

Accredited Standards Committee\*

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

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Date: January 10, 2006

Reply to: John Lohmeyer

To: T10 Membership  
From: Ralph Weber and John Lohmeyer  
Subject: SAS Protocol WG -- January 9, 2006  
Phoenix, AZ

## Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. Old Business
  - 4.1 SAS-2 protocol for changing driver amplitude (03-285) [Evans]
  - 4.2 SAS-2 More counters (04-172) [Elliott]
  - 4.3 SAS-2 Zoning (05-144) [Symons, Laio and Grieff]
  - 4.4 SAS-2 Add device name to IDENTIFY address frame (05-309) [Elliott]
5. New Business
  - 5.1 SAS 1.1 Expander Issues-092805 (05-373 & 06-054) [Stoops/Elliott]
  - 5.2 SAS-2 Multiplexing (05-381) [Elliott]
  - 5.3 SAS-2 Wide SSP target port simultaneous connection rules (05-322) [Elliott]
  - 5.4 Redundant Primitive Sequence Handling - Text for SAS 2.0 (06-028) [Gorshe]
  - 5.5 Zone Broadcast Frame (06-042) [Symons]
  - 5.6 Zone supervisor election process (06-043) [Symons]
  - 5.7 SAS2 BROADCAST (SCSI ASYNCHRONOUS EVENT) (06-044r0) [Fairchild]
  - 5.8 SAS-2 Expander Configuration Supervisor and SMP CHANGE Request (06-029r0) [Weber and Johnson]
  - 5.9 SAS-2 zoning enhancements (06-048r0) [Hoglund]
  - 5.10 SAS-2 SMP Lists (06-037) [Johnson]
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, January 9, 2006. He thanked Bob Sheffield of Intel for hosting the meeting. As usual, the people present introduced themselves.

### 2. Approval of Agenda

The draft agenda was approved with no changes.

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The following agenda additions and changes were made during the course of the meeting:

5.10 SAS-2 SMP Lists (06-037) [Johnson]

### 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                 |
|-----------------------|----|------------------------------|
| Mr. William Lynn      | P  | Adaptec, Inc.                |
| Ms. Pat Thaler        | P  | AvagoTechnologies            |
| Mr. Ron Roberts       | A  | Broadcom Corp.               |
| Mr. Steve Robalino    | A  | Dallas Semiconductor         |
| Mr. Kevin Marks       | P  | Dell, Inc.                   |
| Mr. David Black       | A  | EMC Corp.                    |
| Mr. Kenneth Hirata    | A  | Emulex                       |
| Mr. Robert H. Nixon   | P  | Emulex                       |
| Mr. Ralph O. Weber    | P  | ENDL Texas                   |
| Mr. Walt Hubis        | V  | Engenio Information Tech.    |
| Mr. Nathan Hastad     | P  | General Dynamics             |
| Mr. Rob Elliott       | P  | Hewlett Packard Co.          |
| Mr. Steven Fairchild  | V  | Hewlett Packard Co.          |
| Mr. Dan Colegrove     | P  | Hitachi Global Storage Tech. |
| Mr. George O. Penokie | P  | IBM Corp.                    |
| Mr. Pak Seto          | V  | Intel Corp.                  |
| Mr. Robert Sheffield  | P  | Intel Corp.                  |
| Mr. Dennis Moore      | AV | KnowledgeTek, Inc.           |
| Mr. Brad Besmer       | V  | LSI Logic Corp.              |
| Mr. Brian Day         | V  | LSI Logic Corp.              |
| Mr. Tim Hoglund       | V  | LSI Logic Corp.              |
| Mr. Steve Johnson     | V  | LSI Logic Corp.              |
| Mr. John Lohmeyer     | P  | LSI Logic Corp.              |
| Mr. Avraham Shimor    | P  | M-Systems                    |
| Mr. Jim Walch         | V  | Marvell Semiconductor, Inc.  |
| Mr. Mark Evans        | P  | Maxtor Corp.                 |
| Mr. Truong Nguyen     | V  | PMC-Sierra                   |
| Mr. Tim Symons        | P  | PMC-Sierra                   |
| Dr. Steve Gorshe      | V  | PMC-Sierra, Inc.             |
| Mr. Craig W. Carlson  | A  | QLogic Corp.                 |
| Mr. Gerald Houlder    | P  | Seagate Technology           |
| Mr. William Martin    | P  | Sierra Logic, Inc.           |
| Mr. Vit Novak         | P  | Sun Microsystems, Inc.       |
| Mr. Anders Liverud    | V  | Tandberg Storage             |
| Mr. Ed D'Avignon      | V  | Vitesse Semiconductor        |
| Mr. Gregory Tabor     | P  | Vitesse Semiconductor        |
| Mr. Jeff Williams     | P  | Xiotech Corp.                |
| Mr. Bob Hansen        | V  | Xyratex                      |

38 People Present

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

## 4. Old Business

### 4.1 SAS-2 protocol for changing driver amplitude (03-285) [Evans]

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

### 4.2 SAS-2 More counters (04-172) [Elliott]

Rob Elliott presented a proposal to add counters to the SAS Protocol-Specific Log Page (04-172r3). An editorial issue was raised regarding the usage of keys in table 1.

Concerns were raised about using a reserved Broadcast primitive and overloading Broadcast primitives was discussed inconclusively. Rob mentioned that two other proposals on the agenda were requesting assignment from the available set of four reserved Broadcast primitives (see agenda items 5.7 and 5.8).

Rob agreed to prepare a new revision of the proposal. Rob Elliott moved that 06-055r0 (04-172r3 as revised) be recommended for inclusion in SAS-2. Gerry Houlder seconded the motion. The group requested additional changes in the description of the Broadcast primitive and Rob agreed to further revise the proposal. The motion passed 10:5:4.

### 4.3 SAS-2 Zoning (06-019) [Symons, Laio and Griefff]

Tim Symons presented the revised SAS-2 Zoning proposal (06-019r1). Technical problems had been raised in the form of '*competing*' proposals (see agenda items 5.8 and 5.9) and editorial comments were provided to Tim during the presentation.

Tim agreed to prepare a new revision of the proposal for consideration at the next meeting.

Rob Elliott called for weekly teleconferences to resolve the outstanding issues among the various SAS-2 Zoning proposals. Steve Johnson agreed to host the teleconferences on Thursday mornings. John Lohmeyer added the calls to the T10 Events Schedule. Steve agreed to post announcements on the T10 Reflector.

### 4.4 SAS-2 Add device name to IDENTIFY address frame (05-309) [Elliott]

Rob Elliott presented a proposal to add device name information to the SAS-2 IDENTIFY address frame (05-309r2). The group requested that a length be represented in dwords not bytes and Rob agreed to revise the proposal.

Rob Elliott moved that 05-309r3 (r2 as revised) be recommended for inclusion in SAS-2. Ron Robert seconded the motion. In the absence of objections, the motion passed unanimously.

## **5. New Business**

### **5.1 SAS 1.1 Expander Issues-092805 (05-373 & 06-054) [Stoops/Elliott]**

Rob Elliott presented responses (06-054r0) to issues raised by Expert IO (05-373r2). Minor corrections were requested by the group and Rob agreed to prepare a new revision of 06-054.

Rob Elliott moved that 06-054r1 be recommended for inclusion in SAS-2. Tim Hoglund seconded the motion. In the absence of any objections, the motion passed unanimously.

### **5.2 SAS-2 Multiplexing (05-381) [Elliott]**

Rob Elliott presented a proposal to add link-level dword multiplexing (05-381r). The group requested that MUX primitives be sent with some frequency to verify the correct ordering of the multiplexed data as well as changes to address other issues.

Rob agreed to revise the proposal for consideration at the next meeting.

### **5.3 SAS-2 Wide SSP target port simultaneous connection rules (05-322) [Elliott]**

Rob Elliott presented a proposal to add recommendations regarding target usage of simultaneous connections on wide links (05-322r1). Editorial concerns were raised. George Penokie asked that figures be drawn showing the cases of concern.

Rob agreed to revise the proposal for consideration at the next meeting.

### **5.4 Redundant Primitive Sequence Handling - Text for SAS 2.0 (06-028) [Gorshe]**

Steve Gorshe presented a proposal to modify Redundant Primitive Sequence handling to support Decision Feedback Equalization (06-028r0). The proposal contained two wording options and the group rejected the second option because of its dependency on DFE support. Steve agreed to prepare a new revision of the proposal.

Concerns were raised that some figures already in SAS-2 also needed revision, but no such figures could be located.

Steve Gorshe moved that 06-028r1 (r0 as revised) be recommended for inclusion in SAS-2. Rob Elliott seconded the motion. In the absence of any objections, the motion passed unanimously.

### **5.5 Zone Broadcast Frame (06-042) [Symons]**

Tim Symons presented a review of the Zone Broadcast frame usage (06-042r0) in the latest SAS-2 Zoning proposal (see agenda item 4.3). The group expressed dissatisfaction having two Broadcast frame sizes and recommended that the 32-byte frame should be the one and only frame size. Tim agreed to revise 06-019 accordingly.

### **5.6 Zone supervisor election process (06-043) [Symons]**

Tim Symons presented a review of the Zone Supervisor Election Process (06-042r0) in the latest SAS-2 Zoning proposal (see agenda item 4.3). The group requested that the details shown in the presentation be incorporated in 06-019 and Tim agreed to do so.

The discussion under agenda item 5.8 led to the possibility that the Zone Supervisor Election Process might be completely replaced. Tim stated that the selection of what 06-019 changes to be made would be determined outside the meeting in consultation with his co-authors.

## **5.7 SAS2 BROADCAST (SCSI ASYNCHRONOUS EVENT) (06-044r0) [Fairchild]**

Steve Fairchild presented a proposal to define a Broadcast primitive whose objective was eliminating command timeouts by providing timely notification of reset events (06-044r0). George Penokie complained about the degree of changes being requested in disks.

After several alternatives were discussed, Kevin Marks suggested requiring Link Resets on all Phys (not just all Phys associated with the 'reset' port) as a way of providing the needed notification (via Broadcast Change primitives) that would be more compatible with existing implementations.

Steve agreed involved disk manufacturers in an ongoing discussion of the alternatives (both those discussed in the proposal and those suggested during the meeting) for reaching the stated objectives of the original proposal.

It was not clear whether Steve would revise 06-044 or develop a new proposal.

## **5.8 SAS-2 Expander Configuration Supervisor and SMP CHANGE Request (06-029r0) [Weber and Johnson]**

Ralph Weber presented a proposal to generalize the Zoning Supervisor duties and election process (06-029r0). He noted that this proposal built upon several of the ideas discussed under agenda item 5.6 and superseded some of the specific details of the currently proposed Zoning Supervisor definition (see 06-019r1).

Rob Elliott was opposed to the 06-029 proposal because it moved SAS-2 away from having self-configuring expanders, which he felt was a major improvement.

Several flaws were identified in 06-029 and Ralph agreed to prepare a new revision.

George Penokie expressed concerns that too much meeting time would have to be devoted to correcting both 06-019 and 06-029 to the point where they could be recommended for inclusion in SAS-2. Rob Elliott countered with calls for holding frequent teleconferences. George was not satisfied that sufficient limitations had been placed on the allocation of meeting resources.

George Penokie moved that this working group will expend resources and meeting time resolve the supervisor issues relating to a) a single entity to manage the entire domain (per 06-029) or b) a single entity to manage only zoning (per 06-019). Kevin Marks seconded the motion.

Pat Thaler moved to defer consideration of the motion to the next meeting. Bill Martin seconded the motion to defer consideration. The motion to defer consideration passed 15:2:4.

John Lohmeyer agreed to put consideration of the deferred motion on the agenda for the next meeting.

Tim Hogle asked for a straw poll demonstrating support for the Supervisor Model in each of the two proposals. The results of the straw poll were 11 votes in support of the 06-029 model, 4 votes in support of the 06-019 model, and 13 abstentions.

## **5.9 SAS-2 zoning enhancements (06-048r0) [Hogle]**

Tim Hogle presented a proposal expand the method by which zoning groups are assigned to use source SAS Address as an optional alternative to source Phy (06-048r0). The group suggested improvements in the text.

Tim agreed to prepare a new revision for consideration at the next meeting.

### **5.10 SAS-2 SMP Lists (06-037) [Johnson]**

Steve Johnson presented a proposal to reduce the number of SMP request/response transactions required to read/write configuration data (06-037r0). The group requested changes in the proposal.

Steve agreed to prepare a new revision for consideration at the next meeting.

## **6. Review of Recommendations**

The following document was recommended for inclusion in SAS-2 during this meeting:

For inclusion in SAS-2:

06-055r0 (More counters) [Elliott]

05-309r3 (Add device name to IDENTIFY address frame) [Elliott]

06-028r1 (Redundant Primitive Sequence Handling) [Gorshe]

06-054r1 (Expander Issues) [Elliott]

## **7. Meeting Schedule**

A SAS Protocol Working Group meeting is scheduled for:

Monday, March 6, 2006 commencing at 9:00 a.m. in Hilton Head, SC at the Hilton Ocean Front Resort (843-341-8013) hosted by the SCSI Trade Association.

Teleconference calls will be announced on the T10 reflector as needed.

## **8. Adjournment**

The meeting was adjourned at 6:50 p.m. on Monday January 9, 2006.