer Retries (02-487) [Jones]

Jim Jones proposed that this topic be deferred to SAS-2, provided that it can be considered a high-priority item in the SAS-2 effort. George Penokie noted that it is a high-priority item for his company.

5.   New Business

5.1 SAS Revision 3 T10 letter ballot comment resolution (03-055) [Elliott]

Rob Elliott noted that the following documents are relevant:

    03-055r4.pdf - comments sorted by author
    03-055r4.zip - contains a zip file with sas-r03 with comments (PDF database)
    sas-r03e.pdf - latest version of SAS
    sas-r03e.zip - Frame source for SAS rev 3e

Rob Elliott led the group in a discussion of the letter ballot comments on SAS. Rob summarized the status of the comment resolution (as of the beginning of the meeting) as follows:

```
Total comments: 2727
 Accept - Done: 2046
 Accept - Last: 5
 Accept - Todo: 3
 Reject (only): 569
     Port todo: 90
         Refer: 11
   Todo (only): 1
          Left: 2
  Total worked: 2725 (99.93%)
```

Rob reviewed several comment resolutions where a need for general agreement was indicated.

George Penokie moved that all references to RBC and the RBC amendment be removed from SAS. Cris Simpson seconded the motion. The motion passed on a vote of 6:3:4.

The group reviewed a preliminary proposal (no number assigned) from Bob Sheffield for new text describing the use of the STP Affiliation feature and requested several modifications.

5.2 SAS Requests and Confirmations (03-023) [Evans]

Mark Evans ask that discussion of this topic be deferred to the next meeting.

5.3 SAS Port Layer Description Modifications (03-024) [Evans]

Mark Evans presented a proposed changed to the SAS port layer description (03-024r1). The group advised Mark regarding the resolution of three issues listed in the introduction to the proposal. Then the group reviewed the proposal in detail, recommending several wording changes. Mark agreed to prepare a new revision of the proposal.

5.4 SAS logo or icon? [Penokie]

John Lohmeyer reported that George sent a e-mail to STA detailing the SAS issues with using the trademarked STA logo. John Lohmeyer and Marty Czekalski discussed the conversion of the STA logo to a SAS icon. Rob Elliott noted that we need a resolution this week. However, a final resolution for the issue was not available before the meeting adjourned.

Chair's note:Shortly after the meeting, the STA Board agreed to allow usage of a SAS icon, which is essentially the same as the SAS logo minus all lowercase test. See the STA Liaison Report in the T10 minutes (03-124).

5.5 SAS: SP_DWS Wording Changes (03-114) [Penokie]

George Penokie presented proposed changes to the dword synchronization wording (03-114r2).

George Penokie moved that 03-114r2 be incorporated into SAS as part of the letter ballot resolution. Bill Galloway seconded the motion. In the absence of any objections, the motion passed unanimously.

5.6 SAS: Terminating Discovery (03-115) [Nixon]

Bob Nixon presented a proposal to allow a discovery operation to be terminated in the event that the discovery data appears to be incorrect (03-115r0). The group requested minor changes and Bob agreed to prepare a revised proposal. The group recommended that 03-115r1 (r0 as revised) be accepted as resolving a letter ballot comment.

5.7 SAS Invalid Initiator Connection Tag (03-119) [Day]

Brian Day presented a proposal concerning the handling of invalid initiator connection tags (03-119r0). The group instructed the editor to incorporate 03-119r0 in SAS as part of the letter ballot resolution.

5.8 SAS: Section 7 SL changes (03-120) [Penokie]

George Penokie presented revised SL state diagram changes (03-120r0). The proposal included an explicit statement that BREAKs be ignored during a receipt of an address frame. Jim Coomes argued that the proposal requires transmitters to be more complicated.

The group requested several changes and George agreed to prepare a revised proposal.

George Penokie moved that 03-120r1 (r0 as revised) be accepted for inclusion in SAS. Bill Galloway seconded the motion. The motion passed on a vote of 8:1:1.

Later in the meeting, George Penokie moved that 03-120r2 be accepted for inclusion in SAS, replacing r1, which was accepted previously. Bill Galloway seconded the motion. The motion passed on a vote of 13:0:0.

5.9 SAS: SPC: Media Access Commands During SCSI Power Conditions (03-121) [Penokie]

George Penokie presented a proposal to clarify that media access commands are not functional in the Active_Wait power condition (03-121r0). Mark Evans agreed to cut the material from George's proposal and paste it in his proposal 02-464. Rob Elliott noted that the SAS aspects of the proposal have already been incorporated in rev 03e.

5.10 SAS: Scrambling Text [Coomes]

Jim Coomes presented a proposal to revise and correct the SAS text describing the scrambling algorithm (a draft of 03-129r0). The group discussed the proposal and requested minor changes. The group instructed the editor to incorporate 03-129r0 in SAS to resolve a letter ballot comment.

5.11 SAS Timeline [Elliott]

Rob Elliott presented an e-mail describing the anticipated course of events in the completion of development of SAS.

Concerns were raised about allowing time for rebuttals concerning comments that have been rejected. Rob acknowledged that time must be left for rebutting rejected comments.

The process for getting SAS published as a ISO standard was also discussed.

5.12 Transition SSP_TF2 to SSP_TF4 wording changes (03-126) [Penokie]

George Penokie presented a proposal to clear up the wording for the TF2 to TF4 transition (02-126r0), specifically when the transition takes place. The group requested changes and George agreed to prepare a new revision.

George Penokie moved that 03-126r1 (r0 as revised) be recommended for inclusion in the SAS letter ballot resolution. Mark Evans seconded the motion. In the absence of any objections, the motion passed unanimously.

5.13 UML Diagrams [Penokie]

George Penokie requested that this topic be removed from future agendas.

6.   Review of Recommendations

The following documents were accepted for inclusion in SAS during this meeting:

    03-114r2, SP_DWS Wording Changes
    03-115r1, Terminating Discovery
    03-119r0, SAS Invalid Initiator Connection Tag
    03-120r2, Section 7 SL changes
    03-129r0, Scrambling Text
    03-126r1, Transition SSP_TF2 to SSP_TF4 wording changes

The following recommendations were made during this meeting:

    that IDENTIFY be accepted before the SNTT timer expires
    that BAD DESTINATION be chanted to NO DESTINATION when a request comes in a subtractive routing port
                that cannot be forwarded to anywhere except back to the subtractive routing port
    that all references to RBC and the RBC amendment be removed from SAS

The following documents were accepted for inclusion in SAS during the February 24-25, 2003 meeting:

    03-034r4, SAS Expander internal devices
    03-089r0, SAS PHY CHANGE COUNT
    03-091r1, SAS Target Port Transfer Tag
    03-109r1, SAS STP affiliations

03-112r0, SAS SL_IR state receiving IDENTIFY frames

The following motions were passed during the February 24-25, 2003 meeting:

that in section 7.8.2, 'the application client within an initiator device shall perform a discovery process' be changed to 'the application client within an initiator device should perform a discovery process' (i.e., 'shall' becomes 'should').

that a new confirmation, Done Received, be added to the port layer and that the same confirmation be added from the port layer to the transport layer and from the transport layer to the application layer.

that the statement in 7.12.4.1 that says "This state shall not respond to incoming BREAKs, OPEN_REJECTs, and OPEN_ACCEPTs until after the OPEN address frame has been transmitted." be changed to "This state shall not respond to incoming OPEN_REJECTs or OPEN_ACCEPTs until after the OPEN address frame has been transmitted."

that the SATA references be changed to the appropriate document references in T13.

that the T10 Vice Chair contact STA and request usage of the STA logo for SAS with no restrictions.

The following recommendations were made during the January 13-14, 2003 meeting:

Accept the comment in 7.1.4.4 that increases the number of broadcast primitives from 4 to 8. [14:0:4]

Make one of the new broadcast-reserved primitives a broadcast-reserved-changed primitive. [16:2:3]

Accept the comment regarding the 20 dword rule in 7.1.6.3. [11:0:6]

Remove the 64 entry limit of the number of indices in fanout expanders.[10:1:6]

Remove near end analog loop back. [8:2:10]

Remove note 12. [5:1:10]

SAS Definitions (03-022r1) [Evans] {r0 as revised, unanimous}

SAS SMP error codes (03-058r0) [Fairchild] {unanimous}

7.   Meeting Schedule

SAS Protocol Working Group meetings are scheduled for:

Monday-Tuesday, May 5-6, 2003 commencing at 9 a.m. in Nashua, NH at the Crowne Plaza Nashua (603-886-1200), hosted by Hitachi Cable Manchester.

Additional teleconference calls may be announced on the T10 reflector as needed.

8.   Adjournment

The meeting was adjourned at 6:55 p.m. on Tuesday March 11, 2003.