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

Doc. No.: T10/02-322r0

Date: August 23, 2002
Reply to: John Lohmeyer

To: T10 Membership
From: John Lohmeyer
Subject: SAS Protocol Working Group -- August 21-23, 2002

Agenda

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Results of Meeting

1.   Opening Remarks

John Lohmeyer called the meeting to order at 9:00 a.m., Wednesday, August 21, 2002. He thanked Mark Evans of Maxtor for hosting the meeting.

2.   Approval of Agenda

The draft agenda was approved with the following changes:

    5.3   SAS Relative Offset (02-319) [Gardner]

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

    5.4   SAS Simplified Arbitration (02-320) [Gardner]
    5.5   SAS Data Corruption Problem (02-323) [Gardner]

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. 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. Joe Vincent        V  Hitachi America          joe.vincent@hal.hitachi.
                                                   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. 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. Jeffrey Rogers     V  LSI Logic Corp.          jeff.rogers@lsil.com
Mr. Mark Evans         P  Maxtor Corp.             mark_evans@maxtor.com
Mr. Steve Byan         V  Maxtor Corp.             stephen_byan@maxtor.com
Mr. David Cressman     V  Maxtor Corp.             dave_cressman@maxtor.com
Mr. Martin Czekalski   V  Maxtor Corp.             marty_czekalski@maxtor.
                                                   com
Mr. David Griffith     V  Maxtor Corp.             dave_griffith@maxtor.com
Mr. Edward A. Gardner  P  Ophidian Designs         eag@ophidian.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

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 Working Draft Review [Elliott]

Rob Elliott presented SAS-R01.

Ed Gardner asked several questions of the group relative to SSP data transfers and error handling:

Q. With a bi-directional command, can the data-in and data-out transfers proceed concurrently? E.g. can a target send XFER_RDY, then send DATA frames for the data-in transfer without waiting for all DATA frames for the data-out transfer to arrive?
A. Yes, provided the definition of the command does not require the data-in and data-out transfers to be performed in a specific order.

Q. Has any thought been given whether data striping might be allowed or required in SAS-2? Data striping means transferring data for a single command (in a single direction) simultaneously on multiple connections.
A. There are no plans to include this in SAS-2.

Q. When an initiator issues a task management function that aborts one or more commands, who is responsible for terminating any XFER_RDYs that may be outstanding for those commands?
A. The initiator is expected to terminate data transfer for any XFER_RDYs for the affected commands before it issues the task management function.

Q. When an initiator encounters a failure transmitting a DATA frame (data-out transfer), how is the error communicated to the target?
A. The initiator may continue or abandon the data-out transfer. The target will detect that insufficient data has been delivered after a timeout (unless the initiator issues a TASK ABORT).

Jim Coomes and Mark Evans agreed to prepare a proposal to report SAS transmission errors. This may include SMP, mode pages, and/or log pages.

George Penokie presented an email he had received identifying an issue if a target detects an error while there is an outstanding transfer ready. The group proposed that a rule be added that the target shall not send the response frame until all data associated with the XFER_RDY have been received.

George Penokie moved that it be recommended that SAS be modified to require targets to not send a response frame for a command until all data associated with any outstanding XFER_RDY for that command have been received. John Lohmeyer seconded the motion. The motion passed 6:0:0.

George presented a second email identifying a conflict between figure 16 and the link rate field definition on page 111. The conflict was viewed as editorial and Rob Eliiott agreed to correct the link rate definition.

George Penokie moved that it be recommended that the open originator shall start rate matching on the next dword after the OPEN address frame has been transmitted. John Lohmeyer seconded the motion. The motion passed 7:0:0.

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

John Worden reviewed 02-202r2, SAS Port Control State Diagram Update. He received extensive input and agreed to prepare a revision 3. Later in the meeting, John presented updated state diagrams and received tentative approval.

George Penokie noted that an initiator with a wide port consisting of four physical links connected to four narrow targets can have four concurrent connections with each of the four targets. Wording in the SAS working draft may need revision to make this concept clear. George agreed to prepare a proposal.

4.3 SAS COMMAND ID Removal (02-259) [Day]

Brian Day presented 02-259r1, SAS COMMAND ID Removal. The group was in general agreement with removing the COMMAND ID, but the detailed impacts on the transport state machine need to be fleshed out.

Brian Day moved that 02-259r1 be recommended for inclusion in SAS. Jim Coomes seconded the motion. There was some discussion about the effect of the motion. It was noted that the only changes to SAS at this point would be:

- Remove the field from section 9.2.1 Frame Format
- Remove the words "(based on the COMMAND_ID field and the I_T_L_Q)," from section 9.2.5.4

The motion passed 8:0:1.

Brian agreed to talk to Mark Evans and John Worden about any other impacts of allowing his implementation and to write another proposal if necessary. It was noted that there may be a few more instances of references to COMMAND ID that also need to be expunged.

4.4 Initiator based discovery and configuration of the SAS topology, proposal (02-279) [Fairchild]

Steve Fairchild presented 02-279r3, Initiator based discovery and configuration of the SAS topology. He reviewed the changes, received input, and agreed to prepare a revision 4.

Steve Fairchild moved that 02-279r4 (r3 as revised) (changes 1 through 13) be recommended for inclusion into SAS. Tim Hoglund seconded the motion. The motion passed 8:0:0.

4.5 Arbitration clarification (02-222) [Galloway]

In the absence of Bill Galloway, this topic was deferred.

4.6 SAS SSP target transport layer state machines (02-287) [Evans]

Mark Evans asked that this item be dropped as the target transport state diagram is included in 02-307.

4.7 SAS - OOB and DWS state machines update (02-300) [Grieff]

In the absence of Tom Grieff, this topic was deferred.

4.8 SAS Combined Request-Configuration List (02-276) [Worden]

John Worden presented 02-276r1, SAS Combined Request-Configuration List. He received input and agreed to prepare a revision 2.

4.9 Rate Change Delay in speed negotiation window [Grieff]

In the absence of Tom Grieff, this topic was deferred.

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

Based on the input from the July CAP and T10 meetings, Mark Evans moved that it be recommended that AEN be removed from SAS. George Penokie seconded the motion. The motion passed 8:0:1.

5. New Business

5.1 SAS SSP transport layer state machines (02-307) [Mark Evans]

Mark Evans presented 02-307r0, SAS SSP transport layer state machine. This document includes 02-287, SAS SSP target transport layer state machines. Mark received input and agreed to prepare a revision 1.

5.2 SAS Data Transfer Rules (02-318) [Gardner]

Ed Gardner presented 02-318r0, SAS Data Transfer Rules. The proposal would add additional restrictions to the data transfer rules and improve wording in a number of places. Mark Evans agreed to make several of the wording improvements in sub-clause 9.2. The overall proposal was deferred to the September meeting to get a wider review.

5.3 SAS Relative Offset (02-319) [Gardner]

Ed Gardner presented 02-319r0, SAS Relative Offset. This proposal would add an optional relative offset function to SAS. Ed received input and agreed to revise his proposal.

5.4 SAS Simplified Arbitration (02-320) [Gardner]

Ed Gardner presented 02-320r0, SAS Simplified Arbitration. The scheme uses a hierarchical structure that Ed claims is guaranteed to be deadlock free and simpler than today's method. It is extensible to larger topologies that currently supported.

Ed noted that he feels there are legitimate intellectual property claims in his proposal, but he does not plan to pursue these claims. Should he obtain such claims, he would be willing to comply with the ANSI patent policy.

There were concerns that changing direction now would impact schedules.

5.5 SAS Data Corruption Problem (02-323) [Gardner]

Ed Gardner presented 02-323r0, SAS Data Corruption Problem. There was debate whether or not the case Ed describes is 'corruption' or not. Mark Evans noted that he was adamantly opposed to any of Ed's proposed solutions.

The topic was deferred.

6. Review of Recommendations to the Plenary

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

> that it be recommended that SAS be modified to require targets to not send a response frame for a command until all data associated with any outstanding XFER_RDY for that command have been received.
> that it be recommended that the open originator shall start rate matching on the next dword after the OPEN address frame has been transmitted.
> that 02-259r1 be recommended for inclusion in SAS.
> that 02-279r4 (r3 as revised) (changes 1 through 13) be recommended for inclusion into SAS.
> that it be recommended that AEN be removed from SAS.

7. Meeting Schedule

SAS Protocol Working Group meetings are scheduled for:

> Monday-Tuesday, September 9-10, 2002 commencing at 1:00 p.m. on Monday and ending at 5:00 p.m. on Tuesday in Minneapolis, MN at the Hilton Minneapolis/St. Paul Airport Hotel (952-854-2100).

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 Issues Study Group meeting is tentatively scheduled for Wednesday, September 11, 2002 beginning at 9:00 a.m. and ending at noon. This meeting will be chaired by Ron Roberts and the intent is to identify any issues with the STP protocol.

George Penokie agreed to host a SAS Protocol teleconference:

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   Tuesday September 3, 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: 877-921-6914
           Toll Number: +1-712-923-0332
   Participant Passcode: 338024

WebEx Session: http://seagate.webex.com/
 Meeting Name: SAS Protocol teleconference
     Password: Carol18
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It is likely that there will be another SAS protocol teleconference call on September 24th, but the need will be determined at the September working group meeting.

An editing meeting is tentatively planned for October 3-4, 2002 in Houston, TX.

8.   Adjournment

The meeting was adjourned at approximately noon on Friday, August 23, 2002.